IAC Standards and Guidelines for Perioperative Transesophageal Echocardiography Accreditation

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Introduction

The Intersocietal Accreditation Commission (IAC) / Echocardiography accredits imaging facilities specific to echocardiography. IAC accreditation is a means by which facilities can evaluate and demonstrate the level of patient care they provide. Perioperative Transesophageal Echocardiography (PTE) accreditation is a program designed to accredit services that perform adult perioperative transesophageal echocardiography. For the purposes of IAC accreditation, PTE includes intraoperative TEE performed in a traditional operating room setting and may also include intraprocedural TEE performed, for example, during structural heart disease or other transcatheter-based interventions in a traditional operating room, a hybrid operating room, a catherization laboratory or an electrophysiology laboratory.

While it is recognized that some services may employ other echocardiographic imaging modalities in the perioperative setting (such as transthoracic, epiaortic, epicardial and / or intracardiac echocardiography) as well as in other environments such as the intensive care unit or the post-anesthesia care unit, the IAC / PTE accreditation program is limited to the intraoperative and intraprocedural setting specified above. This is not meant to preclude the provision of these other imaging modalities and service locations by members of an accredited PTE service (which may be performed according to local institutional practice and credentialing standards), but rather to clarify that these other services / locations do not fall under the umbrella of IAC / PTE accreditation, the focus of which is in the intraoperative / intraprocedural arena.

A perioperative TEE service is defined as an entity located at one postal address, composed of at least one ultrasound instrument and a Medical Director performing and/or interpreting perioperative TEE as well as appropriate support personnel. Each perioperative TEE service must have a Medical Director and a Technical Manager who is responsible for operational issues such as equipment maintenance, TEE probe cleaning and image archiving. There may be additional physicians and staff. The designation of the title of Medical Director and Technical Manager are for IAC accreditation purposes only.

An accredited PTE service requires the interpreting physicians to be adequately trained and experienced to interpret and perform TEE. Published documents recognize that echocardiography requires considerable training and expertise (see Bibliography). Although published opinions vary with regard to the absolute numbers necessary for attaining and maintaining competence in TEE, all agree that numbers of studies performed or interpreted are helpful but not sufficient by themselves to assure clinical competence.

The intent of the accreditation process is two-fold. It is designed to recognize facilities that provide quality perioperative TEE services. It is also designed to be used as an educational tool to improve the overall quality of the service.

These accreditation Standards and Guidelines are the minimum standards for accreditation of perioperative TEE services. Standards are the minimum requirements to which an accredited perioperative TEE service is held accountable. Guidelines are descriptions, examples, or recommendations that elaborate on the Standards. Guidelines are not required but can assist with interpretation of the Standards.

Standards are printed in regular typeface in outline form. *Guidelines are printed in italic typeface in narrative form*.

In addition to all Standards listed below, the service, including all staff, must comply at all times with all federal, state and local laws and regulations, including but not limited to laws relating to licensed scope of practice, perioperative transesophageal service operations and billing requirements.

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Part A: Organization

Section 1A: Personnel and Supervision

STANDARD – Medical Director

1.1A The Medical Director must be a licensed physician and may be an anesthesiologist OR a cardiologist.

1.1.1A Medical Director Required Training and Experience

The Anesthesiologist Medical Director must meet ONE of the following initial qualifications:

1.1.1.1A National Board of Echocardiography (NBE) active Advanced PTE Certification status

AND

Qualifying practice experience over previous 18 months:

i. TEE - 75 examinations / 18 months

1.1.1.2A National Board of Echocardiography (NBE) active Testamur status

AND

Qualifying practice experience over previous 18 months:

i. TEE - 150 examinations / 18 months

1.1.1.3A Cumulative practice experience of at least 250 PTE examinations

AND

Qualifying practice experience over previous 36 months:

i. TEE - 150 examinations / 36 months

Comment: In addition to the initial qualifications, physicians must meet Ongoing Practice Experience and Continuing Medical Education Requirements as defined by the Standards outlined in this document.

(See Guidelines on Page 8 for further recommendations.)

OR

The Cardiologist Medical Director must meet ONE of the following initial qualifications:

1.1.1.4A National Board of Echocardiography (NBE) active Testamur status

AND

Qualifying practice experience over previous 18 months:

i. TEE - 75 examinations / 18 months

1.1.1.5A Level 2 or 3 COCATS echocardiography training

AND

Qualifying practice experience over previous 24 months:

i. TEE - 100 examinations / 24 months

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1.1.1.6A Cumulative practice experience of at least 1,800 echocardiography examinations

AND

Qualifying practice experience over previous 36 months:

i. TEE - 150 examinations / 36 months

Comment: In addition to the initial qualifications, physicians must meet Ongoing Practice Experience and Continuing Medical Education Requirements as defined by the Standards outlined in this document.

1.1.2A Ongoing Practice Experience Requirements

Performance/interpretation of an average minimum number of TEE examinations per year:

1.1.2.1A TEE 50 examinations / year

1.1.3A Medical Director Responsibilities

The Medical Director responsibilities include but are not limited to:

1.1.3.1A overseeing all clinical services provided and determining the quality and appropriateness of care provided;

1.1.3.2A supervising the entire operation of the facility or may delegate specific operations to associate directors, if applicable, and the Technical Manager;

1.1.3.3A assuring compliance of the medical and ancillary staff to the Standards outlined in this document and the supervision of their work; and

1.1.3.4A active participation in the interpretation of studies performed in the facility.

1.1.4A Continuing Medical Education (CME) Requirements

1.1.4.1A The Medical Director must document at least 30 hours of CME relevant to cardiac imaging over a period of three years. CME credits must be earned within the three-year period prior to application submission.

i. At least 10 hours must be perioperative transesophageal echocardiography related.

1.1.4.2A Yearly accumulated CME must be kept on file and available for submission upon request.

(See Guidelines on Page 8 for further recommendations.)

Comment: If within the past three years the Medical Director has completed formal training or has acquired/renewed NBE Testamur/certified status, the CME requirement will be considered fulfilled.

STANDARD – Technical Manager

1.2A A qualified Technical Manager must be designated for the service.

1.2.1A Technical Manager Responsibilities

The Technical Manager reports directly to the Medical Director or his/her delegate.

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1.2.1.1A Responsibilities must include, but are not limited to:

i. all duties delegated by the Medical Director;
ii. general supervision of the ancillary staff (if applicable);
iii. delegation, when warranted, of specific responsibilities to the ancillary staff (if applicable);
iv. care, cleaning and maintenance of the equipment used by the service;
v. compliance of the ancillary staff to the Standards outlined within this document (if applicable);
vi. working with the Medical Director, medical staff and ancillary staff to ensure adequate archiving and timely reporting of examinations.

STANDARD – Medical Staff

1.3A All members of the medical staff must be licensed physicians and may be anesthesiologists AND/OR cardiologists.

1.3.1A Medical Staff Required Training and Experience

The anesthesiologist medical staff members must meet ONE of the following initial qualifications:

1.3.1.1A National Board of Echocardiography (NBE) active Advanced PTE Certification status

AND

Qualifying practice experience over previous 12 months:

i. TEE - 25 examinations / 12 months

1.3.1.2A National Board of Echocardiography (NBE) active Basic PTE Certification status.

AND

Qualifying practice experience over previous 12 months:

i. TEE - 25 examinations / 12 months

1.3.1.3A Cumulative practice experience of at least 150 PTE examinations

AND

Qualifying practice experience over previous 36 months:

i. TEE - 75 examinations / 36 months

OR

The cardiologist medical staff members must meet ONE of the following initial qualifications:

1.3.1.4A National Board of Echocardiography (NBE) active Testamur status

AND

Qualifying practice experience over previous 12 months:

i. TEE - 25 examinations / 12 months

1.3.1.5A Level 2 or 3 COCATS echocardiography training

AND

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Qualifying practice experience over previous 12 months:

i. TEE - 25 examinations / 12 months

1.3.1.6A Cumulative practice experience of at least 600 echocardiography examinations, 50 must be perioperative TEE.

AND

Qualifying practice experience over previous 12 months:

i. TEE - 25 examinations / 12 months

Comment: In addition to the initial qualifications, physicians must meet Ongoing Practice Experience and Continuing Medical Education Requirements as defined by the Standards outlined within this document.

(See Guidelines on Page 8 for further recommendations.)

1.3.2A Ongoing Practice Experience Requirements

Performance/interpretation of an average minimum number of perioperative TEE examinations per:

1.3.2.1A TEE 25 examinations / year

1.3.3A Medical Staff Responsibilities

Medical staff responsibilities include but are not limited to:

1.3.3.1A The medical staff performs and/or interprets transesophageal echocardiography studies.

1.3.4A Continuing Medical Education (CME) Requirements

1.3.4.1A The medical staff must document at least 15 hours of CME relevant to cardiac imaging over a period of three years. CME credits must be earned within the three-year period prior to application submission.

i. 5 hours must be perioperative transesophageal echocardiography related.

1.3.4.2A Yearly accumulated CME must be kept on file and available to the IAC when requested.

(See Guidelines on Page 8 for further recommendations.)

Comment: If within the past three years the medical staff member has completed formal training or has acquired/renewed NBE certified/Testamur status, the CME requirement will be considered fulfilled.

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Section 1A: Personnel and Supervision
Guidelines

1.1.1A For the cardiologist Medical Director 25 examinations per year should be perioperative TEE.

1.3.1A For the cardiologist medical staff 10 examinations per year should be perioperative TEE.

1.1.4A and 1.3.4A One hour of CME or non-CME work-related musculoskeletal disorder (WRMSD) training is recommended for all staff. This can be fulfilled through CME, in-service training or IAC webcast.

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Section 2A: Perioperative Service

STANDARD – Examination Areas

2.1A Examinations must be performed in a setting providing patient and staff safety, comfort and privacy.

2.1.1A The adequate performance of an echocardiogram requires the proper positioning of the patient, the echocardiographic system and the echocardiographer. For this reason, adequate spacing is required for inclusion of an operating/procedure table, an echocardiographic imaging system and the echocardiographer.

2.1.1.1A Practice locations may include any of the following:

i. operating rooms, electrophysiology laboratories, catheterization laboratories or hybrid operating rooms.

STANDARD – Instrument Maintenance

2.2A Instrumentation used for diagnostic testing must be maintained in good operating condition. The accuracy of the data collected by ultrasound instruments is paramount in the interpretation and diagnostic utilization of the information collected. Equipment maintenance includes, but is not limited to the following:

2.2.1A Recording of the method and frequency of maintenance of ultrasound instrumentation.

2.2.2A Establishment of and adherence to a policy regarding routine safety inspections and testing of all electrical equipment used by the service.

2.2.3A Establishment of and adherence to an instrument cleaning schedule that includes routine cleaning of equipment parts, including filters and transducers, according to the specifications of the manufacturer. The cleaning schedule must be frequent enough to allow for accurate collection of data.

2.2.4A Establish a policy of cleaning/decontaminating the ultrasound system, cables, etc., between patient use in accordance with local infection control policies/procedures.

2.3A Transesophageal Ultrasound Transducer

2.3.1A The manufacturer's guidelines must be followed for the appropriate care and cleaning of the TEE transducer and adhere to the appropriate infectious disease standards to prevent the transmission of disease. The structural and electrical integrity of the transducer must be checked between each use, using an ultrasound transducer leakage tester. "Passed" or "Failed" must be documented in the routine TEE probe cleaning / maintenance log along with action taken if "Failed."

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Section 3A: Examination Reports and Records

STANDARD – Records

3.1A Provisions must exist for the generation and retention of examination data for all echocardiograms performed. Measures for HIPAA compliance and IT security must be in place.

3.1.1A A system for recording and archiving echocardiographic data (images, measurements and final reports) obtained for diagnostic and/or monitoring purposes must be in place.

3.1.2A A permanent record of the images and interpretation must be made and retained in accordance with applicable state or federal guidelines for medical records, generally five to seven years. Images and interpretation must be retrievable for comparison with new studies.

3.1.3A All studies must be transferred from the ultrasound system to the PACS system/server. There must be a secure backup solution.

STANDARD – Examination Interpretation and Reports

3.2A Provisions must exist for the timely reporting of examination data.

3.2.1A Essential/preliminary findings must be entered into the clinical record within four to six hours of the conclusion of the case.

3.2.2A A final (written) report must be completed within 72 hours.

3.3A Perioperative echocardiography reporting must be standardized in the service. All physicians interpreting echocardiograms in the service must agree on uniform diagnostic criteria and a standardized report format.[5]

3.3.1A The report must accurately reflect the content and results of the study. The report must include, but may not be limited to:

3.3.1.1A Demographics:

i. date of the study;
ii. name and/or identifier of the facility;
iii. name and/or identifier of the patient;
iv. date of birth and/or age of the patient;
v. indication for the study;
vi. name of the performing echocardiographer;
vii. height;
viii. weight;
ix. gender.

Comment: The information must be sufficient to allow for the identification and retrieval of previous studies on the same patient.

3.3.2A The final report must be completely typewritten, including the printed name of the interpreting physician. The final report must be reviewed, signed and dated manually or electronically by the interpreting physician. Electronic signatures must be password protected and indicate they are electronically recorded. Stamped signatures or signing by non-physician staff is unacceptable.

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3.4A Perioperative Transesophageal Echocardiogram Report Components

3.4.1A The final report must accurately reflect the content and results of the study. The report must include, but is not limited to the following elements:

3.4.1.1A Ease of transducer insertion;

3.4.1.2A Complications (yes or no); and

3.4.1.3A Components of the procedure (e.g., 2-D and/or 3-D imaging, color flow Doppler, PW/CW Spectral Doppler, saline contrast administration and ultrasound enhancing agent used).

3.4.2A The final pre-procedural report text must include comments on the evaluation of the following structures:

3.4.2.1A left ventricle;

3.4.2.2A right ventricle;

3.4.2.3A left atrium;

3.4.2.4A right atrium;

3.4.2.5A left atrial appendage;

3.4.2.6A interatrial septum;

3.4.2.7A aortic valve;

3.4.2.8A mitral valve;

3.4.2.9A tricuspid valve;

3.4.2.10A pulmonic valve;

3.4.2.11A pericardium;

3.4.2.12A aorta; and

3.4.2.13A measurements and Spectral Doppler data (if obtained).

Comment: If any structure is not well visualized on the pre-procedural examination, this must be noted in the report.

3.4.3A The final post-procedural report text must include comments relevant to the procedure performed.

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Section 4A: Perioperative Service Safety

STANDARD – Patient and Perioperative Service Safety

4.1A Patient and employee safety are promoted by written policies and procedures approved by the Medical Director.

4.1.1A Personnel Safety Policy (Ergonomics) – A policy must be in place to address staff safety, comfort and avoidance of work-related musculoskeletal disorders (MSD).

4.1.2A When in the presence of ionizing radiation, all staff must observe proper radiation safety techniques as prescribed by the facility's policies.

4.1.3A Although transesophageal echocardiographic examinations are considered relatively safe and minimally invasive, they pose potential risks to the safety of the patient due to their minimally-invasive nature. While most of the procedures will be performed in operating rooms, electrophysiology laboratories, catheterization laboratories and hybrid operating rooms it is imperative for any location where a transesophageal echocardiographic procedure is performed to have an emergency procedure plan, and the following emergency supplies must be readily available:

4.1.3.1A a fully equipped cardiac arrest cart (crash cart);

4.1.3.2A a defibrillator;

4.1.3.3A equipment for starting and maintaining intravenous access;

4.1.3.4A oxygen tanks or wall mounted oxygen sources with appropriate cannulae and/or masks; and

4.1.3.5A suction equipment.

(See Guidelines on Page 13 for further recommendations.)

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Section 4A: Perioperative Service Safety
Guidelines

4.1.1A Comment: For additional information regarding MSD, please visit:
www.cdc.gov/niosh/docs/wp-solutions/2006-148
www.sdms.org/pdf/wrmsd2003.pdf

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Section 5A: Administrative

STANDARD – Patient Confidentiality

5.1A All service personnel must ascribe to professional principles of patient-physician confidentiality as legally required by federal, state, local or institutional policy or regulation.

STANDARD – Patient or Other Customer Complaints

5.2A There must be a policy in place outlining the process for patients or other customers to issue a complaint/grievance in reference to the care/services they received at the facility and how the facility handles complaints/grievances.

STANDARD – Primary Source Verification

5.3A There must be a policy in place identifying how the facility verifies the medical education, training, appropriate licenses and certifications of all physicians as well as, the certification and training of all staff members and any other direct patient care providers.

Section 5A: Administrative
Guidelines

Sample documents are available for each of the required policies listed in Section 5A on the IAC Echocardiography website at www.intersocietal.org/helpful-resources/sample-documents-repository.

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Section 6A: Multiple Sites (Fixed and/or Mobile)

STANDARD – Multiple Sites

6.1A When testing is performed at more than one physical facility, the facility may be eligible to apply for a single accreditation as a multiple site facility.

6.1.1A All facilities have the same Medical Director.

6.1.2A All facilities must have a Technical Manager.

6.1.3A Identical testing protocols are used at all sites.

6.1.4A Identical diagnostic criteria are used at all sites.

6.1.5A For multi-site facilities, each site must be represented in the Quality Improvement (QI) process at least annually, whether done locally or centrally.

6.1.6A Equipment of similar quality and capability must be used at all sites.

6.1.7A Quality and safety standards are identical across all sites.

Section 6A: Multiple Sites (Fixed and/or Mobile)
Guidelines

Facilities needing complete details on adding a multiple site should review the current IAC Policies and Procedures available on the IAC website at intersocietal.org/iac/legal/policies.htm.

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Part B: Examinations and Procedures

Section 1B: Perioperative Transesophageal Echocardiography Testing

STANDARD – Instrumentation

1.1B Cardiac Ultrasound Systems

1.1.1B Ultrasound instruments utilized for perioperative transesophageal echocardiographic studies (PTEs) must include the echocardiographic imaging system requirements:

1.1.1.1B M-Mode imaging;

1.1.1.2B 2-D imaging (the system must include harmonic capabilities);

1.1.1.3B spectral display for pulsed (PW) and continuous wave (CW) Doppler and tissue Doppler imaging;

1.1.1.4B color flow Doppler imaging; and

1.1.1.5B monitor or other display method of suitable size and quality for observation and interpretation of all modalities.

Comment: The display or DICOM header must identify the parent institution, the name of the patient, second patient identifier (such as MRN or DOB) the date and time of the study. The ECG must also be displayed.

(See Guidelines on Page 21 for further recommendations.)

1.1.2B Capabilities to measure the distance between two points, an area on a 2-D image, blood flow velocities, time intervals and peak and mean gradients from spectral Doppler studies.

1.1.3B Transesophageal ultrasound transducers must incorporate multiplane imaging capabilities.

STANDARD – Procedure Volumes

1.2B The annual procedure volume must be sufficient to maintain proficiency in examination performance and interpretation.

STANDARD – Indications

1.3B Perioperative transesophageal echocardiography testing is performed for appropriate indications.[1]

1.3.1B Verification of the Indication Policy – Perioperative TEE is routinely indicated in all open heart (i.e., valvular) and thoracic aortic surgical procedures, and may be used in coronary artery bypass graft surgeries. Perioperative TEE is also indicated in noncardiac surgical procedures when patients have known or suspected cardiovascular pathology, which may impact outcomes. In addition, TEE is indicated in guiding the management of catheter-based structural heart or vascular procedures (including, but not limited to septal defect closures, atrial appendage occlusion, and transcatheter valve repairs or replacements).

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1.3.2B Definition of Procedure Types and Protocols

1.3.2.1B TEE examination is one that comprehensively examines all of the cardiac chambers, valves and great vessels from multiple imaging planes and then uses the information to completely define any recognized abnormalities. This study must include appropriate Doppler interrogation of all cardiac valves and structures (e.g., pulmonary veins and atrial appendage) and provide any hemodynamic data felt to be of importance for patient care. The TEE examination may include the use of three-dimensional (3-D) TEE as appropriate. It is recognized that in some instances "limited" TEEs are performed (i.e., in the OR with time constraints or when a follow up examination is performed to evaluate specific pathology) that may limit or prevent a complete evaluation. It is also recognized that certain patient characteristics, variations in anatomy, or pathologies may limit the ability to perform all elements of a comprehensive TEE examination.

1.3.2.2B The perioperative TEE is a minimally invasive examination and usually is performed under general anesthesia in the operating or procedure room. Based on certain indications, the perioperative TEE may be performed using monitored anesthesia care (MAC) or moderate sedation. The facility must demonstrate that all medical staff routinely adhere to the general anesthesia, MAC or moderate sedation policies in place for the medical facility as required by the Joint Commission (JC) or other appropriate accrediting organizations.

STANDARD – Training

1.4B Perioperative transesophageal echocardiography if performed incorrectly, can lead to serious harm to patients and therefore, must be performed by appropriately trained physicians.

1.4.1B All performing physicians must be adequately trained and experienced to perform and interpret the study.

STANDARD – Techniques

1.5B Examination performance must include proper technique.

1.5.1B Elements of study performance include, but are not limited to:

1.5.1.1B transducer insertion;

1.5.1.2B optimization of equipment gain and display settings;

1.5.1.3B utilization of appropriate Doppler technique and measurements;

1.5.1.4B optimization of image orientation to enhance Doppler display; and

1.5.1.5B performance of a 2-D/3-D/Doppler transesophageal examination according to the service specific and appropriate protocol that incorporates all views and imaging planes mandated by 1.6.6.1B (in any sequence).

1.5.2B Elements of study quality include, but are not limited to:

1.5.2.1B demonstration of cardiac structure and function;

1.5.2.2B evaluation of atrial and ventricular septal integrity;

1.5.2.3B evaluation of left atrium and left atrial appendage;

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1.5.2.4B evaluation of ascending aorta, descending aorta and aortic arch;

1.5.2.5B delineation of the details of valvular anatomy;

1.5.2.6B imaging of at least one right and one left pulmonary vein, with Doppler when appropriate.

1.5.2.7B optimal recording and evaluation of spectral and 2-D and/or 3-D color flow Doppler; and

1.5.2.8B adherence to the facility specific and appropriate protocol (except for sequence).

STANDARD – Components of Perioperative Transesophageal Echocardiograms

1.6B Perioperative transesophageal echocardiograms must be comprehensive and include standard components.

1.6.1B Technical Personnel – Due to the complexity of the PTE study, some physicians may ask for appropriate technical personnel to be available to assist the performing physician. These personnel may include a sonographer, a certified nurse anesthetist (CRNA) or a nurse. The duties of these individuals include, but are not limited to:

1.6.1.1B preparing the patient for the test;

1.6.1.2B assisting the physician with the ultrasound equipment;

1.6.1.3B monitoring the patient during and after the examination; and

1.6.1.4B administration of anesthetic medication and airway management.

1.6.2B Preparation of the Patient – To perform PTE studies safely, appropriate safety guidelines must be in place according to the American Society of Anesthesiology (ASA) and American Society of Echocardiography (ASE). Consent must be obtained in a manner consistent with the rules and regulations required by the hospital or facility. A process must be in place to screen for absolute and relative contraindications. The service must meet the standards set forth by the Occupational Safety and Health Administration (OSHA) and by the Joint Commission (JC), where applicable.

1.6.3B Monitored Anesthesia Care (MAC) or Moderate Sedation – If there are reasons not to perform a general anesthetic for the PTE, the facility must recognize the potential need for patient sedation in order to obtain an adequate examination. During the use of MAC or moderate sedation there must be methods in place to assess the patient's level of consciousness pre-procedure and throughout the procedure. All procedures must be explained to the patient and/or the parents or guardians of those unable to give informed consent. Consent must be obtained in a manner consistent with the rules and regulations required by the hospital or facility. Written policies must exist for the use of moderate sedation including, but not limited to:

1.6.3.1B type of sedatives and appropriate dosing; and

1.6.3.2B monitoring during and after the examination.

1.6.4B Monitoring the Patient – An essential component of MAC and moderate sedation is the assessment and management of a patient's actual or anticipated physiological or medical problems that may occur during the diagnostic/therapeutic procedure. Providers should be able to intervene to rescue a patient's airway from any sedation-induced compromise. During the procedure, the vital signs and medical stability of the patient must be periodically evaluated and recorded. The development of instability in either the vital signs or comfort of the patient must be addressed by the performing physician. Facility guidelines for the monitoring of patients who receive intravenous anesthetic agents are required. These written guidelines must be in place and available for all facilities where TEEs are performed. A method to track peri-procedural complications must be maintained.

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1.6.5B Recovery of the Patient – Prior to discharge from the operating or procedure room, the patient must be monitored for a sufficient amount of time to assure that no complications have arisen either from the procedure or the medication administered. The fully monitored and oxygenated patient will then be transferred to an appropriate recovery room (post anesthesia care unit (PACU) or intensive care unit (ICU) within the facility.

1.6.6B Components of the Examination – A protocol must be in place that defines the standard views and components of a comprehensive PTE examination. Indications for performance of a PTE examination must be included. A complete PTE and PTE-Doppler examination includes standard views from multiple planes including views of all cardiac structures and selected extracardiac structures.

1.6.6.1B The complete examination must include the following standard views while allowing for patient tolerance and safety:

i. multiple imaging planes of the short and long axis views of the aortic valve with appropriate spectral and color flow Doppler;
ii. multiple imaging planes of the mitral valve with appropriate spectral and color flow Doppler;
iii. multiple imaging planes of the tricuspid valve with appropriate spectral and color flow Doppler;
iv. multiple imaging planes of the pulmonic valve with appropriate spectral and color flow Doppler;
v. multiplane imaging (midesophageal and transgastric) short and long axis views of the left ventricle;
vi. multiplane imaging (midesophageal and transgastric) short and long axis views of the right ventricle;
vii. multiple imaging planes of the right atrium, left atrium and left atrial appendage with appropriate Doppler;
viii. multiple imaging planes of the atrial septum and foramen ovale with appropriate Doppler;
ix. imaging of the pulmonary veins with appropriate Doppler, when mitral regurgitation is present;
x. multiple imaging planes of the ascending, descending and transverse arch of the aorta;
xi. long axis views of the main pulmonary artery and proximal portions of the right and left pulmonary arteries;
xii. images of the proximal inferior and superior vena cava;
xiii. imaging of the pericardial space and pericardium; and
xiv. when exclusion of an intracardiac shunt is clinically indicated, and none is identified with color Doppler, injection of agitated saline or equivalent is required unless contraindicated.

(See Guidelines on Page 21 for further recommendations.)

1.6.6.2B The post- procedure or post intervention examination must include views and components pertinent to the procedure performed (e.g., post mitral valve repair must include: [1] multiple imaging planes of the mitral valve with appropriate spectral and color flow Doppler, [2] multiple imaging planes of the left ventricle, [3] multiple imaging planes of the tricuspid valve with spectral and color flow Doppler interrogation, [4] multiple imaging planes imaging of the aortic valve, and [5] short and long axis views of the ascending aorta).

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STANDARD – Focused Adult Perioperative TEE

1.7B It is recognized that many PTEs are performed in situations (e.g., in the OR or interventional catheterization suite) that may limit or prevent complete evaluation due to time constraints or are focused studies to answer specific clinical questions. The focused examination when applicable or available must include the following standard views when cardiac anatomy allows:

1.7.1B multiple imaging planes of the left and right ventricle;

1.7.2B multiple imaging planes of the mitral valve with appropriate Doppler;

1.7.3B multiple imaging planes of the aortic valve with appropriate Doppler;

1.7.4B multiple imaging planes of the tricuspid valve with appropriate Doppler; and

1.7.5B short axis and long axis views of the ascending aorta.

Section 1B: Perioperative Transesophageal Echocardiography Testing
Guidelines

1.1B Instrument settings to enable optimization of ultrasound enhancing agents (UEAs) and tissue Doppler imaging are recommended.

1.6.6.1B Whenever possible a post-procedure examination should include all the components of a complete examination enumerated above.

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Part C:
Quality Improvement

Section 1C: Quality Improvement Program

STANDARD – QI Program

1.1C The facility must have a written Quality Improvement (QI) program for all imaging procedures. The QI program must include the QI measures outlined below but may not be limited to the evaluation and review of:

1.1.1C technical quality and, if applicable, safety of the imaging;

1.1.2C interpretive quality review; and

1.1.3C report completeness and timeliness.

STANDARD – QI Oversight

1.2C The Medical Director of the service, staff and/or an appointed QI Committee must provide oversight to the QI program including but not limited to review of the reports of QI evaluations and any corrective actions taken to address any deficiencies.

Section 1C: Quality Improvement Program
Guidelines

The IAC Quality Improvement (QI) Self-Assessment Tool may be utilized that includes all Quality Improvement measures. Learn more at www.intersocietal.org/QITool.

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Section 2C: Quality Improvement Measures

STANDARD – QI Measures

2.1C Facilities must have a process in place to evaluate the QI measures outlined in sections 2.1.1C through 2.1.4C. A minimum of two perioperative TEE cases per quarter must be evaluated and the same cases may be used for all the measures.

(See Guidelines on Page 25 for further recommendations.)

2.1.1C Technical Quality Review (Echocardiographer Performance Variability)

2.1.1.1C The facility must evaluate the technical quality of the images and, if applicable, the safety of the procedure. The review must include but is not limited to the evaluation of:

i. the clinical images for clarity of images and/or evaluation for suboptimal images or artifact;
ii. completeness of the study; and
iii. adherence to the facility imaging acquisition protocols.

2.1.1.2C A minimum of two cases perioperative TEE cases per quarter must be reviewed for image quality, completeness of the study and be reviewed in QI meetings. The cases must represent as many echocardiographers as possible. Discrepancies in acquisition quality and variability must be reconciled to achieve uniform examination quality.

2.1.2C Interpretive Quality Review (Physician Interpretation Variability)

2.1.2.1C The facility must evaluate the quality and accuracy of the interpretation based on the acquired images.

i. A minimum of two perioperative TEE cases per quarter must be evaluated for the quality and accuracy of the interpretation based on the acquired images. The cases must represent as many physicians as possible. Differences in interpretation must be reconciled to achieve uniform examination interpretation.

2.1.3C Final Report Completeness and Timeliness

2.1.3.1C The facility must evaluate the final report for completeness and timeliness as required in the *Standards*.

2.1.3.2C A minimum of two perioperative TEE cases per quarter must be evaluated for completeness and timeliness of the final report as required in the Standards (refer to Standards 3.3A, 3.4.4A for report completeness and Standards 3.2A through 3.2.2A for report timeliness). The reports must represent as many physicians as possible.

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Section 2C: Quality Improvement Measures
Guidelines

2.1C *Correlation*

Correlation should be performed with any appropriate available imaging modality, surgical findings or clinical outcomes for a minimum of four cases annually.

Correlation of Perioperative Transesophageal Echocardiograms: *For those patients who have undergone perioperative or intra-procedural transesophageal echocardiograms during cardiac surgery, surgical or transcatheter valve repair/replacement or other procedures such as left atrial appendage occlusion, intracardiac shunt closure etc. the findings on the transesophageal echocardiogram and other procedures and/or imaging data should be routinely compared with regard to valvular abnormalities, left ventricular function and abnormalities of the aorta. Comparison studies for each physician responsible for the performance of transesophageal echocardiograms in the facility should be accumulated by the facility and distributed to the physician. Statistics should be generated to ascertain the overall accuracy of the transesophageal echocardiograms being performed in the facility. A process for addressing discrepancies between echocardiogram examination results and the results of other procedures should be in place. Appropriate components and areas for correlation of transesophageal echocardiograms include, but are not limited to:*

- *left ventricular function and regional wall motion analysis;*
- *left or right ventricular function;*
- *presence, mechanism, localization and severity of valvular dysfunction;*
- *defects of atrial and ventricular septa;*
- *presence or absence of thrombi or vegetations;*
- *presence or absence of anomalous venous connections; and*
- *presence or absence of aortic dissection, atheromas, hematomas or ruptures.*

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Section 3C: Quality Improvement Meetings

Quality Improvement (QI) Meetings

3.1C The facility must have a minimum of two QI meetings per year, one of which is to review the results of the QI analyses and any additional QI-related topics.

3.1.1C All staff must participate in at least one meeting per year.

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Section 4C: Quality Improvement Documentation

STANDARD – QI Documentation

4.1C QI Documentation and Record Retention

4.1.1C The facility QI documentation must include but is not limited to:

4.1.1.1C the data for all of the QI meetings;

4.1.1.2C minutes from the QI meetings; and

4.1.1.3C participant list (may include remote participation and/or review of minutes).

4.1.2C The QI documentation must be maintained and available for all appropriate personnel to review.

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