



# Cardiac-Interventional Radiography

Certification and registration requirements for cardiac-interventional (CI) radiography are based on the results of a comprehensive practice analysis conducted by The American Registry of Radiologic Technologists® (ARRT®) staff and the Cardiac-Interventional Radiography Practice Analysis and Continuing Qualifications Requirements (CQR) Advisory Committee. The purpose of the practice analysis is to identify job responsibilities typically required of CI radiographers at entry into the profession. The results of the practice analysis are reflected in this document. The purpose of the task inventory is to list or delineate those responsibilities. The task inventory is the foundation for both the clinical experience requirements and the content specifications.

## Basis of Task Inventory

In 2015, the ARRT surveyed a large national sample of CI radiographers to identify their responsibilities. When evaluating survey results, the advisory committee applied a 40% guideline. That is, to be included on the task inventory, an activity must have been the responsibility of at least 40% of CI radiographers. The advisory committee could include an activity that did not meet the 40% criterion if there was a compelling rationale to do so (e.g., a task that falls below the 40% guideline but is expected to rise above the 40% guideline in the near future).

## Application to Clinical Experience Requirements

The purpose of the clinical experience requirements is to verify that candidates have completed a subset of the clinical procedures within CI radiography. Successful performance of these fundamental procedures, in combination with mastery of the cognitive knowledge and skills covered by the CI radiography examination, provides the basis for acquisition of the full range of clinical skills required in a variety of settings. An activity must appear on the task inventory to be considered for inclusion in the clinical experience requirements. For an activity to be designated as a mandatory requirement, survey results had to indicate the vast majority of CI radiographers performed that activity. The advisory committee designated clinical activities performed by fewer CI radiographers or which are carried out only in selected settings, as elective. The clinical experience requirements are available from ARRT's website ([www.arrt.org](http://www.arrt.org)) and appear in the *Cardiac-Interventional Radiography Certification and Registration Handbook* also located on the ARRT website.

## Application to Content Specifications

The purpose of the ARRT CI Radiography Examination is to assess the knowledge and cognitive skills underlying the intelligent performance of the tasks typically required of CI radiographers at entry into the profession. The content specifications identify the knowledge areas underlying performance of the tasks on the task inventory. Every content category can be linked to one or more activities on the task inventory. Note that each activity on the task inventory is followed by a content category that identifies the section of the content specifications corresponding to that activity. The content specifications are available from ARRT's website ([www.arrt.org](http://www.arrt.org)) and appear in the *Cardiac-Interventional Radiography Certification and Registration Handbook*.



Activity	Content Categories
1. Verify package integrity and expiration date of sterile supplies.	PC.1.E.1.B., P.1.–P.2.
2. Verify the type, concentration, amount, and expiration date of medications.	PC.1.B.5.B.
3. Prepare equipment or trays with medications and materials.	PC.1.D.1.–D.3., PC.1.E.1.B., P.1.–P.2.
4. Check emergency cart to assure appropriate emergency supplies.	PC.1.F.2.–F.3.
5. Prepare equipment for sterilization.	PC.1.E.1.B.
6. Ensure proper function and cleanliness of the automatic contrast injector.	PC.1.E.1.A., IP.1.E.
7. Verify presence of appropriate signed informed procedural consent.	PC.1.A.1.B.
8. Verify patient's identification.	PC.1.A.1.
9. Identify a risk of drug or contrast reaction prior to any procedure, using patient records or by questioning patient.	PC.1.A.1., PC.1.C.2., P.C.1.F.1.–F.3.
10. Monitor and record vital signs.	PC.1.B.1., PC.1.B.5.F.
11. Assess distal pulses pre and post procedure.	PC.1.B.2.
12. Participate in pre-procedural time-out activity.	PC.1.A.1.D.
13. Prepare the vascular access site(s) to include the required sterile drapes and covers.	PC.1.B.2., PC.1.E.1.B.
14. Provide for patient comfort and cooperation by familiarizing patient with the equipment and the examination.	PC.1.A.1.A., PC.1.A.2.–A.3.
15. Prepare the patient for the examination to include physiological monitoring equipment.	PC.1.B.1.–B.4.
<b>In conjunction with physician, select the appropriate contrast agent:</b>	
16. Nonionic low-osmolar	PC.1.C.
17. Nonionic iso-osmolar	PC.1.C.
18. Set-up and operate the automatic contrast injector.	IP.1.E.
<b>Prepare or assist in administering (e.g., obtain medication, fill syringe, label syringe) the following types of injectable medications according to physician's orders:</b>	
19. Analgesics	PC.1.D.1.
20. Anticoagulants	PC.1.D.1.B.
21. Thrombolytics	PC.1.D.1.C.
22. Vasoactives (i.e., constrictors, dilators)	PC.1.D.1.D.
23. Emergency medications	PC.1.D.1.E.–H.
24. Recognize patient emergencies (e.g., seizure, cardiac distress).	PC.1.F.3.A.–N.
25. Respond to patient emergencies (e.g., CPR, defibrillation).	PC.1.F.3.A.–N.



Activity	Content Categories
26. Monitor and maintain medical equipment (e.g., IVs, oxygen) used during the procedure.	PC.1.B.4.
27. Use sterile or aseptic technique to help prevent infection.	PC.1.E.1.–E.2.
28. Handle blood and body fluids in a manner appropriate to biohazardous materials.	PC.1.E.3.
29. Adjust and calibrate pressure transducers.	PC.1.B.1.E., P.1.–P.2.~6.
30. Scrub with the physician.	PC.1.D.1.A.1.–A.3., P.1.–P.2.~5., P.1.–P.2.~6.
31. Take appropriate precautions to minimize radiation exposure to the patient.	IP.1.F.1.A.–H.
32. Take appropriate precautions to minimize occupational radiation exposure.	IP.1.F.2.A.–D.
33. Advocate radiation safety and protection.	IP.1.F.2.D.
34. Describe the potential risk of radiation exposure when asked.	PC.1.A.1.C., IP.1.F.
35. Wear an occupational monitoring device while on duty.	IP.1.F.2.B.
36. Position the patient and/or imaging equipment to achieve desired projections.	IP.1.A.2., P.1.A.~4., P.2.B.~4.
37. Select appropriate imaging protocols (e.g., frame rates, high/low level fluoro) to optimize image quality while minimizing dose.	PC.1.B.5.A., IP.1.A.1.A.1.–A.2.
38. Employ image-enhancement techniques (e.g., magnification, filtration, collimation) during procedure to improve image quality.	IP.1.A.1.B.–E.
39. Acquire digital images.	IP.1.A.1., IP.1.C.–D.
40. Document fluoroscopy time.	PC.1.B.5.C.
41. Document fluoroscopy dose.	PC.1.B.5.D.–E.
42. Process digital images (e.g., roadmapping, subtraction, annotation, magnification).	IP.1.A.1.A.3.–A.4.
43. Process images: 3D reconstruction.	IP.1.A.1.A.5.
44. Assist with ultrasound guidance for vascular access/biopsy.	IP.1.B.
45. Monitor and record procedural data (e.g., radiographic exposure factors, injection data, fluoroscopic time, physiologic data, administered medications and complications).	PC.1.B.5.A.–H., IP.1.
46. Evaluate individual occupational exposure reports to determine if values for the reporting period are within established limits.	IP.1.F.2.C.
<b>Assist with the following procedures:</b>	
<b><u>Access Assessment</u></b>	
47. Femoral angiography	PC.1.B.2.B.1.
48. Radial angiography	PC.1.B.2.B.2.



<b>Activity</b>	<b>Content Categories</b>
49. Brachial angiography	PC.1.B.2.B.3.
50. Axillary angiography	PC.1.B.2.B.4.
51. Subclavian angiography	PC.1.B.2.B.6.
52. Jugular angiography	PC.1.B.2.B.5.
53. Vascular patency (e.g., Allen test, Barbeau test)	PC.1.B.2.A.
<b><u>Diagnostic</u></b>	
54. Pulmonary angiography	P.1.A.1.
55. Pulmonary pressure measurement	P.2.A.5.
56. Aortography	P.1.A.2.
57. Coronary angiography	P.1.A.3.
58. Renal angiography	P.1.A.8.
59. Femoral angiography	P.1.A.6.
60. Internal mammary angiography	P.1.A.4.
61. Carotid angiography	P.1.A.7.
62. Ventriculography	P.1.A.9.
63. Saphenous vein graft angiography	P.1.A.5.
64. Intravascular ultrasound	IP.1.B.2.
65. Optical coherence tomography	IP.1.B.1.
66. Cardiac output calculations and measurement	P.2.A.4.A.–C.
67. Point of care blood sampling (e.g., ACT,ABG)	PC.1.B.3.
68. Biopsies	P.1.A.10.
69. Intracardiac echocardiography (ICE)	IP.1.B.3.
70. Right heart catheterization	P.2.A.5.
71. Fractional flow reserve	P.2.A.6.
72. Shunt detection	P.2.A.3.
73. Ventricular volume measurement (ejection fraction)	P.2.A.1.
74. Cardiac valve area calculations and measurements	P.2.A.2.
75. Electrophysiology studies	P.1.B.1.
<b><u>Interventional</u></b>	
76. Coronary angioplasty	P.2.B.1.
77. Peripheral angioplasty	P.2.B.1.
78. Coronary rotational atherectomy	P.2.B.2.B.
Peripheral atherectomy	
79.    directional	P.2.B.2.A.



<b>Activity</b>		<b>Content Categories</b>
80.	rotational	P.2.B.2.B.
81.	Pulmonary Thrombectomy	P.2.B.4.
82.	Coronary stent placement	P.2.B.3.
83.	Peripheral stent placement	P.2.B.3.
	Coronary thrombectomy	
84.	mechanical	P.2.B.4.A.
85.	pharmacological	P.2.B.4.B.
	Arrhythmia ablation	
86.	Atrial fibrillation	P.1.B.2.A.
87.	Atrial flutter	P.1.B.2.B.
88.	Ventricular tachycardia	P.1.B.2.C.
89.	Cardioversion	P.1.B.3.
90.	Pacemaker, temporary transvenous insertion	P.1.B.5.
91.	Pacemaker, permanent implantation	P.1.B.4.A.
92.	Pericardiocentesis	P.2.B.6.
93.	Defibrillator implantation	P.1.B.4.B.
94.	Patent foramen ovale/atrial septal defect closure	P.2.B.10.
95.	Ventricular assist device implantation	P.2.B.9.
96.	Intra-aortic balloon counterpulsation	P.2.B.7.
97.	Distal protection device placement/retrieval	P.~6.
98.	Foreign body removal	P.2.B.8.
99.	Vascular closure devices	P.~5.
100.	IVC filter placement/retrieval	P.2.B.5.
101.	Transcatheter aortic valve implantation	P.2.B.11.
102.	Valvuloplasty	P.2.B.12.
	Post-Procedure Patient Care	
103.	Apply pressure to arterial or venous puncture site.	PC.1.E., P.~5.
104.	Apply dressing to puncture.	PC.1.E., P.~5.