

DEPARTMENT OF THE ARMY
HEADQUARTERS, WALTER REED ARMY MEDICAL CENTER
6900 Georgia Avenue N.W.
Washington, DC 20307-5001

WRAMC Pamphlet
No. 40-2

2 August 2001

Medical Records
TELE-ECHOCARDIOGRAPHY CONSULT MANAGEMENT

1. History

This is a new Walter Reed Army Medical Center (WRAMC) regulation.

2. Applicability

All North Atlantic Regional Medical Command (NARMC) Echocardiology Laboratories, including relevant staff, commanders and directors.

3. Purpose

This Clinical Business Practice is provided as a guide to the successful implementation and operation of a tele-echocardiograph consult system.

4. References

a. Telemedicine Policy Memorandum, 15 December 1997.

b. WRAMC Echocardiology Laboratory document entitled: The Normal Adult Echocardiograph Examination.

c. MedVizer Tele-Echocardiography Reference Manual.

5. Scope of Care

Patients referred for Echocardiograph testing by physicians who wish expedited and cost-effective consults with Cardiology specialists at the WRAMC.

6. Responsibilities

a. Referring Facility.

(1) Chief of Cardiology.

(a) Oversees all aspects of clinical care, training and research in the Echo lab.

i. Insure that all lab personnel are appropriately trained.

ii. Oversee Echocardiography training of all necessary primary and alternate personnel.

(b) Review lab techniques for adherence to accepted national standards.

(c) Represent the Echo Lab to the Cardiology Service Quality Improvement (QI) committee.

(d) Establish a back-up procedure to ensure consultant coverage at all times.

(e) Arrange for cardiologists not regularly involved in the tele-echo project to review a randomly selected sample of consults for QI purposes.

(2) Laboratory Chief.

(a) Review technical aspects of echocardiograph testing to ensure accuracy.

(b) Secure and maintain equipment used for research purposes.

(c) Conduct echocardiograph tests for research purposes and maintain research data files.

(d) Coordinate the In-Service lecture series for echocardiology technicians.

NARMC Pam 40-2

(3) Referring Provider.

(a) Give patient a signed Standard Form 513 (Consultation Sheet) for referral that describes physical exam findings in sufficient detail for the Echocardiographer to properly focus the study.

(b) Check to see that the interpreted consult is returned within 72 hours (plus local procedure).

(c) Query Echo-technician as to missing/late studies.

(d) Ensure that a stand-in cardiologist has been notified of all scheduled leaves and foreseeable absences two weeks prior or as soon as possible.

(4) Echocardiograph Technician.

(a) Assist in maintenance, security, calibration and quality control of Echo equipment, as directed by the Non-Commissioned Officer-in-Charge (NCOIC).

(b) Conduct daily Echo testing with accuracy, efficiency and compassion.

(c) Serve as Training Non-Commissioned Officer (NCO) or Logistics NCO as directed by NCOIC.

(d) Independently perform standard examinations.

(e) Establish and maintain necessary intravenous lines.

(f) Capable of basic nursing procedures related to echocardiography, including monitoring vital signs, the use of oxygen to assist breathing, and in the provision of cardiopulmonary resuscitation (CPR) /advanced cardiac life support.

(g) Knowledge of ultrasound physics, energy, electrical power and types of electrical circuits, diverse equipment settings to compensate for varying patient size and pathology.

(h) Knowledge of the construction, maintenance and use of digital and analog computer systems sufficient to operate those systems proficiently, and to spot malfunctions and determine when maintenance or repair is needed.

(i) Consult with echocardiologist to establish requirements for non-standard examinations.

(j) Assist in scheduling patients for examinations. Evaluate the nature of critical and emergency procedures and rearrange patient priorities to accommodate them. Maintain meticulous records of patients examined and a permanent record of the echocardiograph studies performed.

(k) Advise the cardiologists of urgent preliminary diagnostic evaluations and notify them of studies requiring their immediate attention while the patient is undergoing examination.

(l) Perform preventative maintenance on the equipment.

(m) Review literature for new developments in the field, with a specific focus on improving the quality of echocardiograph examination.

(n) Assist the echocardiologist in the performance of special applications such as transesophageal echo.

(o) Basic Cardiac Life Support (BCLS) certification.

(5) NCOIC.

(a) Responsible for the daily accountability and conduct of laboratory enlisted personnel.

(b) Oversee technical training and maintain competency files for all lab personnel.

(c) Secure and maintain in good working order all echocardiograph equipment and supplies.

(d) Coordinate leaves, passes and other absences of lab personnel to ensure adequate staffing levels.

(e) Ensure completion of the laboratory QI program.

(f) Provide QI reports to the director, as requested.

(g) Prepare and maintain echocardiograph computerized scheduling.

(h) Provide workload accounting in Composite Health Care System (CHCS), Uniformed Chart of Accounts Personnel Utilization System (UCAPERS), and Military Evaluation Personnel Reporting System (MEPRS) as directed.

(i) Distribute and maintain copies of echocardiograph test results, in accordance with applicable storage and confidentiality procedures.

(j) Copy referring facility on QI reports.

(k) Report usage statistics on a weekly or a monthly basis, including total number of consults performed each period, provide to consult.wramc@na.amedd.army.mil, (202) 782-4031.

b. Consulting Facility.

(1) Chief of Cardiology.

(a) Oversees all aspects of clinical care, training and research in the Echo lab.

i. Ensure that all lab personnel are appropriately trained.

ii. Oversee Echocardiography training of all necessary primary and alternate personnel.

(b) Review lab techniques for adherence to accepted national standards.

(c) Represent the Echo Lab to the Cardiology Service QI committee.

(2) Consulting Cardiologist.

(a) Regular scheduling of on-call e-mail read/response.

(b) Viewing and research.

(c) Return consult form

i. Turn consult around within 72 hours.

ii. QI for consults not returned within 72 hours

(d) Ensure the availability of backup consultants in the case of all scheduled or foreseeable absences.

(3) NCOIC.

(a) Responsible for the daily accountability and conduct of laboratory enlisted personnel.

(b) Oversee technical training and maintain competency files for all lab personnel.

(c) Secure and maintain in good working order all echocardiograph equipment and supplies.

(d) Coordinate leaves, passes and other absences of lab personnel to ensure adequate staffing levels.

(e) Ensure completion of the laboratory QI program.

(f) Provide QI reports to the director, as requested.

(g) Prepare and maintain echocardiograph computerized scheduling.

(h) Provide workload accounting in CHCS, UCAPERS and MEPRS as directed.

(i) Distribute and maintain copies of echocardiograph test results, in accordance with applicable storage and confidentiality procedures.

(j) Copy referring facility on QI reports.

(k) Report usage statistics on a weekly or a monthly basis, including total number of consults performed each period to e-mail, consult.wramc@na.amedd.army.mil, phone number (202) 782-4028.

c. General

(1) System Administrator (refer to MedVizer Reference Manual).

(a) Maintenance on acquisition station.

- (i) Disk space.
- (ii) Volume management.
- (iii) Mail server, settings and timing.

(iv) Coordinate file replication to coincide with off-peak network use.

(b) Maintenance on server.

- (i) Disk space.
- (ii) Mail server, settings and timing.
- (iii) Coordinate file replication to coincide with off-peak network use.

6. Preparation

a. Referring Facility.

(1) Optimize Your Environment.

(a) Choose a room with a controlled, comfortable environment.

- (i) Set thermostat and fan to maintain a temperature comfortable to the patient.
- (ii) Curtain off the testing area in non-private rooms.

(b) Adjust light levels for best image resolution.

(i) Blinds, drapes and shades, as well as the position of portable lamps and/or properly set dimmer switches.

(c) Take universal precautions, as appropriate to each patient.

- (i) Blood borne pathogens.
- (ii) Airborne pathogens.
- (iii) Caustic chemicals that may be present in the exam room.

(d) Setup necessary supplies within easy reach.

- (i) Patient drapes, towels, gowns and examination gloves.
- (ii) Ultrasound gel, alcohol swipes.

(iii) Super very high-speed (VHS) grade videotapes with storage area, log book for quality assurance and patient information.

(iv) Step-stool for elderly patients.

(v) Intravenous (I.V.) pole.

(vi) Chair with adjustable height and back support (where available).

(vii) Padded bed of a height that can be used comfortably from the accompanying chair, at a minimum the bed should incline at the head.

(2) Preparing the Echocardiograph.

(a) Equipment maintenance and testing.

(i) Advise the facility NCOIC of any problems immediately.

(b) Set gain, compress, filter, and other settings to nominal values before beginning.

(c) Choose a transducer frequency appropriate for your patient.

(i) 7 megahertz (MHz) for premature neonates.

(ii) 5-3.5 MHz for children.

(iii) 2.5-4 MHz for thin-chested or young adults with good windows.

(iv) 2-2.5 MHz for general adult use. Use 2 MHz for patients whose size or Chronic Obstructive Pulmonary Disease (COPD) has led to increased anterior/posterior (AP) diameter.

(v) Be aware of special circumstances in which you may wish to change frequencies in order to improve image quality. (Using 3.5 MHz to visualize apical thrombus, for example).

(a) Once it is powered on, the echocardiograph should self-test.

(3) Preparing MedVizer.

(a) Log on to the respective domain with the assigned user name and password provided by your system administrator.

(b) Adjust unit and screen position to maximize comfort and ease of use, particularly when capturing echo data on the MedVizer unit and the Echocardiograph simultaneously.

(i) Local protocols may not require simultaneous capture on both machines—be aware of requirements in order to prevent duplication of effort.

(c) Right click on any part of the desktop, before starting MedVizer, and select Properties, then Screen Saver. Be sure that the screen saver is turned off.

(d) In other respects MedVizer should already be functional. Note that the unit must be left running at all times, both to insure that files are transferred automatically and on schedule, and to preserve program settings. Double click on the MedVizer icon on the desktop, and then log on with your MedVizer password each day. DO NOT log out from the Windows operating system at the end of the shift and DO NOT shut down the Windows operating system.

(i) If the unit was un-powered when you began your shift, turn the system on and proceed with the days testing as usual. Files from the previous day should transfer that night, along with the tests from that day. Contact the NCOIC, who will coordinate the notification of the referring and consulting physicians.

(ii) If the unit displays a network error message, proceed as above, and contact the system administrator as well to ensure that MedVizer can be reconnected to the network as quickly as possible.

(e) Before beginning a study, be sure that the MedVizer capture station is plugged in to the Super video port in the rear of the echocardiograph machine. This port is near the bank of coaxial ports.

(4) Preparing the patient.

(a) Greet the patient and make him/her feel comfortable.

(b) Record the patient's name, age, sex, physical condition, indication for examination and working differential diagnosis.

(c) Use enough gel to insure a clear image.

8. Procedures

a. Referring facility.

(1) Imaging.

(a) Choose a depth for all images that results in the heart occupying most of the video screen. There will be times during the examination when you may wish to change the depth setting in order to improve the visualization of certain cardiac structures; e.g., decreasing the depth so that the left ventricle occupies most of the screen in order to capture regional wall motion anomalies or to visualize the apical thrombus, or increasing the depth in order to capture pulmonary veins or retro-cardiac masses.

(b) For 2-Dimensional and M-mode imaging, use just enough gain to adequately visualize cardiac structures. Too much gain can produce imaging artifacts; too little can result in echo dropout.

(c) To improve resolution, decrease the sector width (especially on the HP) to only visualize the structure that you are imaging. This tactic also applies when using color Doppler imaging.

(d) Use the zoom feature sparingly. On the HP, this enlarges the image without improving the resolution. It is better to decrease both the depth and the sector width. On the Acuson also, the 'res' feature can cause loss of resolution when the image is enlarged.

(e) Shift the patient's position and posture as needed to produce the best possible images.

(f) In general, record more 2-dimensional images than M-mode, color flow, or spectral Doppler. For each view, record at least 10 beats of 2-D to allow adequate assessment of regional wall motion abnormalities.

(g) In addition to 10 beats, record a moving "scan" view of the appropriate cardiac structures. For example, scan the heart from base to apex or apex to base when taking the short axis view, and scan the mitral valve to show all scallops if you are suspicious of a mitral valve prolapse. When using color Doppler, be similarly prepared to scan suspicious areas such as the above mitral valve in color, in order to locate possible eccentric mitral regurgitation (MR) jets.

(h) For color Doppler imaging, slowly increase the gain until you see "sparkling," then decrease the gain slightly until color fills in the chambers.

(i) Always think three (3) dimensionally, even while scanning in two (2). Always keep in mind the interconnections and spatial relationships between cardiac structures.

(j) M-mode imaging is an important procedure for timing events such as valve

opening and closure, assessing for tamponade, etc. It can also help in separating artificial echoes from real ones. Echoes produced by cardiac structures are linear, having finite thickness and motion. Placing an M-mode cursor through fluttering echoes on a cardiac valve can help to establish the presence of vegetation. An M-mode in the left atrium during a contrast injection may help to establish the presence of a right to left shunt.

(l) Review echocardiograph studies for completeness, taking additional images as needed or when requested.

(2) Capture through MedVizer.

(a) To begin a study, click Add in the Action window. Click yes on the dialogue box that appears. MedVizer will automatically display the last study that was performed, until the Add button is clicked.

(b) Key in patient demographics as prompted by MedVizer.

(i) Fill in white fields normally.

(ii) Blue fields represent "pick lists." Right click on blue fields to display a list of previously typed entries for that field. Left click on a blue field and press the F4 key to bring up an edit screen that allows you to add or remove entries from the displayed list. You may also type in the blue fields normally.

(iii) Be sure to list the correct Cardiologist in the appropriate field.

(c) Click on Grab Clip under the Action window to prepare the video capture program.

(i) When the numbers at the bottom left corner of the video clip display turn green, the device is ready to capture video images from the echocardiograph.

(ii) Press the foot pedal, or click on the numbers or the Grab Clip button to begin recording. Note that there will be a slight delay before recording actually begins.

(iii) MedVizer will automatically record a clip of preset length. To terminate recording short of this limit, press the foot pedal, click the moving red numbers at the bottom left corner of the video display, or click on the Grab Click button again.

(iv) To alter the preset recording length, click Options in the Action Window, and select Clip Length. Set the desired duration in whole seconds, and click OK.

(v) Should you need to delete a video clip, right click on the clip in the video display, and click delete.

(d) The five views that should be included in each study are: Peristernal Long Axis, Peristernal Short Axis, Apical 4-chamber, Apical 2-chamber, and SubZyphoid View.

(e) To suspend recording and view clips, press the right side of the foot pedal. You may then play any clips from the video display by double clicking on them.

(i) Clicking "View All" at the top of the video display will cause all of the clips that you have taken so far in that study to be displayed consecutively.

(ii) To resume recording, you must right click on the video playback window to clear it, and then press the center foot pedal.

(f) If a video related "file run time error" occurs, close the video playback window and then click Grab Clip to reload the viewing program. Should this occur while recording, follow the above steps to delete the bad video file.

(3) Finishing a study.

(a) Echocardiographers are only responsible for filling out relevant data on the main screen.

(i) Be aware that in earlier versions of the MedVizer program, the Septal thickness field can only display up to 1 decimal place.

(b) Click Send in the Action Window to bundle the locked record and video clips in the

mail queue. The packing and queuing process is automatic—simply wait for the screen to clear of the packing information to begin a new study.

(c) At the end of the shift, you may turn off the monitor of the capture station utilizing the switch part way down the right side of the screen. *Do Not Turn Off The Capture Station, Nor Shut Down The Windows Operating System, Nor Log Out Of The Network.*

b. Consulting facility.

(1) View Interpretation.

(a) The view interpretation window contains a number of potential search modes for patient records. General information on searching for records can be found in section 7C, *infra*. After running a search in the desired mode, double-click on a record from the list that appears.

(b) While viewing the record, the consulting cardiologist has the option to complete several bubble screens with detailed information and conclusions about the patient under review. These screens are listed in the Main window (beneath the patient information) and include 8 separate categories that may be of concern.

(c) Once the consult has been completed, click "Done Interp". This marks the record as read in the patient database.

(d) Click Lock Record in the Action Window to prevent any future alterations to the patient record. Do not click this until all interpretations are complete to your satisfaction, and all necessary information has been entered into the program.

(e) In the Action window, click Send. This will open up a screen through which the interpreted study may be sent to either the echocardiographer for relay to the requesting physician, or to the requesting physician directly (where the system administrator has included that address in the MedVizer Phonebook).

(f) Repeat the above steps as necessary. The consulting cardiologist will be

the same physician who is listed as the on-call cardiologist at the consulting site. Referrals should be waiting each morning for interpretation, if there are any requests. Interpretations should be completed and turned around within 72 hours plus local procedure.

(g) QI should be completed for any study that is not returned within the above window, as per the procedures established by the NCOIC.

c. General.

(1) Searching for Records is essentially the same for all MedVizer operations. A number of fields will appear, with each field representing a possible search parameter. It is suggested that you use the minimum search criteria possible for the record(s) that you wish to retrieve, as the computer adheres exactly to the search criteria. Any incorrect data in any of the fields could prevent MedVizer from finding your record, so be sure that all fields that you do not wish to search with remain blank. For example, to pull up all records from a certain date, enter only that date, and be sure that all other fields are empty. To retrieve all records on a given drive, enter no criteria at all.

(i) Locked under the View Interpretation window will allow you to search all locked records. This feature is only available on dedicated viewing stations.

(ii) Read under the View interpretation window will allow you to search all records marked as read by the consulting cardiologist. This feature is only available on dedicated viewing stations.

(iii) Search under the View Interpretation window will allow you to search all patient records on file. This feature is only available on dedicated viewing stations.

(2) Patient Reports.

(i) Clicking on Report under the Action Window brings up a copy of Form SF 513-110 that MedVizer will fill out with the information from the various bubble sheets. This information should include the following 2D

measurements: Right Ventricle, Left Ventricle, Aortic Root, Left Atrium, Aortic valve and Septal thickness. The Echocardiographer should also include the following Doppler measurements: Mitral, Aortic, Tricuspid (if applicable), Pulmonic and Left Ventricular Outflow Track, in terms of peak gradient, valve area and degree of ventricular regurgitation.

(ii) The Echocardiographer should also include their impressions in the comment field.

9. RECORDKEEPING

a. Referring Facility. Local procedures shall address the following components:

(1) Paper records, where applicable according to local procedures.

(a) Copies of Echocardiography reports from scheduled studies, from all referred patients, and on patients expected to undergo repeated testing will be maintained on file as per local procedure.

(2) Computer records are to be maintained in the network drive as active files for a period specified by local procedure.

b. Consulting Facility.

(1) Paper records.

(a) At the consult level, paper records should be unnecessary. Should printouts be made of individually identifiable patient records, Cardiology consultants are cautioned to restrict access to such records and to destroy or securely file them when no longer needed, in order to preserve patient privacy.

(2) Computer records.

(a) Again, it is unlikely that records will need to be maintained or archived on drives or other media at the consulting facility. Privacy concerns must be addressed for any copies that are made.

10. WORKLOAD

a. Referring facility.

(1) Workload and accounting is the responsibility of the lab NCOIC. Tasks may be delegated as appropriate.

(2) Written or electronic reports will be completed by the last day of each month for the current month.

(3) Workload data will be reported in the appropriate format, with a copy delivered to manpower and UCAPERS.

(4) A workload database detailing the number and type of tests performed and the referring service will be maintained and provided to the director on a monthly basis.

b. Consulting facility.

(1) The procedure codes on Ambulatory Data System (ADS) workload sheets are the responsibility of the consulting cardiologist for all patients tested.

The proponent agency of this publication is the office of the North Atlantic Regional Medical Command, Walter Reed Army Medical Center, Telemedicine Directorate. Users are invited to send suggestions and comments on DA Form 2028 (Recommended Changes to Publications and Blank Forms) to Commander, Walter Reed Army Medical Center, ATTN: MCAT-CL-T, 6900 Georgia Avenue N.W., Washington, DC 20307-5001.

FOR THE COMMANDER:

OFFICIAL:

THOMAS E. BROYLES
Colonel, MS
Chief of Staff
North Atlantic Regional Medical Command

KAREN J. WAGNER
Lieutenant Colonel, MS
Secretary of the General Staff
North Atlantic Regional Medical Command

DISTRIBUTION:

A