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Examination Overview

RCIS

Registered Cardiovascular Invasive Specialist



Courtesy Lancaster General Hospital

Registered Cardiovascular Invasive Specialist (RCIS)

This Examination Overview is meant to assist you as a prospective candidate of the Registered Cardiovascular Invasive Specialist (RCIS) credentialing program. It provides an overview of the Qualification Requirements and Examination Content. For more details on CCI policies, the testing process, and procedures to submit an application, please visit www.cci-online.org to view or download the Applicant Handbook. **Examination fee is \$365 USD and all exam fees include a \$100 USD non-refundable filing fee.**

Qualification Requirements

All applicants must meet the following criteria:

1. Have a high school diploma or general education diploma at the time of application.
2. Fulfill one (1) of the qualifications of the exam for which you are applying. See qualifications listed in the tables below.
3. Provide typed documentation to support the qualification prerequisite under which you are applying. Required documentation for each qualification is listed below. CCI reserves the right to request additional information.

Qualification Prerequisite (All applicants must fulfill one of the following)	Supporting Documentation
<p>RCIS235 A graduate of a certificate or degree granting program or post-secondary educational program in a health science (includes, but not limited to, cardiovascular technology, ultrasound, radiologic technology, respiratory therapy, nursing or paramedic/EMT)</p> <p>AND One year full-time work experience in invasive cardiovascular technology</p> <p>AND 600* cardiac diagnostic/interventional procedures in their career which is defined as work experience and/or clinical experience gained during a formal educational program.</p> <p>In the verification letter(s) the medical director(s) and/or program director(s) must confirm the number of procedures performed during the applicant's employment and/or during the academic program.</p>	<p>RCIS235 Completion certificate and/or educational transcript AND Employment Verification Letter AND Clinical Experience Letter (only required for applicants submitting verification of the number of procedures completed during a formal educational program)</p>
<p>RCIS5 A graduate of a NON-programmatically accredited program in invasive cardiovascular technology which has a minimum of one year of specialty training and includes a minimum of 800 clinical hours* in the specialty in which the examination is being requested.</p> <p><i>IMPORTANT: If an individual's clinical hours were completed after graduation or if the hours are not a requirement for their educational program, then those hours WOULD NOT count toward the 800-hour minimum under qualification RCIS5. All clinical hours must be earned in a setting in which patients are being tested or medically treated.</i></p>	<p>RCIS5 Completion certificate and/or educational transcript AND Student Verification Letter AND Clinical Verification Letter</p> <p><i>Students applying to take examination prior to graduation will be required to submit this documentation</i></p>
<p>RCIS4 Applicant must be a graduate of a programmatically accredited program** in invasive cardiovascular technology.</p>	<p>RCIS4 Completion certificate and/or educational transcript AND Student Verification Letter</p> <p><i>Students applying to take examination prior to graduation will be required to submit this documentation</i></p>

* If an individual's procedures were completed during a formal educational program, then those procedures completed WOULD count toward the minimum of 600 diagnostic/interventional procedures under qualification RCIS235.

** An accredited program is accredited by an agency recognized by the Council for Higher Education Accreditation (CHEA), United States Department of Education (USDOE), or Canadian Medical Association (CMA) that specifically conducts programmatic accreditation for cardiovascular technology, diagnostic cardiac sonography, or vascular technology.

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Examination Matrix

This examination matrix is provided to illustrate the general distribution of questions and the relative weight or emphasis given to a skill or content area on the examination.

Content Category	Approx. % of Exam
A Conducting Pre-Procedural Activities	10%
B Conducting Diagnostic Procedures	42%
C Conducting Interventional Procedures	33%
D Responding to Emergency Procedures and Protocols	6%
E Conducting Post-Procedural Activities	9%
TOTAL	100%

Task List

The task list below describes the activities which a Registered Cardiovascular Invasive Specialist is expected to perform on the job. All examination questions are linked to these tasks.

Duties and Tasks	Approx. % of Exam
A Conducting Pre-Procedural Activities	10%
1 Prepare procedure/control room (e.g., set up equipment, radiation safety, sterile technique, QC, QA)	
2 Prepare patient for procedure	
3 Review and validate patient or procedure information (e.g., medical records, lab values, time out, consent, presentation)	
B Conducting Diagnostic Procedures	42%
1 Monitor vital signs of patients (e.g., heart rate, rhythm, blood pressure, respiratory rate, O2 saturation, ETCO2)	
2 Assist/perform left heart catheterization (e.g., pressure waveforms, pull-back)	
3 Assist/perform right heart catheterization (e.g., cardiac output, Fick, shunts, PVR, SVR, valve areas, congenital procedures)	
4 Perform 12-Lead ECG analysis (e.g., infarct, bundle branch block, ischemia, tamponade)	
5 Assist in the performance of intra-cardiac imaging procedures (e.g., ICE, identify structures)	
6 Assist in the performance of intra-vascular imaging procedures (e.g., IVUS, OCT, identify structures)	
7 Identify structures on cardiac ultrasound images	
8 Assist/perform fractional flow reserve (FFR) and instantaneous fractional reserve (IFR) studies	
9 Ensure radiation safety (e.g., time, distance, shielding, ALARA)	
10 Assist in performing radiographic procedures (e.g., set-up, positioning, operation)	
11 Acquire/interpret radiographic images (e.g., cardiac, peripheral vascular)	
12 Assist/perform with endomyocardial biopsy	
13 Recognize pharmacologic effects of medications (e.g., recognize side effects/adverse reactions, pain management)	
14 Assist in obtaining vascular access (e.g., femoral, radial, brachial, jugular, peripheral)	
C Conducting Interventional Procedures	33%
1 Assist in performing device implants (e.g., pacemaker, ICD, CRT devices, loop recorders)	
2 Assist in performing coronary interventions (e.g., balloon angioplasty, stenting)	

Duties and Tasks	Approx. % of Exam
3 Assist in performing complex coronary interventions (e.g., CTO, atherectomy, alcohol ablation)	
4 Assist in performing peripheral interventions (e.g., renals, lower extremities, vena cava filters, stenting)	
5 Assist in performing complex peripheral interventions (e.g., carotids, critical limb salvage, atherectomy)	
6 Assist in performing mechanical circulation support (e.g., IABP, LVAD, Impella)	
7 Assist with insertion and operation of transvenous temporary pacemaker	
8 Assist in performing pericardiocentesis	
9 Assist with in performing cardiac thrombectomy (mechanical and aspirational)	
10 Assist with performing peripheral thrombectomy (mechanical and aspirational) (e.g., thrombolysis)	
11 Assist with the insertion of distal protection devices (e.g., cardiac, peripheral)	
12 Assist in performing structural heart therapies (e.g., ASD, PFO, VSD, PDA, LAA)	
13 Assist in performing percutaneous valve interventions (e.g., valvuloplasty, TAVR, annuloplasty, paravalvular leak, valve repair)	
14 Assist in performing endovascular procedures (e.g., aortic aneurysm, aortic dissection, coarctation)	
D Responding to Emergency Procedures and Protocols	6%
1 Respond to emergency situations (e.g., STEMI, chest pain, pulmonary edema, cardiogenic shock, limb ischemia, stroke, administer medications, vasovagal, anaphylaxis)	
2 Maintain and operate emergency equipment (e.g., defibrillator, code cart, suction, airway management)	
E Conducting Post-Procedural Activities	9%
1 Obtain arterial and venous hemostasis	
2 Manage access site complications (e.g., bleeding, occlusion)	
3 Manage post-procedure complications (e.g., stroke, rhythm)	
4 Provide patient education	
5 Report and transfer of care	
TOTAL	100%

Registered Cardiovascular Invasive Specialist (RCIS)

Knowledge List

The list below describes general areas of knowledge that are needed in order to perform the tasks identified. This knowledge will apply across multiple tasks.

Mathematics

- Calculation/conversion skills
- Units of measurement
- Shunt calculations, VOA

Medical terminology

Cardiovascular anatomy and physiology

Cardiovascular pathology and pathophysiology

Body mechanics

Regulatory and compliance standards

Patient care and assessment

Normal and abnormal lab values

ECG interpretation and analysis

Pharmacology and medication administration

Hemodynamic waveform recognition

Imaging

- Angiography
- Radiation safety
- Operation of radiographic equipment
- IVUS
- ICE

Sterile technique

Universal precautions

Diagnostic and interventional procedures

- Cardiac procedures
- Vascular procedures
- Device implants
- Procedural indications, contraindications, and complications

Hemostasis

Emergency procedures and equipment

Sample Questions

1. Based on the following data: O₂ Consumption = 250 ml/min., AO = 21.0 vol. %, PA = 16.0 vol. %, BSA = 1.8 M². What is the approximate cardiac output for the patient?

- 2.5 L/min.
- 4.0 L/min.
- 5.0 L/min.
- 6.0 L/min.

2. Positioning the image intensifier as close to the patient as possible:

- Increases scatter
- Decreases scatter
- Increases exposure time
- Decreases exposure time

3. Which of the following hemodynamic pressures would be used to check for mitral stenosis?

- LV systolic & Aortic systolic
- LV systolic & PCW
- LVedp & PCW
- LVedp & Aortic diastolic

4. If a patient had a large S-wave in lead VI and a large R-wave in V₅, you might suspect:

- LVH
- IV Strain
- Hyperkalemia
- Anterior Infarction

5. What is most likely indicated from the following oximetry samples?

Position	Saturation%	Position	Saturation%
SVC	70%	RV	86%
IVC	71%	PA	86%
Hi RA	78%	LA	94%
Mid RA	86%	LV	94%
Low RA	83%	AO	94%

- ASD with left to right shunt
- PDA with left to right shunt
- VSD with left to right shunt
- Tetralogy of Fallot with bidirectional shunt

Answers

1. c 2. b 3. c 4. a 5. a

RCIS References

The textbooks listed below are intended as recommended resources when preparing for examination. You may have previous or later editions of these or other references available that also present acceptable coverage of the subject matter. Any general text in cardiovascular techniques and evaluation, and cardiac patient care and management may be used. It is not necessary to use all of the texts identified. They are provided as suggestions only. CCI does not endorse or recommend any third-party review course or material.

- Moscucci, Mauro. Grossman & Baim's *Grossman and Baim's Cardiac Catheterization, Angiography, and Intervention*. Philadelphia: Lippincott Williams & Wilkins.
- Darovic, Gloria Oblouk. *Hemodynamic Monitoring: Invasive and Noninvasive Clinical Application*. Philadelphia: W.B. Saunders Co.
- Kern, Morton J., Sorajja, Paul and Lim, Michael. *The Cardiac Catheterization Handbook*. Philadelphia: Saunders Elsevier.
- Watson, Sandy, and Kenneth A. Gorski. *Invasive Cardiology: A Manual for Cath Lab Personnel*. Sudbury, MA: Jones and Bartlett Learning.

Online Self-Assessment Practice Examinations are available for purchase for self-evaluation purposes. It is important to note that the results of the self-assessment exam do not guarantee or indicate individual success on the CCI exam, nor should the self-assessment serve as the only means for preparing for the CCI examination. **To order the self-assessment examinations online visit www.cci-online.org.**

CCI Applicant Handbook is required reading prior to applying for a CCI exam. Included is important information regarding the application policies, CCI procedures, and the testing process. **Download at www.cci-online.org/applicanthandbook.**