

SAMPLE ONLY

ECHOCARDIOGRAPHY LAB POLICIES AND PROCEDURES MANUAL

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Examination Specific Policies

ADULT TRANSTHORACIC ECHOCARDIOGRAPHY EXAMINATION PROTOCOL

PURPOSE:

To evaluate the presence of pathology involving the cardiac valves, chambers, myocardium and pericardium.

COMMON INDICATIONS:

- Murmur
- Chest Pain
- Dyspnea
- Syncope/vertigo
- Known Cardiac Disease
- Postoperative Cardiac Follow-up

PUBLIC INDICATIONS:

- Mitral and Valvular Disease
 - Aortic Stenosis
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 - Cardiac Tamponade
 - Increased Pericardial Thickness
 - Pericardial Tumors and Cysts

- Constrictive Pericarditis
- Congenital Absence of the Pericardium and Pericardial Biopsy After Open-Heart Surgery
- Cardiac Masses and Tumors
- Diseases of the Great Vessels
 - Aortic Dissection
 - Aortic Aneurysm
 - Aortic Rupture and Thoracic Aortic Degenerative Disease
 - The Great Veins
- Pulmonary Disease - Thromboembolism
- Systemic Hypertension
- Neurologic Disease and Other Cardiovascular Disease
- Arrhythmias and Atrial Fibrillation
- Anticoagulation
- Transcatheter Aortic Valve Replacement
- Coronary Intervention
- Adult Congenital Heart Disease

1. ACC/AHA Guidelines for the Clinical Application of Echocardiography: A Report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Committee on Clinical Application of Echocardiography). Developed in Collaboration With the American Society of Echocardiography; Chestnut, 1997;92:1681-1741.

PATIENT COMMUNICATION AND POSITIONING:

Upon arrival in the echocardiography department, the patient should be made comfortable and relaxed with their surroundings. The sonographer should give the patient an introduction and explain the procedure. The patient should be placed in a way which allows for maximum access to the area to be examined, preferably lying supine or in a left or right oblique position. In some cases, due to limitations of the patient's condition, the sonographer may elect to examine the patient sitting erect.

PRE-EXAMINATION ASSESSMENT:

Pre-examination assessment must be completed before the examination is performed. The sonographer should obtain a patient history that provides information as to the characteristics of historic events (e.g., nature of onset, duration, frequency), whenever possible. A brief physical exam should also be included by obtaining blood pressures.

EXAMINATION GUIDELINES:

- The sonographer selects the appropriate presets on the ultrasound machine and the appropriate transducer (Phased Array, 2-5MHz) to begin the exam. Gain, depth and focal settings should be appropriate for region of interest and should allow for adequate visualization of the pericardium, myocardium and all pertinent structures.
- ECG electrodes are placed on the patient's chest in the correct position to obtain an adequate physiological ECG trace. ECG traces should be visualized on the screen and included in clips and images throughout the exam.
- A lead II and coupler should be placed on the patient's chest at the parasternal view location and used during procedure.
- A complete echocardiography examination includes evaluation of the pericardium, myocardium, cardiac chambers, great vessels, pulmonary veins, and all surrounding structures. Stress exams are not performed in this lab for this testing category. The heart is imaged in B-Mode and still framed images, beginning with the parasternal long axis view. The following views are then obtained: Parasternal Short Axis, Four Chamber Apical, Five Chamber Apical, Two Chamber Apical, Three Chamber Apical, Subcostal Long Axis (Four Chamber, Subcostal Short Axis, Subcostal Abdominal Aorta, Suprasternal Notch (if indicated).

Care is taken to evaluate all cardiac chambers, valves, great vessels, myocardium and pericardium from all aspects within each view. Proper evaluation includes 2D imaging with real-time image clips, Color Doppler evaluation of all cardiac valves at each view and Pulsed/Continuous Wave Doppler interrogation of each cardiac valve at multiple views, as best obtainable. The sonographer must be capable of determining the appropriate use of additional imaging methods and views, including the Parasternal transducer as indicated by the study findings and pathology.

- B-Mode/2D data should be obtained to determine the characteristics of normal anatomy, valvular/annular plaque formation and the presence of disease (i.e. homogeneous or heterogeneous) and to determine surface characteristics such as smooth or irregular. If pathology is present, appearance, location, extent and severity should be documented whenever possible.
- Color Doppler must be documented, as listed in the image protocol. Color Doppler will be utilized to characterize plaque formations and to evaluate for regurgitation or stenosis, as well as to identify the presence of intracardiac shunts. Color Doppler will also be utilized to assess for locations of aliasing and as guide for the most accurate location to sample by Pulsed and/or Continuous Wave Doppler.
- Pulsed Doppler waveforms must be obtained from representative locations at the cardiac valves as indicated in the image protocol. Doppler waveform spectral analysis is performed and will be utilized to assess for the presence of turbulent pressure gradients and valvular stenosis, as well as variations in hemodynamics.
- Peak Systolic Velocities (PSV) measurements and/or Time Velocity Integral (TVI) measurements must be documented at locations as indicated in the image protocol. PSV and TVI measurements will be utilized to assess areas of stenosis as well as normal hemodynamic flow.

PRESENTATION AND EXAM FINDINGS

- Report and sonologist reports are provided only to the interpreting physician and are not to be shared with any other person or facility.
- Studies are routinely recorded and include, but not limited to: Gray scale and color images as indicated by the image protocol; Velocity measurements taken at cardiac valves as indicated in the image protocol.
- If a Doppler signal cannot be adequately obtained, it should be recorded as such in order to demonstrate that it was attempted by the sonographer.
- Only extra images involving pathology if present.
- When available, previous studies should be obtained for comparison.

Adult Echocardiogram Suggested Images/Exam Sequence

Parasternal Long Axis View (PLAX)

1. 2D Clip at apex (x 20cm depth)
2. 2D Clip at shallow depth
3. Color Doppler
4. M-mode zoom
5. M-mode aortic valve
6. M-mode mitral valve
7. M-mode tricuspid valve
8. RV diam, IVSd, LVIDd, LVPWd, IVSs, LVIDs, LVPWs
9. Aortic TV
10. Mitral TV with Color Doppler
11. RVID/TV with CW Doppler (RVSP measurement)

- Constrictive Pericarditis
- Congenital Absence of the Pericardium and Pericardial Disease After Open-Heart Surgery
- Cardiac Masses and Tumors
- Diseases of the Great Vessels
 - Aortic Dissection
 - Aortic Aneurysm
 - Aortic Rupture and Thoracic Aortic Degenerative Disease
 - The Great Veins
- Pulmonary Disease- Thromboembolism
- Systemic Hypertension
- Neurological Disease and Other Cardiovascular Disease
- Arrhythmias and Conduction System Disease
- Atrial Fibrillation in Patients With Atrial Fibrillation
- Endocarditis
- Coronary Artery Disease
- Adult Congenital Heart Disease

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PATIENT COMMUNICATION AND POSITIONING:

Upon arrival in the echocardiography department, the patient should be made comfortable and relaxed with their surroundings. The sonographer should give the patient an introduction and explain the procedure. The patient should be placed in a way which allows for maximum access to the area to be examined, preferably supine or in a left lateral decubitus position. In some cases, due to limitations of the patient's condition, the sonographer may elect to examine the patient sitting erect.

PRE-EXAMINATION ASSESSMENT:

Pre-examination assessment must be completed before the examination is performed. The sonographer should obtain a patient history that provides information as to the characteristics of his/her case events (e.g., nature of onset, duration, severity), whenever possible. A brief physical exam should also be included by obtaining blood pressures.

EXAMINATION GUIDELINES:

- The sonographer selects the appropriate presets on the ultrasound machine and the appropriate transducer (Phased Array, 2-5MHz) to begin the exam. Gain, depth and focal settings should be appropriate for region of interest and should allow for adequate visualization of the pericardium, myocardium and all pertinent structures.
- ECG electrodes are placed on the patient's chest in the correct position to obtain an adequate physiological ECG trace. ECG traces should be visualized on the screen and included in clips and images throughout the exam.
- A stethoscope should be placed on the patient's chest at the parasternal view location and used during procedure as needed.
- A complete echocardiography examination includes evaluation of the pericardium, myocardium, cardiac chambers, great vessels, pulmonary veins, and all surrounding structures. Stress exams are not performed in this lab for this testing category. The heart is imaged in still and still framed images, beginning with the parasternal long axis view. The following views are then obtained: Parasternal Short Axis, Four Chamber Apical, Five Chamber Apical, Two Chamber Apical, Three Chamber Apical, Subcostal Long Axis/Four Chamber, Subcostal Short Axis, Subcostal Abdominal Aorta, Suprasternal Notch (if indicated).

Care is taken to evaluate all cardiac chambers, valves, great vessels, myocardium and pericardium from all aspects within each view. Proper evaluation includes 2D imaging with real-time image clips, Color Doppler evaluation of all cardiac valves at each view and Pulsed/Continuous Wave Doppler interrogation of each cardiac valve at multiple views, as best obtainable. The sonographer must be capable of determining the appropriate use of additional imaging methods and views, including the B-mode transducer as indicated by the study findings and pathology.

- B-Mode/2D data should be obtained to determine the characteristics of normal anatomy, valvular/annular plaque formation and the presence of disease (i.e. homogeneous or heterogeneous) and to describe surface characteristics such as smooth or irregular. If pathology is present, appearance, location, extent and severity should be documented whenever possible.
- Color Doppler must be documented, as listed in the image protocol. Color Doppler will be utilized to characterize plaque formations and to evaluate for valvular regurgitation and stenosis, as well as to determine the presence of intracardiac shunts. Color Doppler will also be utilized to assess for locations of aliasing and as guide for the most accurate location to sample by Pulsed and/or Continuous Wave Doppler.
- Pulsed wave Doppler waveforms must be obtained from representative locations at the cardiac valves as indicated in the image protocol. Doppler waveform spectral analysis is performed and will be utilized to assess for the presence of abnormal pressure gradients and valvular stenosis, as well as variations in hemodynamics.
- Peak Systolic Velocities (PSV) measurements and/or Time Velocity Integral (TVI) measurements must be documented at locations as indicated in the image protocol. PSV and TVI measurements will be utilized to assess areas of stenosis as well as normal hemodynamic flow.

PRESENTATION AND EXAM FINDINGS:

- Final sonologist reports are provided only to the interpreting physician and are not to be disseminated to any other person or facility.
- Studies are properly recorded and include, but not limited to: Gray scale and color images as indicated by the image protocol; Velocity measurements taken at cardiac valves as indicated in the image protocol.
- If a Doppler signal cannot be adequately obtained, it should be recorded in order to demonstrate that it was attempted by the sonographer.
- If available, previous studies should be obtained for comparison.

Adult Echocardiogram Suggested Images/Exam Sequence

Parasternal Long Axis View (PLAX)

1. 2D Clip at approx 30cm depth
2. 2D Clip at shallow depth
3. Color Doppler
4. M-mode via Aortic zoom
5. M-mode Mx
6. M-mode Mx
7. M-mode Mx
8. M-mode Mx (RV diam, IVSd, LVIDd, LVPWd, IVSs, LVIDs, LVPWs)
9. M-mode TV
10. M-mode TV with Color Doppler
11. RVID/TV with CW Doppler (RVSP measurement)

Parasternal Short Axis View (PSAX)

1. 2D Clip at approx 20cm depth
2. 2D Clip at shallow depth
3. Clip of AV with Color Doppler
4. 2D Clip of AV with zoom
5. 2D Clip of PV
6. Clip of PV with Color Doppler
7. PV with CW Doppler (measure PHT if indicated)
8. 2D Clip of LV
9. Clip of LV with Color Doppler
10. CW Doppler (RVSP measurement)
11. Evaluate LA with Color Doppler as indicated
12. 2D Clip of MV
13. 2D Clip of MV with Color Doppler
14. 2D Clip of LV at Papillary muscles
15. 2D Clip of LV at Apex

Apical 4 Chamber View / Apical 5 Chamber View (A4P/A5P)

1. 2D Clip of 4 chambers at approx 20cm depth
2. 2D Clip of 4 chambers at shallow depth
3. 2D Clip of MV
4. Clip of MV with Color Doppler
5. PW Doppler at MV leaflet tips (RA ratio, PHT measurements)
6. CW Doppler of MV (assess MR/E)
7. Evaluate Secondary Veins with Color and PW Doppler if indicated
8. LV strain - evaluate wall motion
9. Tissue Doppler at MV Annulus level. (Medial/Lateral)
10. Tissue Velocity Doppler with measurement of e' (calculate E/e' ratio)
11. Perform Q_{LV} (4CH and 2CH - to obtain volume measurement)
12. 2D Clip of AV with zoom
13. Clip of AV with Color Doppler
14. PW Doppler of LVOT (measure PSV and trace TVI)
15. CW Doppler of AV (measure PSV and trace TVI)
16. 2D Clip of TV
17. Clip of TV with Color Doppler
18. CW Doppler of TV (RVSP measurement)

Apical 2 Chamber View (A2P)

1. 2D Clip of Myocardium
2. 2D Clip of MV
3. Clip of MV with Color Doppler

Apical 3 Chamber View (A3P)

1. 2D Clip of Myocardium
2. 2D Clip of MV/AV
3. Clip of MV/AV with Color Doppler

4. Re-assessment of AV/LVOT with PW/CW Doppler as indicated

Sub-Costal Long Axis View

1. 2D Clip of 4CH at approx 20cm depth
2. 2D Clip of 4CH at shallow depth
3. Clip of 4CH with Color Doppler at IAS
4. Clip of 4CH with Color Doppler at IVS

Sub-Costal Short Axis View

1. 2D Clip of IVC/RA
2. 2D Clip of IVC/RA with nasal cannula
3. 2D Clip of Abdominal Aorta
4. 2D Clip of RVOT
5. 2D Clip of LVOT

Suprasternal View (SSN) – If Indicated

1. 2D Clip of Aortic Arch
2. 2D Clip of Aortic Arch with Color Doppler
3. PW Doppler at Ascending Aorta (PSV measurement)
4. PW Doppler at Descending Aorta (PSV measurement)
5. CW Doppler at Descending Aorta (PSV measurement)

NOTE:

- AVM of $>2cm/s$ requires AVM measurement and use of Pedoff transducer at IAS, RA, RVOT, SSN and SSN locations.
- Attempt RV measurements at all obtainable views
- SSN views required with Aortic Stenosis and if indicated by patient
- Report all appropriate data and comments on ventricular and valvular function on tech worksheet
- Include ECG display with image clips

Routine surveillance (>1 y) of known pulmonary hypertension without change in clinical status or cardiac exam A (7)

Re-evaluation of known pulmonary hypertension if change in clinical status or cardiac exam or to guide therapy A (8)

Hypotension or Hemodynamic Instability With TTE
Hypotension or hemodynamic instability of uncertain or suspected cardiac etiology A (8)

Assessment of volume status in a critically ill patient U (5)

Myocardial Ischemia/Infarction With TTE
Acute chest pain with suspected MI and no diagnostic ECG when a resting echocardiogram can be performed during the acute phase I (2)

Evaluation of a patient without chest pain but with other features of an ischemic equivalent or laboratory markers suggestive of ongoing MI I (2)

Stratification of patients with myocardial ischemia/infarction, including patients at risk for acute mitral regurgitation, ventricular septal defect, free-wall rupture/tamponade, shock, right ventricular involvement, HF, or thrombus A (8)

Evaluation of Ventricular Function after ACS With TTE
Initial evaluation of ventricular function following MI/CS A (8)

Re-evaluation of ventricular function following MI/CS during recovery phase when results will guide therapy A (8)

Respiratory Failure With TTE
Respiratory failure of uncertain or suspected cardiac etiology A (8)

Respiratory failure with hypoxemia when a noncardiac etiology of respiratory failure has been established U (5)

Pulmonary Embolism With TTE
Suspected pulmonary embolism in order to establish diagnosis I (2)

Management of acute pulmonary embolism to guide therapy (e.g., thrombolysis and/or heparin) A (8)

Routine evaluation of prior pulmonary embolism with normal right ventricular function and pulmonary artery systolic pressure I (1)

Re-evaluation of known pulmonary embolism after thrombolysis or thrombectomy for assessment of change in right ventricular function and/or pulmonary artery pressure A (7)

Cardiac Trauma With TTE
Severe deceleration injury or chest trauma when valve injury, pericardial effusion, or cardiac injury are possible or suspected A (8)

Routine evaluation in the setting of mild chest trauma with no electrocardiographic changes or biomarker elevation I (1)

Mitral Regurgitation With TTE
Evaluation when there is a reasonable suspicion of valvular or structural heart disease A (8)

Evaluation when there are no other symptoms or signs of valvular or structural heart disease I (2)

Re-evaluation of mitral regurgitation without valvular disease on prior echocardiogram and no change in clinical status or cardiac exam I (1)

Re-evaluation of known valvular heart disease with a change in clinical status or cardiac exam or to guide therapy A (8)

Native Valvular Stenosis With TTE

Routine surveillance (<3 y) of mild valvular stenosis without a change in clinical status or cardiac exam I (3)

Routine surveillance (>3 y) of mild valvular stenosis without a change in clinical status or cardiac exam A (7)

Routine surveillance (<1 y) of moderate or severe valvular stenosis without a change in clinical status or cardiac exam I (3)

Routine surveillance (>1 y) of moderate or severe valvular stenosis without a change in clinical status or cardiac exam A (8)

Native Valvular Regurgitation With TTE

Routine surveillance of mild valvular regurgitation I (1)

Routine surveillance (>1 y) of mild valvular regurgitation without a change in clinical status or cardiac exam I (2)

Routine surveillance (>1 y) of mild valvular regurgitation without a change in clinical status or cardiac exam U (4)

Routine surveillance (<1 y) of moderate or severe valvular regurgitation without a change in clinical status or cardiac exam U (8)

Routine surveillance (>1 y) of moderate or severe valvular regurgitation without change in clinical status or cardiac exam A (8)

Prosthetic Valves With TTE

Initial postoperative evaluation of prosthetic valve for establishment of baseline A (8)

Routine surveillance (>1 y) after valve implantation of prosthetic valve if no known or suspected valve dysfunction A (7)

Routine surveillance (>1 y) after valve implantation of prosthetic valve if no known or suspected valve dysfunction A (7)

Evaluation of prosthetic valve with suspected dysfunction or a change in clinical status or cardiac exam A (8)

Re-evaluation of known prosthetic valve dysfunction when it would change management or guide therapy A (8)

Infective Endocarditis (Native or Prosthetic Valves) With TTE

Initial evaluation of suspected infective endocarditis with positive blood cultures or a new murmur A (8)

Transient fever without evidence of bacteremia or a new murmur I (4)

Bacteremia with a pathogen not typically associated with infective endocarditis and/or a documented nonendovascular source of infection I (3)

Re-evaluation of infective endocarditis at high risk for progression or complication or with a change in clinical status or cardiac exam A (8)

Routine surveillance of complicated infective endocarditis when no change in management is contemplated I (4)

Class A (8)

Suspicion of noncardiac source of embolus A (8)

Suspicion of cerebral conditions A (8)

Routine surveillance of known small pericardial effusion with no change in clinical status I (2)

Re-evaluation of known pericardial effusion to guide management or therapy A (8)

Guidance of percutaneous noncoronary cardiac procedures, including, not limited to pericardiocentesis, septal ablation, or right ventricular biopsy A (8)

Evaluation of the ascending aorta in the setting of a known or suspected connective tissue disease or genetic condition that predisposes to aortic aneurysm or dissection (e.g., Marfan syndrome) A (8)

Re-evaluation of known ascending aortic dilation or history of aortic dissection to establish a baseline rate of expansion or to determine the rate of expansion if excessive A (8)

Re-evaluation of known ascending aortic dilation or history of aortic dissection with a change in clinical status or when findings may alter management or therapy A (8)

Routine re-evaluation or surveillance of known ascending aortic dilation or history of aortic dissection without a change in clinical status or cardiac exam when findings would not change management or therapy I (3)

HEART FAILURE

Initial evaluation of suspected hypertensive heart disease A (8)

Routine re-evaluation of systemic hypertension without symptoms or signs of hypertensive heart disease I (3)

Re-evaluation of known hypertensive heart disease without a change in clinical status or cardiac exam U (4)

HF With TTE

Initial evaluation of known or suspected HF (systolic or diastolic) based on symptoms, signs, or abnormal test results A (8)

Re-evaluation of known HF (systolic or diastolic) with a change in clinical status or cardiac exam without a clear change in medication or diet A (8)

Re-evaluation of known HF (systolic or diastolic) with a change in clinical status or cardiac exam with a clear precipitating change in medication or diet U (4)

Re-evaluation of known HF (systolic or diastolic) to guide therapy A (8)

Routine surveillance (<1 y) of HF (systolic or diastolic) when there is no change in clinical status or cardiac exam I (2)

Routine surveillance (>1 y) of HF (systolic or diastolic) when there is no change in clinical status or cardiac exam U (8)

Device Evaluation (Including Pacemakers, ICD, or CRT) With TTE

Initial evaluation or re-evaluation after revascularization and/or optimal medical therapy to determine candidacy for device therapy and/or to determine optimal choice of device A (8)

Initial evaluation for CRT device optimization after implantation U (8)

Initial evaluation of pacing device with symptoms possibly due to device complication or suboptimal pacing device I (8)

Routine surveillance (<1 y) of implanted device without a change in clinical status or cardiac exam I (1)

Routine surveillance (>1 y) of implanted device without a change in clinical status or cardiac exam I (3)

Valvular Disease, Ventricular Assist Devices and Cardiac Transplantation With TTE

To determine candidacy for ventricular assist device A (8)

Optimization of ventricular assist device settings A (7)

Re-evaluation for signs/symptoms suggestive of ventricular assist device-related complications A (8)

Monitoring for rejection in a cardiac transplant recipient A (7)

Cardiac structure and function evaluation in a potential heart donor A (8)

Cardiomyopathies With TTE

Initial evaluation of known or suspected cardiomyopathy (e.g., restrictive, infiltrative, dilated, hypertrophic, or genetic cardiomyopathy) A (8)

Re-evaluation of known or suspected cardiomyopathy with a change in clinical status or cardiac exam or to guide therapy A (8)

Routine surveillance (>1 y) of known cardiomyopathy without a change in clinical status or cardiac exam I (2)

Routine surveillance (>1 y) of known cardiomyopathy without a change in clinical status or cardiac exam U (5)

Screening echocardiogram for structure and function in first-degree relatives of a patient with an inherited cardiomyopathy A (8)

Baseline and serial re-evaluations in a patient using long-term therapy with cardiotoxic agents A (8)

Initial evaluation of known or suspected adult congenital heart disease A (8)

Known adult congenital heart disease with a change in clinical status or cardiac exam A (8)

Re-evaluation of known or suspected adult congenital heart disease with a change in clinical status or cardiac exam A (8)

Routine surveillance (>1 y) of adult congenital heart disease following complete repair I (3)

+ with residual structural or hemodynamic abnormality + without a change in clinical status or cardiac exam

Routine surveillance (>1 y) of adult congenital heart disease following complete repair U (5)

+ with residual structural or hemodynamic abnormality + without a change in clinical status or cardiac exam

Routine surveillance (>1 y) of adult congenital heart disease following incomplete or palliative repair U (5)

+ with residual structural or hemodynamic abnormality + without a change in clinical status or cardiac exam

Routine surveillance (>1 y) of adult congenital heart disease following incomplete or palliative repair A (8)

ACC/AHA/ASE/AHA/ASNC/HFSA/HRS/SCAI/SCC/SCQ/SCMR 2014 Appropriate Use Criteria for Echocardiography

238 Douglas et al. *Journal of the American Society of Echocardiography*, March 2014

Reporting & Interpretation Policies

REPORTING POLICIES AND PROCEDURES

REPORT CONTENT:

All diagnostic echocardiographic reports will contain the following patient demographic information:

- Title of the study
- Name of the laboratory
- Name of the patient
- Date and age of the patient
- Primary indication for the study
- Name or initials of the performing sonographer
- Name of the ordering physician and/or identifier
- Patient Height
- Patient Weight
- Patient BSA
- Patient Gender
- Patient Blood Pressure

Diagnostic interpretations will also include the following information:

- Specific measurement data for 2D and Doppler measurements taken by the sonographer throughout the examination.
- A description of any pertinent positive and negative findings.
- If pathology is present, it must be characterized according to its location, extent and severity.
- Any incidental exam findings should be documented, as required.
- The reasons for any technically limited, suboptimal, or incomplete examinations.
- A summary (impression/conclusion) of the test findings.
- The final interpretation should address the clinical indications for the study (when appropriate).
- Comparison with previous related studies when they are available for review.

STAT REPORTS ON TIME AND URGENT RESULTS:

STAT reports are to be called to the ordering physician by or under the direction and supervision of the interpreting physician. Documentation of STAT/preliminary results is essential. Please see policy listed below)

- Patients with the need for urgent STAT results based on the findings of the exam will be instructed to await further orders from the interpreting physician. The interpreting physician will be contacted and if available will immediately review images and documentation of urgent pathology. Preliminary results will be made available to the ordering physician or physician's assistant while the patient remains on the premises. Continuation of care and assessment of further medical treatment will be performed by the ordering physician. Patient care will proceed as instructed.
- Interpretation of the study should be available within 24 business hours from the date of service. Reports may be in the form of written interpretation and/or dictated interpretation.
- Any type of signed final report must be completed, distributed to the ordering physician and available in the patient chart within 48 business hours of date of service.

PRELIMINARY REPORTS AND VERIFICATION:

- While it is not the practice of this laboratory to provide preliminary reports to any facilities or outside physician offices, preliminary (STAT) results may be called to the ordering physician or physician assistant at the direction of the interpreting physician, if needed. Any preliminary reports given must be documented and a log of these reports is to be kept on file within the department. Preliminary reports must not be given in any other manner.
- Send no preliminary findings, including exam worksheets may not be distributed to anyone other than the interpreting physician. They may be retained in the patient file for record keeping purposes.
- All preliminary report logs must be reviewed and verified with the final report to check for discrepancies.
- If discrepancies are noted between preliminary and final reports, the interpreting physician is to be contacted immediately. Any errors must be corrected and documented in the preliminary report log. An addendum to the final report will be made if necessary. The ordering physician and/or physician's assistant is to be alerted with the correct results and documentation is to be maintained in the preliminary report log. The corrected final report must be signed and made available to patient's care and to the ordering physician.

REPORT TRANSCRIPTION AND DATA ENTRY:

- All echocardiographic and preliminary report transcription may be entered into the PACS/worksheets by clinical, clerical and administrative staff members as appointed by the Medical Director or Technical Director.

REPORT REVIEW AND COMPLETENESS:

- The Technical Director will supervise quarterly reviews of the echocardiography reports

to evaluate for timeliness and the completeness of the interpretations and final reports.

- Report reviews will consist of a minimum of ten studies.
- Report reviews will assess the timeliness of the indications and final reports associated with the echocardiography exams.
- Report reviews will also assess the completeness of the interpretation reports with regard to the required documentation (including: report header and patient demographic information, basic patient clinical data (height, weight, BSA, blood pressure), exam indication, study measurements (Left Ventricular Size and Function, Right Ventricular Size and Function, Left and Right Atrial Size, Valve Structure and Function, Valvular Regurgitation, Great Vessels).
- The results of the reviews will be disseminated to the Medical Director and results will be discussed with Medical and Technical staff members during quarterly department Quality Assurance meetings.
- Any findings and discrepancies revealed in the report reviews will be disseminated to the Medical Director and the procedures for quality assurance discrepancies will be followed in order to ensure adequate resolution of the issues.



THE ACCREDITATION
CONSULTANTS



THE ACCREDITATION
CONSULTANTS

Quality Assurance & Quality Control

CORRELATION AND CONFIRMATION OF RESULTS:

- Quality Assurance procedures will be utilized to review and compare echocardiography results in order to maintain an expected level of accuracy in our diagnostic studies. Ultimately, our departmental Quality Assurance and Quality Control procedures will improve the standard of care at our facility and allow us to demonstrate to our patients and the local medical community a high level of medical imaging excellence in our echocardiography procedures.

Confirmation and confirmation of the results of at least 4 randomly selected echocardiography studies will be presented at each quarterly staff Quality Assurance meeting for review and discussion. Cases will be selected by the Technical Director.

Randomly selected examinations will be compared to Nuclear Myocardial Perfusion Studies, Cardiac Catheterization, Cardiac MRA, Cardiac CTA, Transesophageal Echocardiography and/ or Intraoperative reports as they are available. Due to the nature of our facility, often comparison studies may be difficult to obtain. While we have established internal tracking methods for these correlative studies, in the absence of the afore mentioned correlative studies, we will also utilize other comparisons with Re-Examination Echocardiography and Over-Read Physician Variability Reviews as necessary to satisfy the Quality Assurance requirements of the ICAC.

- Confirmation of results will be performed by the Technical Director or his/her designee.

Physicians selected by the Medical Director and Medical Staff will be randomly selected for the Physician Variability Reviews and second opinion, in order to ensure accuracy in reporting and results. This will be facilitated by the Technical Director.

The findings of the echocardiography confirmations and variability measures will be reported to the Medical Director and any adverse findings will be addressed as outlined in the Quality Assurance Discrepancies Policy.

- The findings of the confirmations will also be reviewed by the Medical and Technical staff members during the quarterly departmental Quality Assurance meetings. This will allow for direction and recommendations for improvement of technical imaging and/or physician interpretations.
- A record of the information obtained during study correlations/confirmations and the actions or recommendations implemented will be maintained within the department.

QUALITY ASSURANCE DEPARTMENT MEETINGS:

Echocardiography departmental conferences will be held quarterly in order to incorporate new technology, update procedures and to improve the quality of the ultrasound and echocardiography studies performed within our laboratory. Quality Assurance meetings will include quality assurance review, peer review, in-service presented by staff members and the

resolution of any other lab related issues.

- Mandatory attendance of each Medical and Technical staff member is required at fifty percent of the meetings, each calendar year.
- The correlation and confirmation of results of randomly selected echocardiography studies will be presented for review and discussion as directed in the written departmental policy.
- Any additional information as necessary will be presented for review and/or discussion.
- A written record will be kept of the meeting attendees and the minutes of the data presented and any recommendations implemented, as well as an annual summary of the quality assurance reviews. This information will be utilized to improve patient care and the accuracy of our echocardiography examination results.
- Safely, Quality Assurance and Quality Control procedures will be utilized to improve the standard of care at the facility.

QUALITY ASSURANCE DISCREPANCIES

- The Technical Director will perform or directly supervise the performance of Quality Assurance Reviews (including Variability Measures, Report Timeliness & Completeness and Study Correlations and Appropriate Use Criteria) The information obtained by performing these quality assurance measures will be disseminated to the Medical Director and the technical staff.
- When a discrepancy is noted during the quality assurance reviews, the Medical Director will alert the medical and technical staff and evaluate the reason for the discrepancy and will devise a plan of action to inform all staff members to resolve any discrepancies affecting quality assurance measures.
- The Medical Director will be given to the medical and technical staff in order to maintain consistency in examination procedures and to allow for improvement of exam quality within the department.

EQUIPMENT AND INSTRUMENT QUALITY CONTROL

PREVENTATIVE MAINTENANCE

- Preventative maintenance procedures will be taken to assure that all medical instruments and medical equipment used for diagnosis and testing are maintained in good operating condition.
- The ultrasound lab requires documentation of proper equipment maintenance and safety measures. Quality Assurance procedures will be used to help ensure the equipment used by our facility meets or exceeds expected standards and is functioning properly for optimal patient care.
- All ultrasound equipment will be maintained under an equipment service plan with **YOUR SERVICE PROVIDER**. The field service engineer under contract with **YOUR SERVICE PROVIDER**.

PROVIDER will perform preventative maintenance (PM) service on the **YOUR EQUIPMENT TYPE** ultrasound unit every six months according to the guidelines and specifications recommended by the equipment manufacturer, **YOUR EQUIPMENT MANUFACTURER**. Calibration with use of an ultrasound phantom will be performed when possible and documented for each Preventative Maintenance service.

SAFETY INSPECTIONS / GENERAL MAINTENANCE OF INSTRUMENTS AND TRANSDUCERS

- The sonographer will routinely assess the imaging equipment for electrical and/or physical damage. The sonographer will inspect and clean all equipment filters by removing lint either by vacuuming or by rinsing filters and allowing them to air dry. This will be performed routinely as scheduled permits, a minimum of once monthly. Documentation of equipment damage and filter cleaning will be maintained in the medical equipment log and this will be maintained within the department.
- The sonographer will clean transducers with anti-bacterial, anti-viral cleaning agent after each patient encounter and will take care to clean transducer cables and cords daily or as needed with each patient encounter.
- The sonographer will inspect transducer cords and bases daily for exposure of electrical cables or physical damage. Please refer to *transducer cleaning policy* for further details.
- Other components of ultrasound equipment must be cleaned on a routine basis (a minimum of once monthly), with documentation maintained on the medical equipment logs.
- All ultrasound equipment, both imaging and non-imaging must be visually evaluated for electrical safety concerns on a routine basis (a minimum of once monthly, as scheduling permits). Electrical safety inspections must be completed and will be maintained in the medical equipment log within the department.
- Any damage or malfunction of ultrasound equipment and/or transducers will be immediately reported to the Medical Director or administrative staff and the use of the equipment will be discontinued until resolution, repair or replacement of malfunctioning/damaged equipment is performed. Documentation of equipment malfunction and/or damage will be maintained in the medical equipment log within the department.

Infectious Disease Prevention

INFECTIOUS DISEASE CONTROL:

- Universal precaution measures will be used for every patient encounter.
- Personal Protective Equipment (PPE) will be utilized during any patient procedure or encounter that involves risk of exposure to blood borne pathogens or bodily fluids.
- In order to prevent the spread of infectious disease, any item contaminated with blood and/or bodily fluids will be disposed of in an appropriate biohazard container.
- Ultrasound transducers will be changed between every patient, and the table will be cleaned down with disinfectant and sterile wipes as indicated by patient exposure.
- Hand-washing procedures, with anti-microbial hand soap, will be utilized before and after every patient encounter.
- Hand-washing procedures will be utilized after contact with any potentially hazardous materials.
- Hand-washing procedures will also be used after any personal hygiene practices.
- Patients who are sent to our facility and echocardiography laboratory with a known infectious or contagious disease should be removed immediately from the receiving area or other location and placed in a private room and should be isolated from the general public. Staff members that will have direct contact with the individual should wear personal protective equipment in order to reduce the potential spread of the disease. The patient's preliminary care physician and/or referring physician should be notified. The Medical Director should also be alerted to the potential biohazard in maintaining patient confidentiality. The patient will be admitted to the hospital for an initial examination.
- All exposures will be thoroughly documented and all patients and/or staff members exposed will be treated according to OSHA standards.
- Staff members with a known infectious disease or exposure to an infectious disease should either return home or go to the emergency room depending on severity of the disease.

ULTRASOUND TRANSDUCER CLEANING:

- Transducer cleaning procedures are required in order to meet the health and safety needs of our patients and to reduce the risk of exposure to microorganisms and other pathogens.
- The temperature of the transducer used in the department will be maintained in order to ensure a safe environment for the patients and employees.
- After every patient encounter, the sonographer will gently cleanse the head of the transducer by spraying with a registered anti-viral transducer cleansing agent and wiping with dry, clean sterile wipes. The sonographer will also wipe down the transducer cord between patient encounters.
- The transducer will then be allowed to air dry prior to the next use.

Patient Care Related Policies

ACUTE MEDICAL EMERGENCIES:

- All staff sonographers and trainees are required to maintain current BLS/CPR certificate.
- Our department lab will maintain an emergency crash cart on-site.
- If an acute medical emergency occurs the sonographer or staff member will take appropriate measures to assess the patient's medical condition.
- The sonographer will obtain help from physicians and staff members, as necessary. The sonographer will use the phone system to announce "CODE BLUE" and the room number over the intercom system.
- Sonographer or staff member should begin CPR if necessary and 911 or emergency medical services should be alerted.
- The RN and/or medical assistant in the department will initially respond to the page and bring a crash cart and oxygen bag.
- The physician will implement ACLS protocol with BLS trained staff.
- The RN/medical assistant will give parameters and/or code team a report of the patient history and vital signs/meds with patient transport to emergency unit as necessary.
- The medical assistant will then document the incident.
- The medical assistant will restock the crash cart as needed.
- The sonographer will alert administration, including the Medical Director to the occurrence of the event.

DEPARTMENT OF EMERGENCY MEDICAL SUPPLIES:

- Any use of emergency medical supplies and/or equipment must be immediately reported to the Technical Director.
- The Technical Director will also routinely verify the inventory of emergency medical equipment and supplies (a minimum of once per week).
- Once the use of these supplies and/or equipment has been reported to the Technical Director, inventory will be assessed by the Technical Director and/or Nursing Staff.
- Additional supplies and/or equipment will be ordered or replaced as deemed necessary by the Technical Director and/or Nursing Staff.

TOWARD PATIENT'S POLICY:

- Complications may arise during any ultrasound examination.

- Untoward effects of ultrasound examinations must be assessed by the sonographer.
- If patient complications are significant, the sonographer will be responsible to alert a member of the nursing staff and/or medical staff.
- If untoward effects of any ultrasound examination become severe and/or critical, guidelines for handling an acute medical emergency will need to be followed and adhered to (please see above page).
- All adverse events resulting from an ultrasound examination, whether emergent or non-emergent must be documented.
- Documentation must be updated in the Quality Assurance method for record keeping purpose.
- All events noted within the Untoward Effects Log will be reviewed with the Medical and nursing staff members during quarterly department Quality Assurance meetings.



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Medical and Technical Staff Policies

CREDENTIALING OF STAFF MEMBERS:

- All staff members will be required to comply with continuing medical education guidelines as set forth by the American Registry for Diagnostic Medical Sonography (ARDMS) and Cardiovascular Credentialing International (CCI), as well as to follow the guidelines and recommendations of the Intersocietal Commission on Accreditation of Echocardiography (ACE) and the Intersocietal Commission on Accreditation of Vascular Ultrasound (ICAVUS).
- Sonographers are responsible for keeping all individual Continuing Medical Educational records up to date in the department. Technical and Medical staff Continuing Medical Education records and certifications will be ultimately maintained and reviewed by the Medical Director.
- Copies of all Medical and Technical staff medical Continuing Medical Education credits and certificates will be filed in the Required Documents section of the Quality Assurance Manual.
- Updated ARDMS/CCI and CPR/AHA/ACLS card copies will be maintained by the Technical Director and will be filed in the Required Documents section of the Quality Assurance Manual.
- Sonographers who are newly hired must be credentialed by the ARDMS and/or CCI, or they will be required to achieve appropriate credentials within the first one year of employment at our facility. Sonographers who do not satisfactorily meet this requirement will be unable to maintain employment at our facility.
- Sonographers who are unregistered, will be considered trainees and their work will be directly supervised by the Technical Director until the appropriate credentials are achieved.

CONTINUING MEDICAL EDUCATION:

- The Medical Director must be a legally qualified physician.
- The Technical Director must be a qualified, registered sonographer.
- All non-trainee members of the technical staff must be qualified, registered sonographers.
- Quality assurance requires that the Medical Director and Technical Director must document at least 15 hours of continuing education over a 3 year period.
- Quality assurance requires that each member of the Medical and Technical staff must document at least 15 hours of continuing education in echocardiography over a 3 year period.
- The distribution of Continuing Medical Education credits for each staff member will be outlined in the Echocardiography Lab, as described above.
- All members of the Medical and Technical staff are responsible for keeping his or her own Continuing Medical Education records up to date and on file within the department.

AVOIDANCE OF MUSCULOSKELETAL INJURY

- All ultrasound/echocardiography staff members will be required to take all necessary steps to avoid work-related musculoskeletal injuries.
- Sonographers will be responsible to research and follow industry standards for proper ergonomics related to ultrasound scanning procedures.
- If available, 1 hour of CME Credit will be required as relating to avoidance of musculoskeletal work-related injuries. CME credit sources and references can be obtained from the ICACL website: www.icacell.com/online/resources.htm.

Staff members will be responsible to alert the administrative staff of any potential areas of concern related to ultrasound ergonomics and technical safety.

The safety of our employees and patients is of utmost importance and as such, the Medical Director and the Administration of our facility will work with the ultrasound staff to help reduce the risk of work-related musculoskeletal injury. We are committed to avoid work-related injury and will demonstrate this commitment by providing all necessary equipment, positioning tables, chairs and other miscellaneous positioning tools in order to allow proper positioning of the echocardiography patients during the ultrasound examinations and to decrease the likelihood of musculoskeletal injuries.



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