# Site Visit Report

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*By signing the completed site visit report, the site visit team agrees and confirms the validity and completeness of this report, based on the completed site visit. If either the team chair or team member is in disagreement regarding the completeness/content of this site visit report, signature should be withheld and the JRC-DMS office notified.*
INSTRUCTIONS FOR USE

This Site Visit Report has been designed by JRC-DMS for report consistency and standardization in the evaluation of diagnostic medical sonography programs. Please utilize this instrument during the site visit. A separate narrative is not required unless the team believes exceptional findings necessitate additional explanation.

The program director may be provided with this document to provide familiarity with the evaluation procedure. It is recommended that the program provide blank copies of the Site Visit Report to attendees of the exit summation to aid in understanding the site visit team’s findings.

The primary function of the site visit team is to gather information and report findings. It is the responsibility of the JRC-DMS to determine, on the basis of the application, Self-Study Report, and team findings, the extent and degree of sponsor/program compliance with the Standards. The site visit team is present only to substantiate information submitted by the program.

As the site visit proceeds, each criterion appropriate to program operation will be evaluated. The site visit team will check the line that describes the degree of compliance. For any criterion checked “NO,” the team must provide findings and substantiation, since this assessment represents a potential deficiency in program compliance with the Standards. Each item reviewed in connection with substantiation will be checked off on the report form by the team.

The following definitions and examples may assist the site visit team in determining the degree of compliance:

YES – Conforming or agreeing with the Standards. The program satisfies the evaluation criterion.

*NO – Not conforming or agreeing with the Standards. The program does not satisfy the evaluation criterion.

Standard: III.B.1.b. – Program Director Qualifications:
1) be an appointed faculty member or institutional equivalent
2) possess a minimum of a Bachelor’s Degree
3) have course work in instructional methodologies, evaluation and assessment
4) possess the appropriate credential(s) specific to one or more of the concentration(s) offered
5) have proficiency in curriculum development
6) possess a minimum of two years of full-time experience as a registered sonographer in the professional sonography field. Full-time is defined as 35 hours per week.

Finding: The program is seeking accreditation for the vascular concentration. The program director is the only faculty member and is not appropriately credentialed for the vascular concentration.

The Site Visit Report must be signed by each team member and submitted by the team chair to the JRC-DMS Executive Office. An accompanying narrative is not required. The team members meet privately prior to the exit summation to ascertain team agreement on all the findings. The exit summation must reflect team findings and relate only to the Standards.

A typewritten report is requested. A blank copy of this site visit report is available at www.jrcdms.org or by contacting the JRC-DMS office at mail@jrcdms.org.

I. Sponsorship
I.A.1. Sponsoring Institution
A sponsoring institution must be at least one of the following:

1) A post-secondary academic institution accredited by an institutional accrediting agency that is recognized by the U.S. Department of Education, and authorized under applicable law or other acceptable authority to provide a post-secondary program which awards a minimum of a certificate at the completion of the program.

2) A hospital or medical center or other governmental medical service, which is accredited by a health care accrediting agency or equivalent that is recognized by the U.S. Department of Health and Human Services, and authorized under applicable law or other acceptable authority to provide healthcare, which awards a minimum of a certificate at the completion of the program.

3) A branch of the United States Armed Forces, which awards a minimum of a certificate at the completion of the program.

\[\text{Site visitor complete:} \]
\[\text{Is the program in compliance with this Standard? \hspace{5mm} \boxed{\text{\hspace{5mm}}} Yes \hspace{5mm} \boxed{\text{\hspace{5mm}}} No^*}\]
\[\text{Substantiated by: \hspace{5mm}} \boxed{\text{\hspace{5mm}}} \text{Credentialing Results} \hspace{5mm} \boxed{\text{\hspace{5mm}}} \text{Interviews} \hspace{5mm} \boxed{\text{\hspace{5mm}}} \text{Policies / Competencies} \hspace{5mm} \boxed{\text{\hspace{5mm}}} \text{Other: Click here to enter text.}\]
\[\text{Findings and Substantiation for No*: Click here to enter text.}\]

I.B. Consortium Sponsor
1) A consortium sponsor is an entity consisting of two or more members that exists for the purpose of operating an educational program. In such instances, at least one of the members of the consortium must meet the requirements of a sponsoring educational institution as described in I.A.

2) The responsibilities of each member of the consortium must be clearly documented as a formal affiliation agreement or memorandum of understanding, which includes governance and lines of authority.

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\[\text{Findings and Substantiation for No*: Click here to enter text.}\]

I.C. Responsibilities of Sponsor
The Sponsor must assure that the provisions of these Standards are met.

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II. Program Goals
II.A. Program Goals and Outcomes
There must be a written statement of the program’s goals and learning domains (cognitive, psychomotor, affective) consistent with and responsive to the demonstrated needs and expectations of the various communities of interest served by the educational program. The communities of interest that are served by the program include, but are not limited to, students, graduates, faculty, sponsor administration, employers, physicians, the public, and nationally accepted standards of roles and functions.

Program-specific statements of goals and learning domains provide the basis for program planning, implementation, and evaluation. Such goals and learning domains must be compatible with both the mission of the sponsoring institution(s) and the expectations of the communities of interest. Goals and learning domains are based upon the substantiated needs of health care providers and employers, and the educational needs of the students served by the educational program.
II.B. Appropriateness of Goals and Learning Domains

The program must regularly assess its goals and learning domains. Program personnel must identify and respond to changes in the needs and/or expectations of its communities of interest.

An advisory committee, which is representative of at least each of the communities of interest named in these Standards, must be designated and charged with the responsibility of meeting at least annually, to assist program and sponsor personnel in formulating and periodically revising appropriate goals and learning domains, monitoring needs and expectations, and ensuring program responsiveness to change.

II.C. Minimum Expectations

The program must have the following goal(s) defining minimum expectations: “To prepare competent entry-level general sonographers in the cognitive (knowledge), psychomotor (skills), and affective (behavior) learning domains” and/or “To prepare competent entry-level adult cardiac sonographers in the cognitive (knowledge), psychomotor (skills), and affective (behavior) learning domains” To prepare competent entry-level pediatric cardiac sonographers in the cognitive (knowledge), psychomotor (skills), and affective (behavior) learning domains” and/or “To prepare competent entry-level vascular technologists in the cognitive (knowledge), psychomotor (skills), and affective (behavior) learning domains.”

Programs adopting educational goals beyond entry-level competence must clearly delineate this intent and provide evidence that all students have achieved the basic competencies prior to entry into the field.

III. Resources

III.A. Type and Amount

Program resources must be sufficient to ensure the achievement of the program’s goals and outcomes. Resources include, but are not limited to: faculty, clerical/support staff, curriculum, finances, offices, classroom/laboratory facilities, ancillary student facilities, clinical affiliations, equipment/supplies, computer resources, instructional reference materials, and faculty/staff continuing education.

III.B. Personnel

The sponsor must appoint sufficient faculty and staff with the necessary qualifications to perform the functions identified in documented job descriptions and to achieve the program’s stated goals and outcomes.
III.B.1. Program Director
III.B.1.a. Program Director Responsibilities
The program director must be responsible for the structure as well as the daily operation of the program, including organization, administration, periodic review and evaluation, continued development, and general effectiveness of program curricula. The program director must ensure that the effectiveness of all clinical affiliates/clinical education centers is maintained. The responsibilities of the program director must not be adversely affected by educationally unrelated functions.

Site visitor complete:

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Findings and Substantiation for No*: Click here to enter text.

III.B.1.b. Program Director Qualifications
The program director must possess, at a minimum, the following:
1) be an appointed faculty member or institutional equivalent
2) possess a minimum of a Bachelor’s Degree
3) have course work in instructional methodologies, evaluation and assessment
4) possess the appropriate credential(s) specific to one or more of the concentration(s) offered
5) have proficiency in curriculum development
6) possess a minimum of two years of full-time experience as a registered sonographer in the professional sonography field. Full-time is defined as 35 hours per week.

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III.B.2.a. Concentration Coordinator(s) Responsibilities
Concentration coordinator(s) report(s) to the Program Director, and must be designated and responsible for the coordination of concentration(s) for which the Program Director does not possess the appropriate credential.

Site visitor complete:

Is the program in compliance with this Standard? ☐ Yes ☐ No* ☐ N/A
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III. B.2.b. Concentration Coordinator(s) Qualifications
Concentration coordinator(s) must:
1) be an appointed faculty member or institutional equivalent;
2) possess an academic degree at least equivalent to the degree that is offered in the concentration(s) that s/he is designated to coordinate;
3) possess the appropriate credential(s) specific to the concentration(s) that s/he is designated to coordinate;
4) have proficiency in curriculum development;
5) possess a minimum of two years of full time experience as a registered sonographer in the professional sonography field. Full-time is defined as 35 hours per week.

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III.B.3. Clinical Coordinator(s)
Programs with eight or more clinical affiliates / clinical education centers must have an additional faculty member designated as the clinical coordinator. For programs with fewer than eight clinical affiliates/clinical education centers that do not have an additional faculty member designated as the clinical coordinator, the Program Director must have the qualifications and fulfill the responsibilities of the Clinical Coordinator.

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III.B.3.a. Clinical Coordinator(s) Responsibilities
The clinical coordinator(s) must be responsible for coordinating clinical education with didactic education as assigned by the program director. The clinical coordinator must evaluate and ensure the effectiveness of the clinical affiliate/clinical education centers. The clinical coordinator's responsibilities must include coordination, instruction, and evaluation. The responsibilities of the clinical coordinator must not be adversely affected by educationally unrelated functions.

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III.B.3.b. Clinical Coordinator(s) Qualifications
The clinical coordinator(s) must possess, at a minimum, the following:
1) proficiency in teaching methodology, supervision, instruction, evaluation, and guidance;
2) appropriate credential(s) specific to the concentrations offered; and
3) the equivalent of two years full-time professional experience as a general sonographer, cardiac sonographer and/or vascular technologist. Full-time is defined as 35 hours per week.
4) an academic degree no lower than an associate's degree and at least equal to that for which the graduates are being prepared.

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III.B.4. Medical Advisor
III.B.4.a. Medical Advisor Responsibilities
The medical advisor must provide guidance that the medical components of the didactic and clinical curriculum meet current acceptable performance standards.

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III.B.4.b. Medical Advisor Qualifications
The medical advisor must be a United States licensed physician, Board certified in a medical specialty related to at least one of the cardiac, vascular or general learning concentrations as applicable to the program's design.

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III.B.5. Faculty and Instructional Staff
If the key personnel do not have all of the appropriate credentials for the learning concentrations offered, then there must be another faculty member with the appropriate credentials who will assume the didactic instruction and clinical evaluation responsibilities specific to that concentration.

All faculty must be familiar with program goals, be able to demonstrate the ability to develop an organized plan of instruction and evaluation, and have appropriate credentials for the learning areas they teach.

Site visitor complete:
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III.B.5.a. (1) Didactic Instructor(s) Responsibilities
The instructional staff must be responsible for providing didactic content, evaluating students, reporting progress, and for the periodic review and updating of course material.

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III.B.5.a. (2) Didactic Instructor(s) Qualifications
The instructors must be individually credentialed if a credentialing examination is offered in the concentration that the instructor is teaching and the program is seeking initial or continuing accreditation in the concentration. They must also be qualified by education and experience, and be effective in teaching the subjects assigned.

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III.B.5.b. Clinical Instructor(s)
A clinical instructor must be identified for each clinical affiliate/clinical education center.

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III.B.5.b. (1) Clinical Instructor(s) Responsibilities
A clinical instructor must be available to students whenever he or she is assigned to a clinical setting, provide appropriate clinical supervision, and be responsible for student clinical evaluation. The program must provide a position description for a clinical instructor to carry out educational responsibilities.

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III.B.5.b. (2) Clinical Instructor(s) Qualifications

Clinical instructors must have the appropriate credential for the concentration they are teaching.

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### III.C. Curriculum

The curriculum must ensure the achievement of program goals and learning domains. Instruction must be an appropriate sequence of classroom, laboratory, and clinical activities. Instruction must be based on clearly written course syllabi describing learning goals, course objectives, and competencies required for graduation.

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#### III.C.1. Curriculum Requisites

The following curriculum requisites must be met prior to the beginning of the core curriculum of the diagnostic medical sonography education program; they must be included in college level courses:

- a. Algebra, statistics, or higher mathematics course
- b. General college-level physics and/or radiographic physics
- c. Communication skills and
- d. Human anatomy and physiology

The following curriculum requisites must either be met prior to the diagnostic medical sonography education program or be presented as course work; courses may be presented within a course at the college level and must include the following:

- e. Patient care
- f. Medical ethics and law
- g. Medical terminology and
- h. Pathophysiology

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#### III.C.2. Master Plan

The master plan of education must be sufficiently detailed to provide for continuity, delivery, and ongoing evaluation of the program in the event of staff changes. The master plan of education must be available for review.

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#### III.C.3. Learning Competencies Common to Each Concentration

The minimum competency offered by the program must include the following:

**III.C.3.a. Utilize oral and written communication.**

1) Maintain clinical records;
2) Interact with the interpreting physician or other designated physicians with oral or written summary of findings as permitted by employer policy and procedure
3) Recognize significant clinical information and historical facts from the patient and the medical records, which may impact the diagnostic examination;

4) Comprehend and employ appropriate medical terminology, abbreviations, symbols, terms, and phrases; and

5) Educate other health care providers and the public in the appropriate applications of ultrasound and other diagnostic vascular evaluation, including the following:
   - Medical terminology
   - Sonographic/other vascular terminology
   - Pertinent clinical signs, symptoms, and laboratory tests
   - Pertinent legal principles

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III.C.3.b. Provide basic patient care and comfort.
1) Maintain infection control and utilize standard precautions;
2) Anticipate and be able to respond to the needs of the patient;
   - Demonstrate age related competency (i.e., neonates, pediatric patients, adolescents, adults, and Obstetric patients)
   - Respond appropriately to parental needs
   - Recognize when sedation may be appropriate
   - Demonstrate appropriate care in nursery and intensive care environments (ancillary equipment, thermal, central venous lines, ET tubes, respiratory needs)
3) Identify life-threatening situations and implement emergency care as permitted by employer procedure, including the following:
   - Pertinent patient care procedures
   - Principles of psychological support
   - Emergency conditions and procedures
   - First aid and resuscitation techniques
4) Proper patient positioning

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III.C.3.c. Demonstrate knowledge and understanding of human gross anatomy and sectional anatomy.
1) Evaluate anatomic structures in the region of interest; and
2) Recognize the sonographic appearance of normal tissue structures, including the following:
   - Sectional anatomy
   - Embryology
   - Normal sonographic patterns

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III.C.3.d. Demonstrate knowledge and understanding of physiology, pathology, and pathophysiology.
1) Obtain and evaluate pertinent patient history and physical findings;
2) Extend standard diagnostic testing protocol as required by patient history or initial findings;
3) Review data from current and previous examinations to produce a written/oral summary of technical findings, including relevant interval changes, for the interpreting physician's reference and
4) Recognize examination findings that require immediate clinical response and notify the interpreting physician of such findings, including the following:

• Patient interview and examination techniques
• Chart and referral evaluation
• Diagnostic testing protocols related to specific disease conditions
• Physiology including blood flow dynamics
• Pertinent pathology and pathophysiology
• Pertinent legal issues

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III.C.3.e. Demonstrate knowledge and understanding of acoustic physics, Doppler ultrasound principles, and ultrasound instrumentation.
1) Select the appropriate technique(s) for examination(s) being performed;
2) Adjust instrument controls to optimize image quality;
3) Perform linear, area, circumference, and other related measurements from sonographic images or data;
4) Recognize and compensate for acoustical artifacts
5) Utilize appropriate devices to obtain pertinent documentation
6) Minimize patient exposure to acoustic energy
7) Apply basic concepts of acoustic physics which include the following:
   • Sound production and propagation
   • Interaction of sound and matter
   • Instrument options and transducer selection
   • Principles of ultrasound instruments and modes of operation
   • Operator control options
   • Physics of Doppler
   • Principles of Doppler techniques
   • Methods of Doppler flow analysis
   • Recording techniques
   • Acoustic artifacts
8) Emerging Technologies

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III.C.3.f. Demonstrate knowledge and understanding of the interaction between ultrasound and tissue and the probability of biological effects in clinical examinations, including the following:
• Biologic effects
• Pertinent in-vitro and in-vivo studies
• Exposure display indices
• Generally accepted maximum safe exposure levels
• ALARA principle

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III.C.3.g. Employ professional judgment and discretion.
1) Protect the patient’s right to privacy based on current federal standards and regulations;
2) Maintain confidentiality; and
3) Adhere to the professional codes of conduct/ethics through the following:

- Medical ethics
- Pertinent legal principles
- Professional interaction skills
- Professional scopes of practice

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III.C.3.h. Understand the fundamental elements for implementing a quality assurance and improvement program, and the policies, protocols, and procedures for the general function of the ultrasound laboratory, including the following:

- Administrative procedures
- Quality control procedures
- Elements of quality assurance program
- Records maintenance
- Personnel and fiscal management
- Trends in health care systems

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III.C.3.i. Recognize the importance of continuing education, through the following:

- Professional journals
- Conferences
- Lectures
- In-house educational offerings
- Professional organizations and resources
- Recent developments in sonography
- Research statistics and design

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III.C.3.j. Recognize the importance of, and employ, ergonomically correct scanning techniques:

- Personal fitness
- Supports, tools, and devices
- Equipment adjustments
- Patient positioning

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III.C.4. The General Learning Concentration must include the following:
☐ Site visit not for the evaluation of the general learning concentration

III.C.4.a. Demonstrate the ability to perform sonographic examinations of the abdomen, superficial structures, non-cardiac chest, and the gravid and nongravid pelvis according to protocol guidelines established by national professional organizations and the protocol of the employing institution utilizing real-time equipment with both transabdominal and endocavitary transducers, and Doppler display modes.

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III.C.4.b. Recognize and identify the sonographic appearance of normal anatomic structures, including anatomic variants and normal Doppler patterns:
- Liver
- Biliary system
- Pancreas
- Urinary tract
- Adrenal glands
- Spleen
- Prevertebral vessels
- Peritoneal cavity, including potential spaces
- Gastrointestinal tract
- Noncardiac chest
- Neck
- Breast
- Scrotum
- Prostate
- Anterior abdominal wall
- Extremities
- Brain and spinal cord
- Musculoskeletal

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III.C.4.c. Recognize, identify, and appropriately document the abnormal sonographic and Doppler patterns of disease processes, pathology, and pathophysiology of the structures listed in III.C.4.b. Modify the scanning protocol based on the sonographic findings and the differential diagnosis:
- History and physical examination
- Related imaging, laboratory, and functional testing procedures
- Clinical differential diagnosis
- Role of ultrasound in patient management

Sonographic and Doppler patterns in clinical diseases that may occur in the following categories:
- Iatrogenic
- Degenerative
- Inflammatory
- Traumatic
- Neoplastic
- Infectious
- Obstructive
- Congenital
- Metabolic
- Immunologic

### III.C.4.d. Recognize and identify the sonographic appearance of normal anatomic structures of the female pelvis, including anatomic variants and normal Doppler patterns:
- Reproductive system
- Pelvic muscles
- Suspensory ligaments
- Peritoneal spaces
- Pelvic vasculature

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### III.C.4.e. Recognize and identify the sonographic appearance of normal maternal, embryonic, and fetal anatomic structures during the first, second, and third trimesters:
- Sectional anatomy
- Pertinent measurement techniques
- Doppler applications

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### III.C.4.f. Recognize, identify, and appropriately document the sonographic appearance of gynecologic disease processes, pathology, and pathophysiology:
- History and physical examination
- Related imaging, laboratory, and functional testing procedures
- Differential diagnosis
- Role of ultrasound in patient management

Abnormal sonographic patterns:
- Iatrogenic
- Degenerative
- Inflammatory
- Traumatic
- Neoplastic
- Infectious
- Obstructive
- Congenital
- Metabolic
- Immunologic
- Contraceptive devices
- Infertility procedures
- Doppler applications

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**III.C.4.g.** Recognize, identify, and appropriately document the sonographic appearance of obstetric abnormalities, disease, pathology, and pathophysiology:

- History and physical examination
- Related imaging, laboratory, and functional testing procedures
- Differential diagnosis
- Role of ultrasound in patient management
- Use of three-dimensional obstetric sonography
- Abnormal sonographic characteristics in pregnancy:
  - Placenta
  - Congenital/genetic anomalies
  - Growth abnormalities
  - Amniotic fluid
  - Viability
  - Multiple gestation
  - Fetal monitoring
  - Maternal factors
  - Postpartum
  - Fetal therapy

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**III.C.4.h.** Demonstrate knowledge and understanding of the role of the sonographer in performing interventional/invasive procedures.

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Findings and Substantiation for No*:

The Diagnostic Medical Sonography Site Visit Report is based on the *Standards and Guidelines for an Accredited Educational Program for the Diagnostic Medical Sonographer* initially adopted 1979; revised 1987, 1996, 2007, 2011.
III.C.5. The Adult Cardiac Learning Concentration must include the following:
☐ Site visit not for the evaluation of the cardiac learning concentration

III.C.5.a. Demonstrate knowledge of normal and abnormal cardiac anatomy:
- Embryology and fetal cardiac development
- Cardiac chambers and septation
- Valve anatomy and dynamics
- Coronary artery anatomy
- Relationships of cardiac chambers and great vessels

Site visitor complete:
Is the program in compliance with this Standard? ☐ Yes ☐ No*
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III.C.5.b. Demonstrate knowledge of normal cardiovascular physiology:
- Hemodynamics
- Ventricular function, including influence of loading conditions and measurement of cardiac output
- Exercise physiology
- Electrophysiology and conduction system
- Pulmonary vascular disease

Site visitor complete:
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Findings and Substantiation for No*: Click here to enter text.

III.C.5.c. Demonstrate knowledge and understanding of cardiac pathology, pathophysiology, and hemodynamics in different types of cardiac disease:
- Valvular heart disease
- Ischemic cardiac disease
- Cardiomyopathy
- Pericardial disease
- Congenital heart disease
- Cardiac neoplasms and masses
- Cardiac trauma
- Pulmonary vascular disease
- Diseases of the aorta and great vessels

Site visitor complete:
Is the program in compliance with this Standard? ☐ Yes ☐ No*
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Findings and Substantiation for No*: Click here to enter text.

III.C.5.d. Demonstrate knowledge and understanding of clinical cardiology:
- Relationship of echocardiography to history and physical examination (including indications for echocardiography)
- Differential diagnosis as it relates to the echocardiographic examination
- Cardiovascular surgery and interventional cardiology
- Effect of systemic diseases on cardiovascular anatomy and physiology

Site visitor complete:
Is the program in compliance with this Standard? ☐ Yes ☐ No*
III.C.5.e. Demonstrate knowledge of other cardiac procedures emphasizing indications, utility, and limitations of these procedures:

- Angiography and cardiac catheterization
- Electrocardiography, electrophysiologic studies, Holter monitoring
- Stress testing
- Radionuclide studies
- Other tomographic imaging procedures
- Phonocardiography and external pulse recording

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III.C.5.f. Demonstrate proficiency in the performance of M-mode, two-dimensional, and Doppler (pulsed wave, continuous wave, color flow and power) echocardiographic studies.

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III.C.5.g. Recognize, identify, and appropriately document the abnormal echocardiographic and Doppler patterns of disease, pathology, and pathophysiology for the disease categories listed

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III.C.5.h. Demonstrate knowledge and understanding of the indications, utility, limitations, and technical procedures for related echocardiographic studies:

- Stress echocardiography
- Transesophageal echocardiography
- Intraoperative echocardiography
- Contrast echocardiography
- Three-dimensional echocardiography
- Echo-guided procedures

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III.C.5.i. Demonstrate knowledge and understanding of clinical pharmacology as it relates to echocardiography and provocative maneuvers:

- Cardiovascular pharmacology
- Theory and use of provocative stress agents
- Non-pharmacologic stress
- Potential effects of cardiac medications on echocardiographic findings

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III.C.5.j. Demonstrate knowledge, understanding, and proficiency in the use of quantitation principles applied to echocardiographic images and flow data:

- Standard M-mode, two-dimensional, and Doppler measurements and calculations
- Knowledge and understanding of normal and abnormal values for M-mode, two-dimensional and Doppler echocardiography
- Evaluation of normal and abnormal ventricular function
- Evaluation of the severity of valve stenosis and regurgitation
- Knowledge of normal and abnormal cardiovascular hemodynamics and flow patterns

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III.C.6. The Pediatric Cardiac Learning Concentration must include the following:
☐ Site visit not for the evaluation of the pediatric cardiac learning concentration

III.C.6.a. Demonstrate knowledge of normal and abnormal cardiac anatomy:
- Embryology and fetal cardiac development
- Segmental approach
- Cardiac chambers and septation
- Valve anatomy and dynamics
- Coronary artery anatomy
- Relationships of cardiac chambers and great vessels
- Mediastinal structures
- Arch anatomy
- Pulmonary artery and venous anatomy
- Systemic venous return

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III.C.6.b. Demonstrate knowledge of normal cardiovascular physiology as appropriate to the patient or fetus with congenital heart disease:
- Hemodynamics
- Ventricular function, including influence of loading conditions and measurement of cardiac output
- Exercise physiology
- Electrophysiology and conduction system
- Pulmonary vascular disease
- Fetal physiology
- Transitional Neonatal physiology

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Findings and Substantiation for No*: Click here to enter text.

III.C.6.c. Demonstrate knowledge and understanding of cardiac pathology, pathophysiology, and hemodynamics in different types of cardiac disease as appropriate in the fetus or patient with congenital heart disease:
- Valvular heart disease
- Ischemic cardiac disease
- Cardiomyopathy
- Pericardial disease
- Congenital heart disease
  - Situs abnormalities
  - Defects in cardiac septation
  - Abnormalities in atrial-ventricular connections
  - Ventricular hypoplasia
  - Ventricular Inflow anomalies
  - Abnormalities in ventriculoarterial connection
  - Ventricular outflow anomalies
  - Abnormal vascular (arterial and venous) connections
  - Abnormalities within cardiac chambers, vessels and thorax
  - Post operative repair

• Cardiac neoplasms and masses
• Cardiac trauma
• Pulmonary vascular disease
• Diseases of the aorta and great vessels

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III.C.6.d. Demonstrate knowledge and understanding of clinical cardiology as appropriate to the fetus and patient with congenital heart disease:
• Relationship of echocardiography to history and physical examination (including indications for echocardiography) - diagnostic approach to congenital heart disease
• Acquired heart disease and noncardiac disease and effects of systemic diseases on cardiovascular anatomy and physiology
• Differential diagnosis as it relates to the echocardiographic examination
• Arrhythmias
• Genetic syndromes and chromosomal anomalies associated with congenital heart disease (CHD)
• Cardiovascular surgery and interventional cardiology
• Post-operative repair evaluation
• Current and future approaches to caring for the fetus identified with CHD
• Current and future approaches to caring for the pediatric patient with CHD
• Current and future approaches to caring for the adult patient with CHD

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III.C.6.e. Demonstrate knowledge of other cardiac procedures emphasizing indications, utility, and limitations of these procedures:
• Chest X-ray
• Angiography and cardiac catheterization
• Electrocardiography, electrophysiologic studies, Holter monitoring
• Stress testing
• Radionuclide studies
• Tomographic imaging procedures (CT, MRI)
• Fetal interventions for congenital heart disease

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III.C.6.f. Demonstrate proficiency in the performance of M-mode, two-dimensional, and Doppler (pulsed wave, continuous wave, color flow) echocardiographic studies.

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III.C.6.g. Recognize, identify, and appropriately document the abnormal echocardiographic and Doppler patterns of disease, pathology, and pathophysiology for the disease categories (knowledge of additional views to obtain based on patient history).

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III.C.6.h. Demonstrate knowledge and understanding of the indications, utility, limitations, and technical procedures for related echocardiographic studies:

- Stress echocardiography
- Transesophageal echocardiography
- Intraoperative echocardiography
- Contrast echocardiography
- Three-dimensional echocardiography
- Echo-guided procedures
- Strain echocardiography
- Targeted obstetric exam

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III.6.C.i. Demonstrate knowledge and understanding of clinical pharmacology as it relates to echocardiography and provocative maneuvers:

- Cardiovascular pharmacology
- Theory and use of provocative stress agents
- Non-pharmacologic stress
- Potential effects of cardiac medications on echocardiographic findings

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III.6.C.j. Demonstrate knowledge, understanding, and proficiency in the use of quantitation principles applied to echocardiographic images and flow data:

- Standard M-mode, two-dimensional, and Doppler measurements and calculations (which should be normalized based on body surface area, and/or other biometric measurements for the fetus)
- Knowledge and understanding of normal and abnormal values for M-mode, two-dimensional and Doppler echocardiography
- Evaluation of normal and abnormal ventricular function
- Evaluation of the severity of valve stenosis and regurgitation
- Knowledge of normal and abnormal cardiovascular hemodynamics and flow patterns
- Knowledge of normal and abnormal sonographic appearances of peripheral vascular anatomy (i.e., branches of pulmonary artery, branches of aortic arch)
- Miscellaneous measurements specific to patient history

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III.C.7. The Vascular Learning Concentration must include the following:
☐ Site visit not for the evaluation of the vascular learning concentration

III.C.7.a. Demonstrate knowledge of normal and abnormal vascular anatomy:
- Extremity Arterial (upper and lower)
- Extremity Venous (upper and lower)
- Cerebrovascular: extracranial and intracranial
- Abdominal Vasculature: arterial and venous
- Special circulations: arterial and venous

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III.C.7.b. Demonstrate knowledge of normal and abnormal vascular physiology;
- Normal and Abnormal Arterial and Venous Hemodynamics: Flow physics
- Exercise physiology
- Effects of collateralization on Hemodynamics

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III.C.7.c. Demonstrate knowledge and understanding of vascular physiology, pathophysiology, and hemodynamics in the different types of vascular disease/dysfunction:
- Iatrogenic
- Degenerative
- Inflammatory
- Traumatic
- Neoplastic
- Infectious
- Obstructive
- Congenital
- Metabolic
- Immunologic
- Flow changes secondary to other states, e.g., cardiac diseases, pulmonary diseases, pregnancy, inflammatory diseases, intracranial and extracranial disease, anemia
- Pharmacology

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III.C.7.d. Demonstrate knowledge and understanding of clinical vascular diagnostic procedures:
- Relationship of vascular diagnostic techniques to patient history and physical examination
- Knowledge of appropriate indications for vascular examination
- Differential diagnosis as it relates to vascular testing and examination
- Vascular surgery and interventional vascular procedures including intravascular ultrasound, angioscopy, transluminal angioplasty with and without stenting, atherectomy, endarterectomy, patch graft endarterectomy, vein and synthetic vascular bypass procedures as well as embolectomy and thrombectomy, radio-frequency and laser vein ablation, endovascular repair
III.C.7.e. Demonstrate knowledge of other vascular procedures emphasizing indications, utility, and limitations of these procedures:
- Angiography
- Venography
- Magnetic resonance angiogram
- Magnetic resonance flow meters
- Computed tomography
- Nuclear medicine vascular procedures

III.C.7.f. Knowledge of importance and impact of other laboratory values and invasive and non-invasive testing/imaging modalities.

III.C.7.g. Demonstrate proficiency in the performance of physiologic testing (including volume pulse recording, pressure measurements, plethysmography, and stress testing), real-time ultrasound imaging, and Doppler evaluation (pulsed and continuous wave, color and power flow) as relates to the vasculature. Vascular testing proficiency must be demonstrated in the following areas:
- Extracranial Cerebrovascular
- Intracranial Cerebrovascular (transcranial Doppler)
- Extremity Arterial (upper and lower)
- Extremity Venous (upper and lower)
- Visceral Vascular (renal artery, mesenteric/splanchnic, hepatoporal)

III.C.7.h. Demonstrate knowledge and understanding of clinical pharmacology as it relates to vascular evaluation and stress testing:
- Vasoactive relationships
- Potential effects of medications on vascular diagnostic findings

III.C.7.i. Demonstrate knowledge, understanding, and proficiency in the use of quantitative principles applied to vascular testing:
- Ankle/brachial pressure ratios
- Segmental pressures
- Aorta/renal ratios
- Resistive index
- Pulsatility index
- Internal carotid artery to common carotid artery ratio
- Percentage velocity change across stenosis for grading arterial lesions
- Area and diameter reduction measurements
- Knowledge of normal and abnormal vascular flow patterns and waveform morphology

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Findings and Substantiation for No*: Click here to enter text.
III.D. Resource Assessment
The program must, at least annually, assess the appropriateness and effectiveness of the resources described in these standards. The results of resource assessment must be the basis for ongoing planning and appropriate change. An action plan must be developed when deficiencies are identified in the program resources. Implementation of the action plan must be documented and results measured by ongoing resource assessment.

Site visitor complete:
Is the program in compliance with this Standard? ☐Yes ☐No*
Substantiated ☐ Credentialing Results ☐ Interviews ☐ Policies / Competencies ☐ Other: Click here to enter text.
Findings and Substantiation for No*: Click here to enter text.

IV. Student and Graduate (Outcomes) Evaluation/Assessment
IV.A. Student Evaluation
IV.A.1. Frequency and purpose
Evaluation of students must be conducted on a recurrent basis and with sufficient frequency to provide both the students and program faculty with valid and timely indications of the students’ progress toward and achievement of the competencies and learning domains stated in the curriculum.

Site visitor complete:
Is the program in compliance with this Standard? ☐Yes ☐No*
Substantiated ☐ Credentialing Results ☐ Interviews ☐ Policies / Competencies ☐ Other: Click here to enter text.
Findings and Substantiation for No*: Click here to enter text.

IV.A.2. Documentation
Records of student evaluations must be maintained in sufficient detail to document learning progress and achievements.

Records indicating the number and type of procedures performed by the student, the examination findings, the extent of student supervision, and the level of involvement of the student in scanning/performances must be maintained and must document that all students meet the minimum numbers of procedures and types of procedures established by the program.

Site visitor complete:
Is the program in compliance with this Standard? ☐Yes ☐No*
Substantiated ☐ Credentialing Results ☐ Interviews ☐ Policies / Competencies ☐ Other: Click here to enter text.
Findings and Substantiation for No*: Click here to enter text.

IV.B. Outcomes
IV.B.1. Outcomes Assessment
The program must periodically assess its effectiveness in achieving its stated goals and learning domains. The results of this evaluation must be reflected in the review and timely revision of the program.

Outcomes assessments include, but are not limited to: national credentialing examination performance, programmatic retention/attrition, graduate satisfaction, employer satisfaction, and job (positive) placement. The program must meet the outcomes assessment thresholds.

Site visitor complete:
Is the program in compliance with this Standard? ☐Yes ☐No*
Substantiated ☐ Credentialing Results ☐ Interviews ☐ Policies / Competencies ☐ Other: Click here to enter text.
Findings and Substantiation for No*: Click here to enter text.

IV.B.2. Outcomes Reporting
The program must periodically submit its goal(s), learning domains, evaluation systems (including type, cut score, validity, and reliability), outcomes, its analysis of the outcomes and an appropriate action plan based on the analysis.

**Site visitor complete:**

Is the program in compliance with this Standard?  ☐ Yes  ☐ No*  
Substantiated by:  ☐ Credentialing Results  ☐ Interviews  ☐ Policies / Competencies  ☐ Other: Click here to enter text.  

**Findings and Substantiation for No*:** Click here to enter text.

### V. Fair Practices

#### V.A. Publications and Disclosure

#### V.A.1. Announcements, catalogs, publications, and advertising must accurately reflect the program offered.

**Site visitor complete:**

Is the program in compliance with this Standard?  ☐ Yes  ☐ No*  
Substantiated by:  ☐ Credentialing Results  ☐ Interviews  ☐ Policies / Competencies  ☐ Other: Click here to enter text.  

**Findings and Substantiation for No*:** Click here to enter text.

#### V.A.2. At least the following must be made known to all applicants and students: the sponsor’s institutional and programmatic accreditation status as well as the name, address and phone number of the accrediting agencies; admissions policies and practices; policies on advanced placement, transfer of credits, and credits for experiential learning; number of credits required for completion of the program; tuition/fees and other costs required to complete the program; policies and processes for withdrawal and for refunds of tuition/fees.

**Site visitor complete:**

Is the program in compliance with this Standard?  ☐ Yes  ☐ No*  
Substantiated by:  ☐ Credentialing Results  ☐ Interviews  ☐ Policies / Competencies  ☐ Other: Click here to enter text.  

**Findings and Substantiation for No*:** Click here to enter text.

#### V.A.3. At least the following must be made known to all students: academic calendar, student grievance procedure, criteria for successful completion of each segment of the curriculum and graduation, policies for student leave of absence, exposure to blood borne pathogens, communicable diseases, and pregnancy, and policies and processes by which students may perform clinical work while enrolled in the program.

**Site visitor complete:**

Is the program in compliance with this Standard?  ☐ Yes  ☐ No*  
Substantiated by:  ☐ Credentialing Results  ☐ Interviews  ☐ Policies / Competencies  ☐ Other: Click here to enter text.  

**Findings and Substantiation for No*:** Click here to enter text.

#### V.A.4. The sponsor must maintain, and make available to the public current and consistent summary information about student/graduate achievement that includes the results of one or more of the outcomes assessments required in these Standards.

**Site visitor complete:**

Is the program in compliance with this Standard?  ☐ Yes  ☐ No*  
Substantiated by:  ☐ Credentialing Results  ☐ Interviews  ☐ Policies / Competencies  ☐ Other: Click here to enter text.  

**Findings and Substantiation for No*:** Click here to enter text.

### V.B. Lawful and Non-discriminatory Practices

All activities associated with the program, including student and faculty recruitment, student admission, and faculty employment practices, must be non-discriminatory and in accordance with federal and state statutes, rules, and regulations. There must be a faculty grievance procedure made known to all paid faculty.

**Site visitor complete:**

V.C. Safeguards

The health and safety of patients, students, and faculty associated with the educational activities of the students must be adequately safeguarded.

The program must ensure voluntary and prudent use of students or other human subjects for non-clinical scanning. Students’ grades and evaluations must not be affected by participation or non-participation.

The combined total didactic/clinical involvement of the student in the program must not exceed 40 hours per week.

V.D. Student Records

Satisfactory records must be maintained for student admission, advisement, counseling, and evaluation. Grades and credits for courses must be recorded on the student transcript and permanently maintained by the sponsor in a safe and accessible location.

V.E. Substantive Change

The sponsor must report substantive change(s) as described in Appendix A to CAAHEP/JRC-DMS in a timely manner. Other substantive change(s) to be reported to JRC-DMS within the time limits prescribed include:

1) Changes in affiliates
2) Added or deleted learning concentrations
3) Institution’s mission or objectives if these will affect the program
4) Addition of courses that represent a significant departure in content or in method of delivery
5) Degree or credential level
6) Substantial change in clock or credit hours for successful completion of a program or in the length of a program.

V.F. Agreements

There must be a formal affiliation agreement or memorandum of understanding between the sponsor and all other entities that participate in the education of the students describing the relationship, role, and responsibilities between the sponsor and that entity.
Program Strengths:
Click here to enter text.

Program Deficiencies:
Click here to enter text.

Additional Comments/Notes to the Board Reviewer:
Click here to enter text.