

American Society of Echocardiography Minimum Standards for the Cardiac Sonographer: A Position Paper

S. Michelle Bierig, MPH, RDCS, FASE, Donna Ehler, BS, RDCS, FASE,
Margaret L. Knoll, RDCS, FASE, and Alan D. Waggoner, MHS, RDCS, *St Louis and Kansas
City, Missouri, and Orange, California*

EXECUTIVE SUMMARY

Echocardiography is an invaluable diagnostic tool for the evaluation of cardiac form and function. Evaluation of the cardiac form and function requires highly skilled acquisition given that the technique of performing the examination has become increasingly sophisticated. Although several publications exist relating to the role and training of cardiac sonographers, none of these articulate clearly and concisely minimum qualifications for cardiac sonographers. In light of the advances in cardiovascular ultrasound imaging, which have placed growing educational and professional demands on cardiac sonographers, and the fundamental vision of the American Society of Echocardiography (ASE) as being an organization that strives for excellence and stands for quality, ASE believes that such a statement is necessary.

The ASE believes that there are 3 primary elements involved in assuring the competence of a cardiac sonographer:

Credentialing and Formal Education

A cardiac sonographer must obtain a recognized credential^{1,3,5} within the time frame and using the pathways specified by a credentialing organization recognized by the ASE. A new cardiac sonographer entering the field must comply with the formal educational requirements specified by the applicable credentialing organization, and must fulfill those requirements through participation in a program recognized by the ASE.

Technical Competence

A cardiac sonographer must demonstrate and document technical competence in the performance of those types of echocardiographic examinations that the sonographer performs.

Continuing Education

A cardiac sonographer must maintain skills through participation in appropriate continuing education.

INTRODUCTION

The role of the cardiac sonographer is increasingly complex and demanding. Not only must the cardiac sonographer be familiar with approved clinical protocols for each type of cardiovascular ultrasound examination performed, the sonographer also must be able to analyze the patient's clinical history fully, identify the purpose of the examination, frame the clinical question or questions that the examination is intended to answer, and expand the examination as necessary to answer the clinical question or questions.

To this end, the cardiac sonographer must have a comprehensive understanding of cardiovascular and thoracic anatomy, cardiovascular pathophysiology, hemodynamics, and embryology to recognize normal and abnormal cardiovascular structure and function, and abnormalities of blood flow. The cardiac sonographer also must demonstrate knowledge and understanding of ultrasound physics, instrumentation, tissue characteristics, and measurements of blood flow, including the biological effects of ultrasound. The cardiac sonographer must be familiar with other types of diagnostic tests (ie, clinical laboratory tests, nuclear cardiology, and cardiac catheterization) and be able to integrate echocardiographic results with the results of such tests.

In addition, the cardiac sonographer must have a number of important communication and basic safety-related skills. The cardiac sonographer must:

- Be able to interact and communicate effectively—both orally and in writing—with health care pro-

From St Louis, Missouri; Kansas City, Missouri (D.E.); and Orange, California (M.L.K.).

Reprint requests: S. Michelle Bierig, MPH, RDCS, FASE, American Society of Echocardiography, 1500 Sunday Dr, Suite 102, Raleigh, NC 27607.

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viders, including other sonographers, physicians, and nurses.

- Be well versed in medical terminology.
- Be capable of explaining the purpose of the echocardiographic examination to the patient and answering patients' questions.
- Be aware of proper infection control, including precautionary procedures.
- Be familiar with, and in compliance with, relevant laws regarding patient confidentiality and privacy.
- Be competent in first aid and certified in basic life support.

CREDENTIALING AND FORMAL EDUCATION

Credentialing

ASE believes that, to achieve minimum standards of competence, a cardiac sonographer must be credentialed. Examinations recognized by the ASE are provided by the American Registry for Diagnostic Medical Sonography in adult, pediatric, or fetal echocardiography (registered diagnostic cardiac sonographer), and by Cardiovascular Credentialing International for the specialty of cardiac sonography (registered cardiac sonographer). Separate credentialing requirements apply for adult and pediatric applications of cardiac ultrasound. ASE also recommends that a cardiac sonographer who performs ultrasound in other modalities (eg, vascular, abdominal, obstetric) acquire the appropriate credential in each area of practice.³

Formal Education

The ASE recognizes that several pathways are available to provide formal instruction to cardiac sonographers, including programs that solely focus on cardiac ultrasound, offer cardiac and general diagnostic ultrasound, and introduce participants to a broad array of cardiovascular technologies. The ASE has adopted specific recommendations for education and training curricula^{1,2} and believes that, to achieve minimum competency, cardiac sonographers entering the field should obtain education and training that are consistent with these recommendations.

TECHNICAL EXPERTISE

Proper ultrasound instrument operation is critical in obtaining diagnostic images. The operator must be able to properly display cardiac and/or vascular structures and blood flow in each of the imaging views. A cardiac sonographer must demonstrate proficiency in the performance of 2-dimensional, M-mode, and Doppler (pulsed wave, continuous

wave, and color flow) echocardiographic diagnostic procedures. Visualization of all cardiac chambers, valves, and vessels, with appropriate structural and blood flow measurements, should be provided using a standardized protocol.⁶ Abnormal echocardiographic and Doppler velocities that are indicative of cardiovascular pathophysiology must be accurately documented.

There are multiple types of specialty practices in echocardiography, including adult transthoracic, pediatric transthoracic, fetal, transesophageal, and exercise and pharmacologic stress examinations. The Intersocietal Commission for the Accreditation of Echocardiography Laboratories (ICAEL) and the ASE have established guidelines and protocols for each of these practice areas,⁷ which should be followed. In addition, in light of the increasing use of echocardiography contrast agents, a cardiac sonographer who performs echocardiograms in a laboratory that uses contrast agents should be familiar with the use, potential side effects, and indications for such agents,⁸ and any special protocols required by the institution. If a cardiac sonographer participates in the performance of invasive procedures (eg, intraoperative and echocardiographically guided interventions) or performs new technologies, such as 3-dimensional echocardiography, the sonographer must demonstrate knowledge and competency in these additional specialty areas.

MAINTENANCE OF COMPETENCE

Competency in the performance of cardiovascular ultrasound examinations requires maintenance of skills in each area of practice. Each sonographer should meet the applicable procedure volume requirements and continuing medical education requirements set forth in the ICAEL standards.⁷ As of April 2002, the ICAEL procedure volume standards require the performance of 300 resting transthoracic echocardiograms per year and 100 stress echocardiograms per year.

Sonographers must fulfill such continuing medical education requirements as may be required by the applicable credentialing organization. Those sonographers who provide services in accredited laboratories also should meet any applicable ICAEL continuing medical education requirements.

Sonographers must adhere to the scope of practice for diagnostic ultrasound professionals and the code of ethics as outlined in Appendices I and II,^{4,5} and must participate in peer review and quality assurance activities as required by the institution that operates the laboratory and by ICAEL standards, if applicable.

Conclusion

The ASE firmly supports sonographer credentialing and minimum education and training requirements for cardiac sonographers as a crucial component of overall quality efforts, along with laboratory accreditation and physician training requirements. These minimum standards are necessary to ensure that comprehensive and accurate data are obtained for interpretation by the physician. Unless qualified sonographers and qualified physicians function as a team, the full potential of echocardiography as a diagnostic tool will not be realized.

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APPENDIX I. SCOPE OF PRACTICE FOR THE DIAGNOSTIC ULTRASOUND PROFESSIONAL

Preamble

The purpose of this document is to define the scope of practice for diagnostic ultrasound professionals and specify their roles as members of the health care

team, acting in the best interest of the patient. This scope of practice is a “living” document that will evolve as the technology expands.

Definition of the Profession

The diagnostic ultrasound profession is a multispecialty field comprised of diagnostic medical sonography (with subspecialties in abdominal, neurologic, obstetric/gynecologic, and ophthalmic ultrasound), diagnostic cardiac sonography (with subspecialties in adult and pediatric echocardiography), vascular technology, and other emerging fields. These diverse specialties are distinguished by their use of diagnostic medical ultrasound as a primary technology in their daily work. Certification is considered the standard of practice in ultrasound. Individuals who are not yet certified should reference the scope as a professional model and strive to become certified.

Scope of Practice of the Profession

The diagnostic ultrasound professional is an individual qualified by professional credentialing and academic and clinical experience to provide diagnostic patient care services using ultrasound and related diagnostic procedures. The scope of practice of the diagnostic ultrasound professional includes those procedures, acts, and processes permitted by law, for which the individual has received education and clinical experience, and in which he or she has demonstrated competency.

Diagnostic Ultrasound Professionals:

- Perform patient assessments.
- Acquire and analyze data obtained using ultrasound and related diagnostic technologies.
- Provide a summary of findings to the physician to aid in patient diagnosis and treatment.
- Use independent judgment and systematic problem-solving methods to produce high-quality diagnostic information and optimize patient care.

CODE OF ETHICS FOR THE PROFESSION OF DIAGNOSTIC MEDICAL ULTRASOUND

Preamble

The goal of this code of ethics is to promote excellence in patient care by fostering responsibility and accountability and, thereby, help to ensure the integrity of professionals involved in all aspects of diagnostic medical ultrasound.

Objectives:

To create an environment where professional and ethical issues are discussed.

To help the individual practitioner identify ethical issues.

To provide guidelines for individual practitioners regarding ethical behavior.

Principles

Principle I. To promote patient well-being, professionals shall:

Provide information about the procedure and the reason it is being done. Respond to patient's concerns and questions.

Respect the patient's self-determination and the right to refuse the procedure.

Recognize the patient's individuality and provide care in a nonjudgmental and nondiscriminatory manner.

Promote the privacy, dignity, and comfort of the patient and his or her family.

Protect the confidentiality of acquired patient information.

Strive to ensure patient safety.

Principle II. To promote the highest level of competent practice, professionals shall:

Obtain the appropriate education and skills to ensure competence.

Practice according to published and recognized standards.

Work to achieve and maintain appropriate credentials.

Acknowledge personal limits and not practice beyond capability and skills.

Perform only those procedures that are medically indicated, restricting practice to validated and appropriate tests. For research studies, follow established research protocol, obtaining (and documenting) informed patient consent as needed.

Ensure the completeness of examinations and the timely communication of important information.

Strive for excellence and continued competence through continuing education.

Perform ongoing quality assurance.

Not compromise patient care by the use of substances that may alter judgment or skill.

Principle III. To promote professional integrity and public trust, the professional shall:

Be truthful and promote honesty in interactions with patients, colleagues, and the public.

Accurately represent their level of competence, education, and certification.

Avoid situations that may constitute a conflict of interest.

Maintain appropriate personal boundaries with patients including avoidance of inappropriate conduct, be it verbal or nonverbal.

Promote cooperative relationships within the profession and with other members of the health care community.

Avoid situations that exploit others for financial gain or misrepresent information to obtain reimbursement.

Promote equitable access to care.