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Job Task Analysis for ARDMS Adult Echo Specialty

May 30, 2007

Analysis Summary For: Adult Echo Sonography Exam

Survey Dates:	March 5, 2007 -March 26, 2007
Invited Respondents:	2,999
Surveys with Demographics:	1106 (completed demographics section)
Completed Surveys:	910 (completed all responses)
Response Rate, Completed Surveys:	30.3%

Demographics

Educational Level

Educational Level		
	N	Percent
Missing	7	1%
On-the-job training (apprenticeship)	185	17%
Formal education certificate program	227	21%
Formal education Associates degree	301	27%
Formal education Bachelors degree	296	27%
Formal education Masters degree	34	3%
Formal education MD	51	5%
Formal education PhD	5	0%
Total	1106	

Table 1. Education-All Survey Respondents

Graphically, the educational level is represented below.

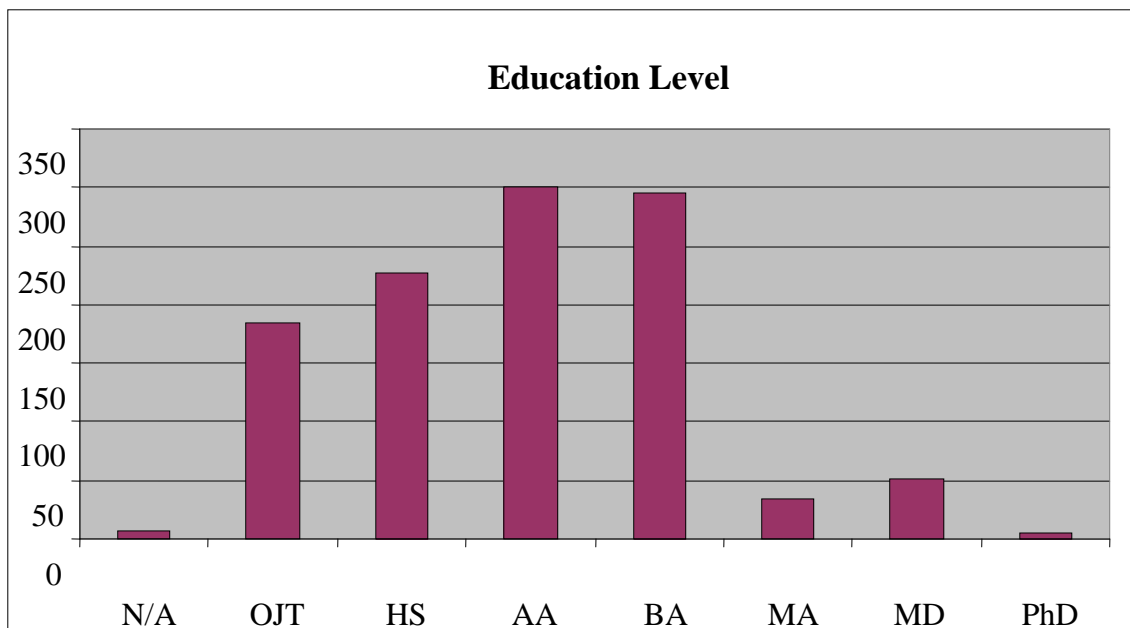


Figure 1. Educational Level

CAAHEP

CAAHEP is the largest programmatic accrediting organization in the health sciences field. In collaboration with its Committees on Accreditation, CAAHEP reviews and accredits nearly 2000 educational programs in nineteen (19) health science occupations. CAAHEP is recognized by the Council for Higher Education Accreditation ([CHEA](#)).

Respondents were asked whether they had graduated from a CAAHEP-approved program.

CAAHEP Graduate	N	Percent
Missing	12	1%
No	641	58%
Yes	453	41%
Total	1,106	

Table 2. CAAHEP Graduate

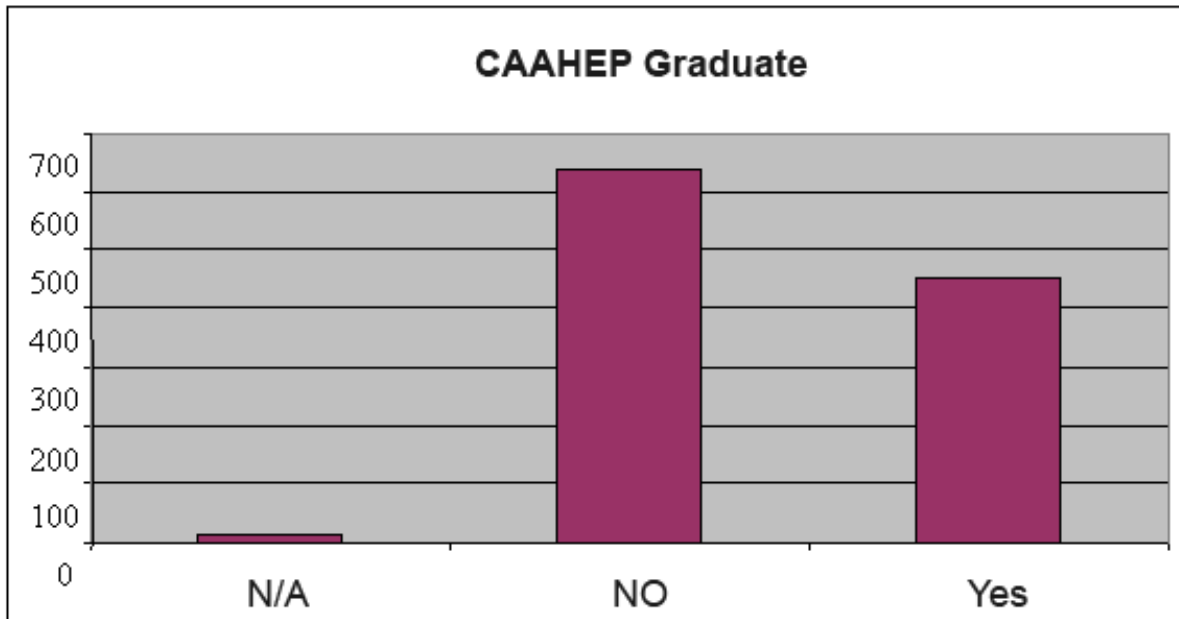


Figure 2. CAAHEP Graduate

Adult Echo Exams performed/ Month

Table 3. Adult Echo Exam/Month shows the number of exams respondents typically conduct per month in their practices.

Adult Echo Exams/ Month	N	Percent
Missing	11	3%
0-25	181	16%
26-50	198	18%
51-100	336	30%
More than 100	380	34%
Total	1106	

Table 3. Adult Echo Exams/Month

Exams per month are represented graphically below in Figure 3.

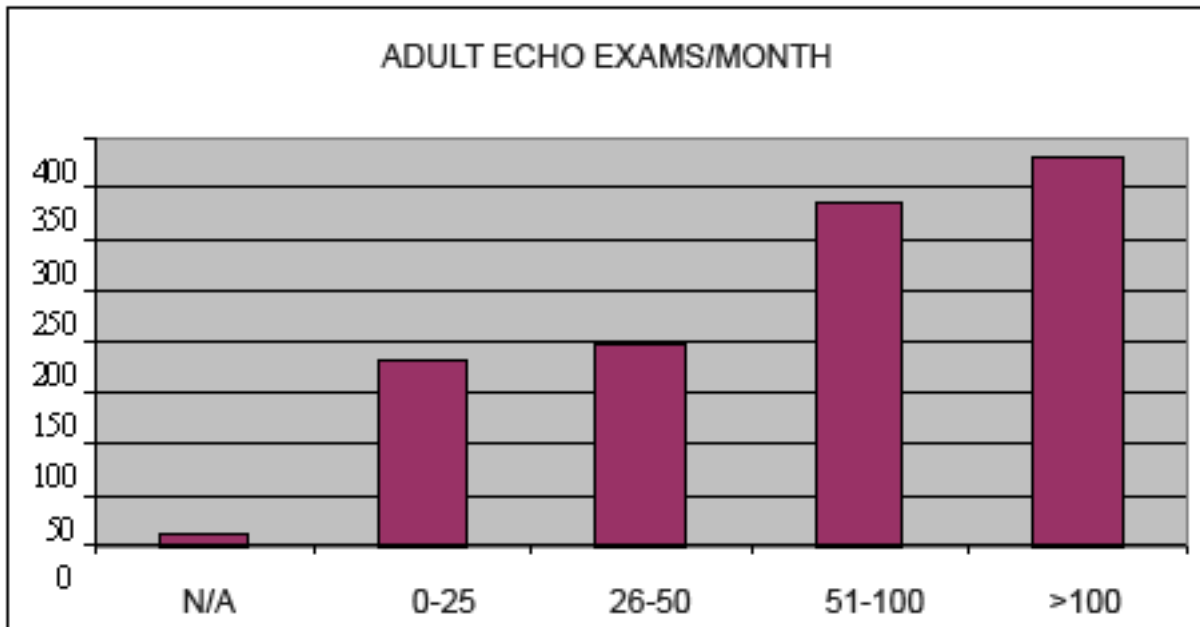


Figure 3. Adult Echo Exams/Month

Adult Echo Exams Performed in Laboratory/ Month

Table 4, Adult Echo Exams Performed in Respondent's Laboratory, shows the number of Adult Echo sonography exams conducted in the respondent's laboratory during the previous year.

Adult Echo Exams in Lab/Month		
	N	Percent
Missing	11	1%
0-150	332	30%
151-300	259	23%
301-1000	361	33%
More than 1,000	143	13%
Total	1106	

Table 4. Adult Echo Exams in Lab/ Month

The results from table 4 are presented graphically below.

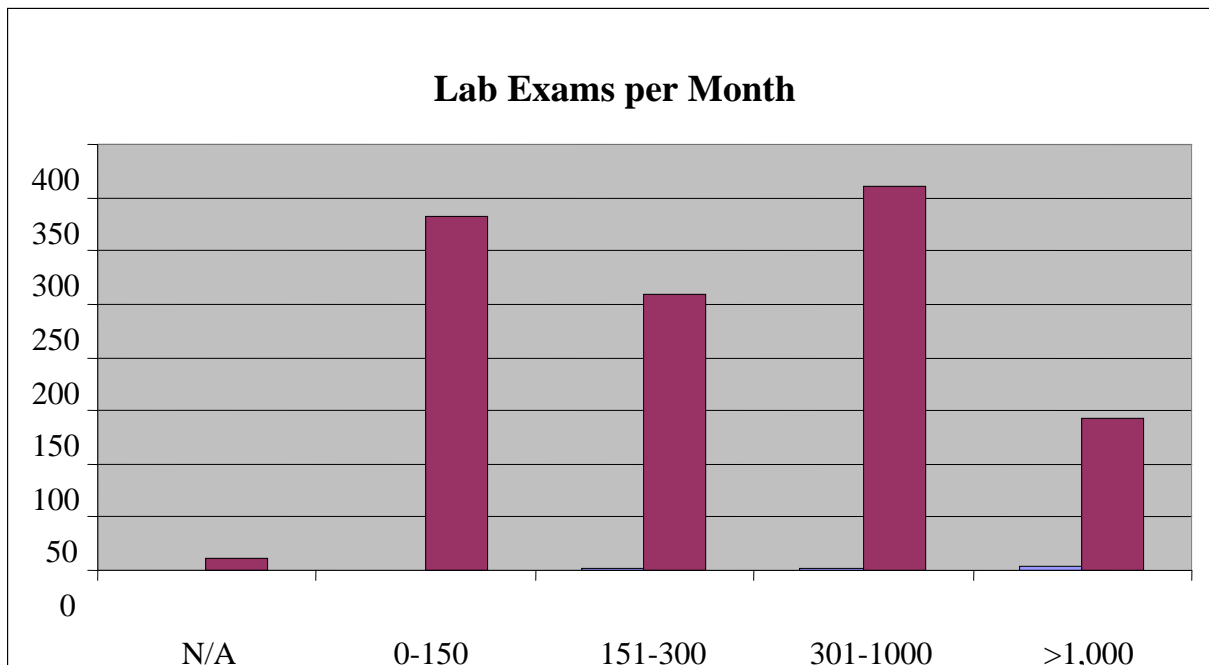


Figure 4. Adult Echo Exams in Respondent's Laboratory

Years as an Adult Echo Sonographer

The number of years the respondents have spent as an Adult Echo Sonographer are tabulated in Table 5.

Years as Adult Echo Sonographer		
	N	Percent
Missing	6	2%
0-5	213	71%
6-10	212	71%
11-15	186	62%
16-20	189	63%
More than 20	300	
Total	1106	

Table 5. Years as an Adult Echo Sonographer

The results from Table 5 are depicted graphically below.

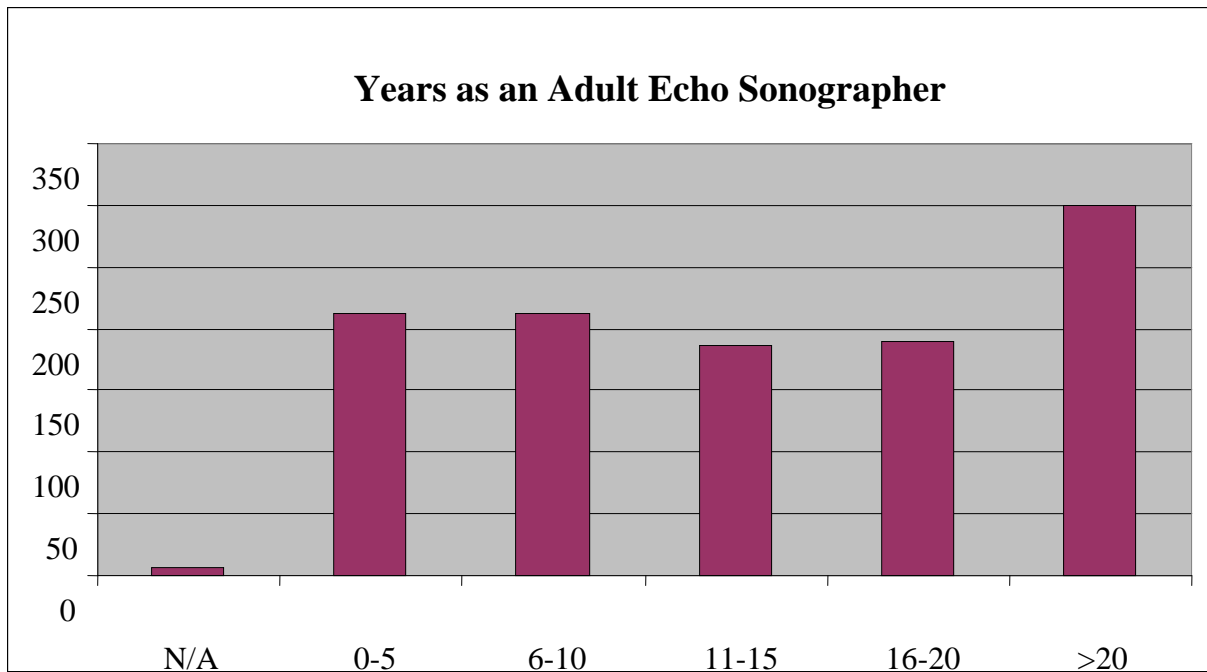


Figure 5. Years as an Adult Echo Sonographer

Years in Profession

Table 6, Years in Profession, shows the number of years the respondents have been in sonography profession.

Years in Profession		
	N	Percent
Missing	2	0%
0-5	259	23%
6-10	242	22%
11-15	189	17%
16-20	176	16%
More than 20	238	22%
Total	1106	

Table 6. Years in Profession

As is evidenced in Figure 6, Years in Profession All Respondents, the distribution of practice experience is bimodal, with the largest number of respondent newcomers to the field, and the second largest number of respondents having spent more than twenty years in the field.

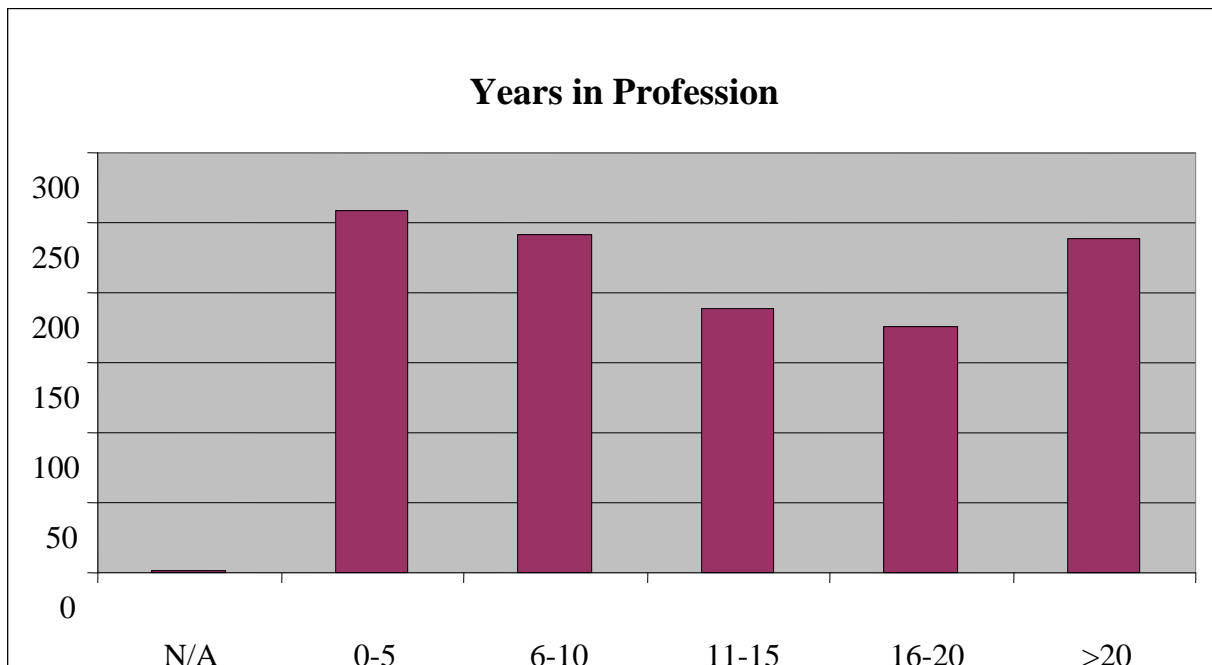


Figure 6. Years in Profession All Respondents

Survey Topic Listings

Below are the complete topic listings as they appeared in the survey.

Topic ID	Topic Text
1.	Anatomy and Physiology
1.1.	Identify ventricular wall segments
1.2.	Identify valves
1.3.	Identify the coronary sinus
1.4.	Identify coronary arteries
1.5.	Identify normal pressures in cardiac chambers and great vessels
1.6.	Identify phases of the cardiac cycle
1.7.	Identify electrical/mechanical systole
1.8.	Identify filling phases of diastole
1.9.	Identify timing of events relative to ECG
1.10.	Identify pulmonary veins
2.	Technique
2.1.	Use contrast agents
2.2.	Perform provocative maneuvers
2.3.	Participate in performance of transesophageal echocardiography
2.4.	Perform color M-mode
2.5.	Analyze dP/dT
2.6.	Obtain clinical history from patient and medical records
2.7.	Measure and record patient's blood pressure
2.8.	Perform cardiac auscultation of patient
2.9.	Establish intravenous access by insertion of IV catheter
2.10.	Correlate outside imaging modalities with echo findings
2.11.	Select multiple transducer frequencies for the same exam
2.12.	Record echo/Doppler images on videotape only
2.13.	Use digital system for image acquisition, storage, and manipulation
2.14.	Identify ultrasound imaging artifacts
2.15.	Perform M-mode echocardiography
2.16.	Perform continuous wave Doppler with a non-imaging probe
2.17.	Utilize harmonic imaging
2.18.	Utilize contrast for left ventricular or Doppler enhancement
2.19.	Utilize contrast for coronary perfusion

Topic ID	Topic Text
2.20.	Use saline contrast
2.21.	Perform Doppler tissue imaging
2.22.	Utilize power Doppler
2.23.	Utilize automatic boundary border detection
2.24.	Utilize 3-D imaging
2.25.	Assess for cardiac dyssynchrony
2.26.	Perform AV optimization
2.27.	Image the inferior vena cava and hepatic veins
2.28.	Image the abdominal aorta
2.29.	Image the aortic arch
2.30.	Adjust pre- or post-processing parameters
2.30.1.	Adjust dynamic range
2.30.2.	Change power output
2.30.3.	Adjust focal zone
2.30.4.	Change sample volume size
2.30.5.	Adjust for high Pulse Repetition Frequency (PRF)
2.31.	Calculate ejection fraction by M-mode echocardiography
2.32.	Calculate ejection fraction by 2-D measurements
2.33.	Make standard M-mode measurements
2.34.	Measure chamber/vessel size / wall thickness from 2-D images
2.35.	Quantify left atrial volume
2.36.	Calculate 2-D area measurements
2.37.	Analyze right ventricular size and systolic function
2.38.	Estimate PA systolic pressure
2.39.	Estimate right atrial pressure
2.40.	Calculate valve areas w/ the continuity equation when valve stenosis is present
2.41.	Calculate valve areas using pressure half time in patients with mitral stenosis
2.42.	Calculate mean pressure gradients in patients with valve stenosis
2.43.	Calculate indices of diastolic function using mitral valve flow
2.44.	Calculate IVRT
2.45.	Calculate indices of diastolic function using pulmonary vein flow
2.46.	Calculate shunt ratios
2.47.	Calculate regurgitant fractions
2.48.	Use color Doppler as an integral part of the Doppler exam
2.49.	Use PISA measurements to evaluate valvular lesions
2.50.	Use a respirometer to evaluate for tamponade or constriction
2.51.	Participate in exercise stress testing for coronary disease
2.52.	Participate in pharmacological stress testing for coronary disease

Topic ID	Topic Text
2.53.	Perform strain rate imaging
2.54.	Personally administer saline contrast for shunt detection or Doppler enhancement
2.55.	Personally administer contrast agent for left ventricular opacification
2.56.	Personally administer contrast agent for coronary perfusion
2.57.	Record your diagnostic observations/impressions on lab's internal worksheet
2.58.	Record your diagnostic observations/impressions in patient's medical record
2.59.	Train echocardiographic students in echocardiography techniques
2.60.	Maintain training in basic life support techniques (CPR)
2.61.	Inspect transducer for mechanical or electrical hazards
2.62.	Routinely disinfect transthoracic transducers between patients
2.63.	Use tissue equivalent phantom to test ultrasound system
3.	Ventricular Function
3.1.	Quantify LV systolic function
3.2.	Assess diastolic dysfunction
4.	Ischemic Heart Disease
4.1.	Analyze wall motion abnormalities and associated coronary anatomy
4.2.	Evaluate the complications of ischemic heart disease
4.2.1.	Identify thrombi
4.2.2.	Identify post-MI ventricular septal defect
4.2.3.	Identify aneurysm
4.2.4.	Identify valve dysfunction
4.2.5.	Identify pericardial effusion
4.2.6.	Identify papillary muscle rupture
4.2.7.	Identify ruptured myocardium
4.2.8.	Identify right ventricular involvement
5.	Valvular Heart Disease and Hemodynamic Consequences
5.1.	Determine the etiology of mitral stenosis
5.2.	Identify the underlying etiology associated with mitral regurgitation
5.2.1.	Identify mitral prolapse
5.2.2.	Identify chordal rupture
5.2.3.	Identify flail leaflet
5.3.	Identify mitral annular calcification
5.4.	Identify the underlying etiology of aortic stenosis
5.4.1.	Identify congenital etiologies
5.4.2.	Identify rheumatic etiologies
5.4.3.	Identify degenerative etiologies
5.5.	Identify the underlying etiology of aortic regurgitation
5.5.1.	Identify congenital etiologies

Topic ID	Topic Text
5.5.2.	Identify rheumatic etiologies
5.5.3.	Identify infectious etiologies
5.5.4.	Identify secondary (e.g., aortic root abnormality) etiologies
5.5.5.	Identify flail etiologies
5.6.	Identify the underlying etiology of tricuspid stenosis
5.7.	Identify the underlying etiology of tricuspid regurgitation
5.7.1.	Identify rheumatic etiologies
5.7.2.	Identify carcinoid etiologies
5.7.3.	Identify tricuspid prolapse
5.7.4.	Identify chordal rupture
5.7.5.	Identify flail leaflet etiologies
5.8.	Identify the underlying etiology of pulmonary stenosis
5.8.1.	Identify congenital etiologies
5.8.2.	Identify carcinoid etiologies
5.9.	Identify the underlying etiology of pulmonary regurgitation
5.10.	Identify causes of pulmonary hypertension
5.11.	Evaluate complications associated with endocarditis
5.12.	Differentiate between types of prosthetic valves
5.12.1.	Identify tilting-disc
5.12.2.	Identify bioprosthetic
5.12.3.	Identify annular rings
5.13.	Evaluate presence of prosthetic valve dysfunction
5.13.1.	Identify stenosis
5.13.2.	Identify regurgitation
5.13.3.	Analyze mechanisms of prosthetic valve dysfunction
6.	Cardiomyopathies
6.1.	Identify hypertrophic cardiomyopathies
6.2.	Identify hemodynamic consequences associated with hypertrophic cardiomyopathies
6.3.	Identify the underlying etiology associated with hypertrophic cardiomyopathies
6.3.1.	Identify asymmetric septal hypertrophy
6.3.2.	Identify hypertensive hypertrophic cardiomyopathy
6.4.	Identify complications of dilated cardiomyopathies
6.5.	Distinguish between constrictive and restrictive physiology
7.	Other Diseases
7.1.	Identify pericardial effusions
7.2.	Evaluate the hemodynamic consequences of cardiac tamponade
7.3.	Identify physiology/hemodynamics findings associated with pericardial effusion
7.4.	Differentiate pleural effusion from pericardial effusion

Topic ID	Topic Text
7.5.	Assess pericardium
7.6.	Identify causes of systemic hypertension
7.7.	Identify complications of pulmonic hypertension
7.8.	Identify complications of systemic hypertension
7.9.	Assess for cardiac masses and tumors
7.9.1.	Identify primary cardiac tumors
7.9.2.	Identify metastatic cardiac tumors
7.9.3.	Differentiate cardiac tumors from other masses or artifacts
7.10.	Evaluate for the presence of congenital heart disease in the adult
7.10.1.	Evaluate for the presence of atrial septal defect
7.10.2.	Evaluate for the presence of ventricular septal defect
7.10.3.	Evaluate for the presence of endocardial cushion defect
7.10.4.	Evaluate for the presence of Ebstein's anomaly
7.10.5.	Evaluate for the presence of patent ductus arteriosus
7.10.6.	Evaluate for the presence of Tetralogy of Fallot
7.10.7.	Evaluate for the presence of repaired congenital heart disease
7.10.8.	Evaluate for the presence of coarctation of the aorta
7.11.	Evaluate for the presence of supraaortic/subaortic stenosis
7.12.	Identify mitral valve prolapse
7.13.	Evaluate for diseases of the aorta
7.13.1.	Identify Marfan's syndrome
7.13.2.	Identify aortic atheroma
7.13.3.	Identify aortic aneurysm
7.13.4.	Identify aortic dissection
7.13.5.	Identify sinus of Valsalva aneurysms
7.13.6.	Identify coarctation of the aorta
7.14.	Identify abnormal heart rhythms and conduction disturbances
7.15.	Analyze echocardiographic findings of arrhythmias & conduction disturbances
7.16.	Identify cardiac sources of embolism