

Certification Board of Cardiovascular Computed Tomography



2010 Testing Information and Policies

CBCCT Contact Information

101 Lakeforest Boulevard, Suite 401
Gaithersburg, MD 20877
Tel: +240.631.8151 • Fax: +240.631.8152
Email: info@cbcct.org • Website: www.cbcct.org



Prometric Scheduling Contact Information

Tel: 1-888-763-0134 • Website: www.prometric.com/CBCCT

Please review the Authorization To Test (ATT) letter you received with this booklet NOW to be sure your name is spelled correctly and any address data are correct. Contact the CBCCT office if any changes are required.

2010 Exam Important Dates

Exam Testing Dates

Tuesday, September 14 and Wednesday, September 15, 2010

Withdrawal/Cancellation Deadline

Friday, September 3, 2010

Cancellation of Scores Deadline

5 working days after your exam

2010 Scores to be Mailed (Anticipated)

Approximately 10 weeks following the Exam

Diplomate Certificates Mailed

January 2011

Table of Contents

	Page
Exam Overview	4
About the Exam	4
Scheduling Your Appointment at Prometric	4
Rescheduling or Cancelling your Appointment	
Change of Address and/or Name	
Special Testing Arrangements	
Admission to the Testing Center	8
Admission Document	
Appearing at the Test Center	8
Security On-Site	
Problems at the Testing Center	
After the Exam	11
Cancellation of Scores	
Determination of Passing Score	
Reporting Exam Scores	
Request Manual Scoring	
Appeal of Scores	
Designation of Diplomate Status	
Other Exam Related Policies	12
Nondiscrimination Policy	
Maintenance of Certification	
Revocation of Certification	
Other CBCCT Policies	
Preparing for the Exam	13
Appendix A: Cancellation of Scores Form	14
Appendix B: Exam Content Outline	15
Appendix C: References	17
Appendix D: Sample Questions	18

Exam Overview

Certification Exam

- Up to 170 multiple choice questions
- 4 ½ hours to complete (5 hour total appointment time, including onsite pre-exam tutorial and post exam survey)

The Exam

- Computer-based testing format hosted at Prometric testing centers
- Testing centers around the world
- Exams administered in English
- Multiple choice questions with four (4) answer options, only one of which is best or correct
- Images and figures may be in grayscale or color; cine or static

About the Exam

Exam Development

A national analysis of the practice of Cardiovascular Computed Tomography was conducted in 2007 in order to define the responsibilities, tasks and knowledge necessary for physicians to practice in the field. The data from this analysis was used to create the exam specifications and to determine the content of the exam (see Appendix B).

The exam questions were developed by the Examination Committee, an expert panel of the CBCCT, under the guidance of Alpine Testing Solutions. The exam question pool is updated on a regular basis to reflect current knowledge. Individual questions are modified or deleted based on statistical analysis of the exam.

The CBCCT retains Alpine Testing Solutions of Orem, UT to provide assistance in the development of the exams. Alpine is a research and development firm that serves certification bodies by planning, developing, and administering assessment procedures and programs designed to measure professional competence.

Scheduling Your Appointment at a Prometric Testing Center

The CBCCT has contracted with Prometric™, a leading global provider of comprehensive testing services including computer based testing (CBT), to host the CBCCT exam.

Scheduling an Exam Seat and Time

To obtain your preferred testing date, time and location schedule an exam appointment as soon as you receive your Authorization To Test (ATT) letter confirming approval of your eligibility to sit for the exam. This letter was included with this booklet. **This letter includes your name, the test you have been approved to take and your CBCCT Candidate ID number. You will need these data exactly as printed on your ATT letter.**

You must register for a seat and time no later than sixty (60) days prior to the exam date. After that time, seats for the CBCCT exams cannot be guaranteed by Prometric. Seats are limited; those who register early will have the best opportunities to schedule their exam at a time and location convenient to them.

Online scheduling is encouraged because it is faster and more efficient and can be done any time after receiving your ATT letter. An email address is required to schedule online. Candidates who schedule online will receive an email confirmation of the exam appointment and a Prometric confirmation number. To schedule online, go to www.prometric.com/cbcct. Please be aware that communications sent via email from CBCCT and/or Prometric may be filtered by spam filters. Please be sure to enable your spam filter to allow email from the cbcct.org and Prometric.com domains, and check your Junk Mail folder often to ensure emails from CBCCT and Prometric have not been filtered.

Note:
Your Prometric ID number is required to confirm, reschedule or cancel an exam appointment. Please store this number in a secure place.

Exam appointments can be scheduled by phone Monday through Friday, 8:00 a.m. to 8:00 p.m. (ET) by calling 1-888-763-0134 in the U.S. Candidates from outside the United States, U.S. Territories and Canada must contact the Prometric Regional Call Center for your area. This information can be found at www.Prometric.com/cbcct. Please have your CBCCT Candidate ID number available when you contact Prometric. Candidates scheduling by phone will not receive written confirmation of their appointment so be sure to note the appointment details and confirmation number. Put your confirmation number in a safe place. This number is required to confirm, reschedule or cancel an exam appointment and differs from your CBCCT Candidate ID number.

Candidates should be aware that not all test centers will be open on the CBCCT test dates, nor will sites necessarily have availability at all times during the day. For this reason, Candidates are encouraged to schedule early to get their preferred exam date, time and location.

Scheduling Online (preferred) *(A valid email address is required)*

- Go to: www.Prometric.com/cbcct
- Click the "Start" button in the orange box.
- Select your Country and State (if necessary) from the drop down menus and click the "Next".
- Select "Schedule an Exam" from the options.
- You will then be directed to an information page about CBCCT. Please review this page carefully and then click "Next".
- Review the Data Privacy Notice. You must acknowledge this Privacy Notice by selecting the "I Agree" button. Click the "Next" button to proceed.
- The next page will require you to enter your **Eligibility ID** number and the first four letters of your last name. Your Eligibility ID number can be found at the top of your Authorization To Test (ATT) letter. Once you've entered the required information, click "Next" to proceed.
- A list of all the available testing centers in your country/state will appear.
- Enter the specific city name or zip code to get a list of the centers in your local area.
- Select your preferred testing center and click on "Schedule an Exam".
- You will then be on the scheduling page, which is set to find available seats in a **3 month period**, select the month of **September 2010**. Leave the default settings as is and click "Go".

- When you select the date, the available times will appear in the little window on the right side. To select a time from the options, just click on it.
- You will then be directed to an Additional Information page. Please enter or modify all required information and then click "Next".
- This will bring you to a Verify Appointment Information page. If all of your appointment information is correct, click "Commit Registration". If you would like to modify your appointment information, click "Back".
- Once your date and time have been confirmed, print this page. You will also receive a Prometric Confirmation number. **KEEP YOUR PROMETRIC CONFIRMATION NUMBER IN A SAFE PLACE.** You will need this to cancel or reschedule your exam.

Scheduling by Telephone

If you do not have a valid email address, you will need to make testing arrangements with Prometric by phone. In the United States, U.S. Territories and Canada, please dial 1-888-763-0134. Please have your CBCCT Candidate ID number available when you contact Prometric.

You will not receive a printed (email) confirmation if you schedule by telephone. You will be given a Prometric confirmation number to write down. Keep this number safe. You will need this to cancel or reschedule your exam.

Prometric has a new service called *e-chat* available for Candidates who require urgent weekend (Saturday/Sunday) support. Visit Prometric Customer Service for more information at www.Prometric.com/TestTakers/ContactUs.

Contact the CBCCT office if you experience ANY difficulty scheduling your exam appointment at a Prometric testing center. We may be able to help.

Rescheduling Your Exam Date

Exam appointments can be rescheduled if time slots are available. CBCCT shares Prometric test centers with other organizations and seats fill up quickly so if you need to reschedule you are cautioned to do so as early as possible because seats cannot be guaranteed.

To reschedule an exam appointment you must have your Prometric confirmation number and you must do so at least 3 days prior to your appointment using the Reschedule option at www.Prometric.com/cbcct or by calling Prometric's Contact Center 888-763-0134; both are available 24/7. Prometric will assess a \$25 rescheduling fee for appointments rescheduled between 3-29 days of exam.

Cancelling your Exam

In the event you decide for any reason to withdraw from participation in the exam you must cancel your appointment with Prometric and notify CBCCT in writing **no later than September 3, 2010** to be eligible for a refund of \$795. All other fees are not refundable.

To cancel an exam appointment you must cancel your appointment with Prometric and notify CBCCT prior to September 3rd to be eligible for a refund of \$795. All appointments must be cancelled at

least 3 days prior to your appointment using Reschedule/Cancel option at www.Prometric.com/cbcct or by calling Prometric's Contact Center at 888-763-0134. Prometric will assess a \$25 cancellation fee for appointments cancelled between 3-29 days of the exam. Candidates who cancel appointments but do not notify CBCCT in writing by September 3, 2010 will forfeit all refunds and fees.

If you are a No-Show: If you fail to cancel by September 3, 2010 or for any reason fail to appear at the exam site where you are registered to sit for the exam you will forfeit all fees paid and no refund will be provided. If you are deemed eligible to take the exam, but do not schedule an appointment and do not request a refund by September 3, 2010 you are considered a "No-Show Candidate" and forfeit all fees. If you arrive late you may not be permitted to sit for the exam; whether or not you can sit is entirely at the discretion of the Prometric test center and will depend on whether the site has availability to accommodate a late-arriving Candidate. Should the late-arriving Candidate not be permitted to test, he/she will forfeit all fees paid and no refund will be provided.

If you cancel or fail to appear for the exam you will be required to file a new application, pay applicable fees and meet applicable eligibility criteria if you wish to sit for future exams.

To update your Contact Information or make Address Changes

Authorization To Test letters, score reports and the all-important **Admission Documents** are mailed to the address provided in the Candidate's application. Candidates should notify CBCCT **immediately** if there are changes to contact information. This notification must be in writing with your signature and can be faxed to 240-631-8152. CBCCT is not responsible for lost communications when changes to contact information have not been conveyed to CBCCT in a timely manner.

To make a Name Change

To correct small errors in your name (e.g., incorrect middle initial, typo, etc.) as printed on your Authorization To Test letter please email CBCCT at info@cbcct.org or call us at 240.631.8151 no later than August 3, 2010. This will ensure the correct information is printed on your Admission Document.

To change your name due to a legal name change, submit copies of notarized documentation to CBCCT no later than August 3, 2010. Please do not send originals. When submitting a name change, make sure that you have an unexpired government issued ID bearing a current photo and your signature that matches the requested name change. When appearing for the exam appointment, Candidates without appropriate ID will not be admitted to take the exam and will forfeit all fees.

Requesting Special Testing Arrangements

As stated in the Candidate Bulletin (page 11), special testing accommodations must be requested in writing at the time of application. CBCCT will try to accommodate later requests but cannot guarantee accommodations. In all cases, special accommodations must be requested in advance of scheduling an exam appointment. CBCCT will make reasonable efforts to accommodate eligible Candidates, who provide documented evidence of their disability, with auxiliary aids and services that do not fundamentally alter the measurement of the knowledge the assessment program is intended to test. You can find a CBCCT Special Accommodations Request form on our website at www.cbcct.org/resources/special_accommodations_form.

Admission to the Testing Center

Candidates will be required to present their Admission Document, which will include the signed photograph submitted with your application and; a form of unexpired government issued ID bearing a current photo and your signature in order to enter the testing site. If your driver's license does not include a photograph, this is not an acceptable form of identification. If you are testing outside of your country of citizenship, you must present a valid passport or some other form of government issued ID with a photograph and signature. If you are testing within your country of citizenship, you must present either a valid passport, driver's license, national ID or military ID which contains a photograph and signature. The identification document must be in Latin characters and contain your photograph and signature. If you do not have a government issued ID with photograph and signature you must make special arrangements with CBCCT PRIOR to the exam date. All other personal items brought with you to the testing center must be locked in a locker for test security purposes, so please limit what you bring to the testing center.

Admission Document

At least fourteen (14) days before the exam (21 days if residing outside North America), you will receive an Admission Document. It will include the signed photograph from your original application, your CBCCT Candidate ID number and your Prometric confirmation number. Due to the possibility of exam time changes by Candidates after the documents are mailed, this document will **not** include specifics on your testing location or time. However, with the information on the Admission Document you will be able to confirm your test information at www.prometric.com/cbcct.

Please contact CBCCT if you:

- lose your Admission Document
- have not received your Admission Document 7 days before the exam (10 days if outside No. America).
- change your address (or your name)

You must bring your CBCCT ADMISSION DOCUMENT and unexpired government issued ID bearing your photo and signature to the test site on your test date. You will not be permitted to test without your CBCCT Admission Document and unexpired government issued ID bearing your photo and signature.

Appearing at the Testing Center

1. All Candidates must present their ADMISSION DOCUMENT and a form UNEXPIRED GOVERNMENT ISSUED IDENTIFICATION BEARING A CURRENT PHOTO AND SIGNATURE (e.g. driver's license or passport WITH photo and signature) at the test site in order to be allowed to take the exam. NO EXCEPTIONS TO THIS REQUIREMENT WILL BE MADE. In order to validate the Candidate's ID at the test center the name, photo and signature on the ID must match the name on the application and the name, photo and signature on the Admission Document. Test Center Administrators are required to collect and destroy all CBCCT Admission Documents. If you do not have the appropriate ID you must make arrangements with CBCCT PRIOR to the exam date.

2. Candidates should arrive at the test site 30 minutes prior to the starting time of the exam. Ideally, Candidates should scout the location of the site and parking availability prior to exam day. **Candidates arriving after the starting time of the exam may not be permitted to sit for the exam due to scheduling issues or other factors at the test site.** Neither CBCCT nor Prometric represents or guarantees that a Candidate will be permitted to sit for the exam if the Candidate arrives after the starting time of the scheduled exam. In making application, Candidates agreed that neither CBCCT nor Prometric shall be liable for a Candidate's failure to arrive at the test site prior to the start time of the exam. Candidates are not entitled to a refund of the application fee resulting from the Candidate arriving after the start time of the exam.
3. **No electronic or other devices with memory capabilities, cells phones, pagers, Blackberries, books, calculators, or notes are permitted in the testing room.** Lockers are available for storage of personal items. If such devices are stored in a locker you are NOT permitted to use them during a break or anytime during your visit to the test center. It is recommended that such devices be left securely in your car or at home. You are not permitted to leave the building during a break.
4. Food and beverages are not allowed in the testing room. You may bring a snack, but it must be left in a locker outside the testing room.
5. There are no scheduled breaks but Candidates may take a break as needed to use the restroom or get a snack. Notes may not be taken from the test room, nor may notes or any other electronic devices be retrieved, reviewed or used during a break. Candidates will be required to sign in and out of the testing room and may be asked to provide photo ID upon re-entry. No additional testing time is added for unscheduled breaks.
6. All Prometric workstations conform to CBCCT Board approved specifications for the exam in cardiovascular computed tomography. Candidates may request one workstation change if needed, provided the testing center has availability.

Security On-Site

Strict security measures are maintained throughout all phases of exam development and administration. Prometric and CBCCT will at all times be in compliance with applicable laws relative to Identity Management Services.

Proctors will supervise the administration of the exam and Candidates may be video and/or audio taped to maintain the strictest security throughout the testing period. Irregularities observed during the testing period, such as creating a disturbance, giving or receiving unauthorized information or aid to or from other Candidates, attempting to remove test materials or notes from the testing room, referencing electronic or written notes during a break, or using any prohibited device, material or notes may be sufficient cause to terminate a Candidate's participation in the exam administration, or to invalidate or cancel scores. If it is determined that a Candidate engaged in any form of exam impropriety before or during the exam, the exam will not be scored. Furthermore, should any impropriety have been found, the Candidate will not be allowed to reapply until three (3) years have passed; a new application and Candidate fees will be required. If such instance occurs, no refund of any fees paid will be made.

The exam materials are the property of the Certification Board of Cardiovascular Computed Tomography (CBCCT). Their contents are copyrighted under the laws of the United States. Copying, reproducing or taking any action to reveal the contents of an exam in whole or in part is unlawful and may be grounds for disciplinary or legal action by the CBCCT. Removal of any exam materials from the

testing room by Candidates or unauthorized persons is prohibited and may be subject to disciplinary or legal action.

Irregularities may be identified by observation or suspicion by the exam proctors or may be evidenced by subsequent statistical analysis of testing materials. The CBCCT reserves the right to investigate each incident of misconduct or irregularity.

Problems at the Testing Center

Rescheduling Due to Test Center or Workstation Failure or *Force Majeure* Condition

CBCCT and Prometric will make all reasonable efforts to deliver the CBCCT exam on the date and time scheduled. If the test cannot be delivered at the date and time scheduled due to a test center or workstation failure, or a *force majeure* condition which arises from events or circumstances beyond the reasonable control of Prometric or CBCCT, Prometric will use reasonable efforts to reschedule the Candidate for the exam within the test window dates at a time and location convenient to the Candidate. However, in making application, Candidates understand and agree that neither CBCCT nor Prometric shall be liable for a test center or workstation failure, or a *force majeure* condition which arises from events or circumstances beyond their reasonable control.

Errors and Disruptions in Exam Administration

Occasionally issues arise in the creation, administration, and scoring of exams. For example, power failures, hardware and software problems, weather, or other problems may interfere with some part of the exam process or delay the reporting of scores. When such problems occur, CBCCT at its discretion may provide the affected Candidates with an opportunity to take the exam at the next scheduled exam date for a reduced or waived exam fee. This shall be the Candidate's sole remedy. CBCCT shall not be liable to any Candidate for inconvenience, expense, or other damage, including consequential, incidental, special, or exemplary damages caused by any problems in the creation, administration, or scoring of an exam, including delays in score reporting.

Issues or problems arising during the administration of the exam **must be reported** to Prometric test center staff by the Candidate experiencing the issue or problem at the time the exam is being administered and prior to the Candidate departing the test center site. Candidates are advised to ask the test center staff for their name and the ticket number assigned to their reported issue or problem. Candidates are then required to **notify CBCCT** of the issue or problem with the exam within 48 hours of the scheduled exam time. This notification should include the ticket number assigned by the test center staff for the Candidate's issue or problem.

In no circumstance will CBCCT reduce its standards or overturn a Candidate's score as a means of correcting a problem in exam administration.

After the Exam

Cancellation of Scores

If, for any reason, a Candidate feels that he or she may not have performed as well as hoped on the exam and does not want his/her exam scored or reported, he/she may send a letter or a FAX to CBCCT requesting cancellation of their score. A Cancellation of Scores form is also available in Appendix A of this booklet and at www.CBCCT.org. These written requests must be signed and be received within five (5) working days of taking the exam. After this time, a score cannot be cancelled and will be reported and recorded.

Cancelled scores will not be reported to Candidates. No refunds will be given to Candidates requesting score cancellations. To retake the exam after a score cancellation, a new application and fee must be submitted and the Candidate must meet the eligibility requirements.

Determination of Passing Score

The passing score is based on an expected level of knowledge; it is not related to the distribution of scores obtained during a particular exam administration (i.e., the CBCCT exams are not “graded on a curve”). Thus, in any given year, a Candidate has the same chance of passing the exam whether the group taking the exam at that time tends to have high scores or low scores. In other words, each Candidate is measured against a standard of knowledge, not against the performance of the other individuals taking the exam. For a series of articles that explain a variety of exam related processes in greater detail visit www.CBCCT.org/resources/articles.cfm.

Reporting of Exam Scores

Approximately ten (10) weeks following the administration of the exam, CBCCT will mail each Candidate his or her exam results. Results will not be available onsite at the test centers and RESULTS WILL NOT BE GIVEN OVER THE TELEPHONE, BY FAX OR EMAIL by the CBCCT.

Each Candidate will receive a letter indicating the number of correct questions needed to pass the exam and the number of questions they answered correctly and; a diagnostic report showing performance in each content area. Successful Candidates will receive a press release to announce their Diplomate status with CBCCT. For security and exposure reasons Candidates are not permitted to review specific questions. Physicians certified by CBCCT as Diplomates will be listed on the CBCCT website approximately 2 weeks after the exam scores have been mailed and will receive a certificate suitable for framing in early January.

Candidates who applied as Testamurs and who passed the CBCCT exam, will need to provide CBCCT with documentation of having passed the Cardiology, Nuclear Medicine or Radiology board exam and a copy of their current medical license before a CBCCT certificate can be mailed and name added to the roster of Diplomates. A copy of the letter from the certifying board or a print-out from the certifying board's website documenting board certified status in Cardiology, Nuclear Medicine or Radiology and a copy of the medical license will be accepted as documentation and can be faxed to 240-631-8152.

Request for Manual Scoring

Candidates who were not successful in passing the exam may request that their exam be rescored

manually to verify reported scores. This process involves a human review of scores to make certain that all score data were captured and that the questions and answers were correctly matched in the electronic scoring. Requests for manual scoring can be honored only up to four (4) months after the date published on the score report and should be directed to CBCCT at our home office.

Manual score requests must be in writing and accompanied by a check or money order payable to CBCCT in the amount of \$45. We also accept credit card payments. The written request must include the Candidate's name, CBCCT Candidate ID number, address and signature.

Appeal of Scores

Candidates who wish to appeal their score should contact the CBCCT office to obtain a copy of CBCCT's Due Process and Appeals policy. Exam response data will be retained by CBCCT for six (6) months following an exam. If there are appeals by Candidates, those records will be retained until the appeal process is concluded. All appeals will be conducted in accordance with the appeal procedures adopted by the CBCCT Board of Directors. Appeal requests should be directed to CBCCT at our home office.

Designation of Diplomate Status

CBCCT issues a certificate to successful Candidates who may then present themselves to the public as specialists in the field of Cardiovascular Computed Tomography. Successful Candidates may designate on letterhead, cards, websites, etc. that they are Diplomates of the Certification Board of Cardiovascular Computed Tomography. Acceptable terminology for CBCCT Board Certified Diplomates is limited to:

- Board Certified in Cardiovascular Computed Tomography,
- Board Certified, Certification Board of Cardiovascular Computed Tomography, and
- Diplomate, Certification Board of Cardiovascular Computed Tomography

* Note: The organization initials (CBCCT) may be substituted for the full name. Advertising of "Board Qualified" or "Board Eligible" status is prohibited.

Diplomates are not permitted to use the CBCCT logo as part of their designation. The CBCCT logo is trademarked and unauthorized use is unlawful and subject to disciplinary action and/or prosecution. Diplomates found to be out of compliance with allowable usage will be contacted in writing and asked to conform to CBCCT's policy on Designation. If the error is not corrected within a reasonable amount of time (e.g., 30 days) the individual may be subject to disciplinary action according to CBCCT policies.

Other Exam Related Policies

Nondiscrimination Policy

The CBCCT does not discriminate against any person on the basis of age, gender, sexual orientation, race, religion, national origin, medical condition, physical disability, or marital status.

Maintenance of Certification

It is the responsibility of CBCCT Diplomates to maintain their certified status by applying for recertification at the appropriate time during the ten-year certification period. Diplomates are permitted to recertify in years 8, 9 or 10. CBCCT will make a good faith effort to contact Diplomates regarding changes in policy and procedure and to provide application material to recertify; however, the onus is on Diplomates to maintain their certification status and to keep the CBCCT office appraised of any address changes.

Revocation of Certification

The CBCCT Board of Directors may, at its discretion, revoke certification if the Diplomate fails to maintain moral, ethical or professional behavior satisfactory to the Board or engages in misconduct that adversely affects professional competence or integrity. This includes, but is not limited to, the Diplomate losing his/her license to practice medicine either through suspension or termination or conviction of a felony or other serious crime.

Other CBCCT Policies

For a list of CBCCT Exam Policies and Procedures, visit www.CBCCT.org and click on "About the Exam".

Preparing for the Exam

To help ensure adequate preparation for the certification exam, the following suggestions are offered:

1. **Review the Exam Content Outline** in Appendix B. Indicated in parentheses is the approximate percentage of the total exam that is allotted to each major content area.
2. The **References** listed in Appendix C may prove helpful in the review of the subject areas included in the exam. (Note: The listing of these references is intended for use as a study aid only. CBCCT does not intend the list to imply endorsement of specific texts, nor are the questions on the exam taken directly from these texts.) These references are also available on CBCCT's website with links to the publishers of each book or program.
3. Go through the **CBCCT Exam Preparation Tutorial**, available at no cost at www.CBCCT.org. Click on the Tutorial link in the upper right corner. This demonstration tutorial closely imitates computer screens as Candidates will see them during the exam and allows Candidates to review buttons and graphics to prepare Candidates to navigate through the electronic format. Candidates should not expect to be able to learn electronic exam navigation onsite at the exam, and should arrive having reviewed the tutorial previously. The tutorial is not a content review.
4. Prometric offers a "Test Drive", which allows Candidates to schedule a generic sample test at a testing center. For a fee of \$30, Candidates will be able to go through the scheduling and registration process, the check-in process and participate in a 15 minute sample test that introduces the electronic testing utilities that Candidates will encounter during the exam. For first-time electronic testing Candidates, this can eliminate some of the unfamiliarity that causes stress during an actual exam. To sign up for a "test drive", go to www.Prometric.com/testdrive.com and follow the instructions to schedule an appointment.

Appendix A: Cancellation of Scores Form



I do not wish to have my exam scored. I understand that my score will not be reported to me or to the Certification Board of Cardiovascular Computed Tomography, nor will a record of my exam results be kept. I understand that I will receive no refund of my exam fees.

I understand that this form must be received in the CBCCT office within five (5) working days after my exam test date.

I understand that if I want to retake the exam at a later date, I must meet all eligibility requirements in force at that time. I understand that I must file a new application, submit all of the supporting materials and pay the exam fee.

Candidate Name Printed Date

Candidate Signature

Mail or fax form to:

Certification Board of Cardiovascular Computed Tomography
101 Lakeforest Boulevard, Suite 401
Gaithersburg MD 20877 USA
Fax: +240.631.8152

APPENDIX B: 2010 Exam Content Outline

CBCCT has conducted an analysis of the practice to identify the tasks performed by physicians practicing cardiovascular CT and the knowledge required to perform these tasks. The purpose of this practice analysis is to ensure that the exam content accurately reflects the current practice of cardiovascular CT. To accomplish this, a carefully constructed survey was sent to a representative sample of physicians practicing within the profession. The results were analyzed by a cross section of experts in the field. The result is the following outline of knowledge areas upon which the exam in cardiovascular CT will be based.

I. RADIATION & RADIATION SAFETY (9-13%)

1. Radiation science, generation and physics
2. Radiation safety procedures (e.g., ALARA, dose reduction devices, periodic regular measurement of radiation dose)
3. Government regulations pertaining to radiation safety
4. Clinical application of radiation safety (e.g., pregnancy, children)

II. COMPUTED TOMOGRAPHY FUNDAMENTALS (8-12%)

1. Mechanical aspects of CT (axial, helical, fan beams, rotational velocity)
2. Differentiation between different CT technologies (uses and limitations of 16, 64, 256, EBT, dual source, etc.)
3. Collimation
4. Resolution (temporal, spatial, contrast)
5. Table speed pitch
6. Signal-to-noise ratio
7. Contrast-to-noise ratio
8. Voxel (size and shape)
9. Output settings

III. PATIENT SELECTION AND PREPARATION (7-11%)

A. Selection

1. Cardiac CT indications, contraindications, risks and benefits based on specific patient characteristics and medical history
2. Alternative diagnostic modalities
3. Impact of negative patient characteristics (e.g., obesity, heavy calcium, arrhythmias) resulting in modifying or cancelling the CT scan as appropriate
4. Factors associated with suboptimal and optimal scans

B. Patient Preparation

1. Beta blockers, nitroglycerin and calcium blockers (e.g., indications, contraindications, risks, proper dosage, and administration)
2. Sedation (e.g., indications, contraindications, risks, proper dosage, administration, post-sedation care)
3. Breath-holding techniques
4. Screening and pretreatment for underlying renal insufficiency or allergies

5. Procedures for monitoring patients following the administration of cardiac drugs and contrast
6. Preparation of a patient with a permanent pacemaker

IV. IMAGE ACQUISITION & PROTOCOLS (7-11%)

A. Scan Set-up and Protocols

1. ECG gating (prospective, retrospective, ectopy)
2. Scan set-up based on patient characteristics (e.g., obesity, slow heart rate)
3. Timing protocols (e.g., timing bolus, test bolus, bolus tracking)
4. Injection protocols (e.g., uniphasic, biphasic, triphasic)
5. Protocols for specific types of patients (e.g., patients with grafts, combined aortic and coronary artery disease)

B. Contrast Media

1. Contrast kinetics (e.g., flow rate, changes related to cardiac output, peak opacification of target sites, myocardial enhancement patterns)
2. Contrast attenuation (e.g., iodine flux, dose)

C. Image Quality

1. Body mass
2. Contrast bolus timing or threshold triggering for bolus tracking
3. Heart rate and heart rate variability
4. Breath holding

V. RECONSTRUCTION AND POST-PROCESSING (7-11%)

A. Reconstruction (Processing on the Scanner)

1. Filters and kernels
2. Intervals (phases)
3. Spatial resolution
4. Slice thickness
5. Slice overlap
6. Defined field of view
7. Multisegment reconstruction

Exam Content Outline, continued

B. Post-Processing

(Features and Functionality of Workstation)

1. Windows/levels
2. Multiplanar reformation, straight and curved
3. Centerline
4. Slab thickness
5. Conventional orthogonal view (e.g., axial, sagittal, coronal)
6. Minimum and maximum intensity projections
7. Volume rendering

VI. ARTIFACTS (4-6%)

A. Artifacts Related to Bright Structures

1. Beam hardening (e.g., related to stents, contrast, vascular clips, other metal, bone)
2. Partial volume averaging

B. Image Processing Artifacts

1. Stair step artifact
2. Banding artifact

C. Motion Artifacts

1. Cardiac motion artifact due to high heart rate and variability
2. Cardiac motion artifact due to improper selection of phase
3. Respiratory motion artifact
4. ECG-gating artifacts
5. Streak artifacts
6. Ring artifacts
7. Helical artifacts

VII. CORONARY VESSELS

(Anatomy and Pathology) (25-35%)

A. Anatomy, Variations and Anomalies

1. Coronary (e.g., coronary artery, coronary venous, coronary by-pass grafts)
2. Other coronary pathology (e.g., intramyocardial course, fistula, AVM, aneurysms)
3. Anomalous coronaries (identification and localization of the type and course)

B. Coronary Artery Disease

1. Coronary heart disease
2. Plaque characterization
3. Quantification of coronary artery stenosis
4. Totally occluded vessels
5. Bypass graft analysis (e.g., localization)
6. Pre-operative planning (graft localization)
7. Stent analysis (e.g., limitations, post-processing techniques)

C. Coronary Calcium

1. Quantification methods
2. Epidemiology of CAC
3. Diagnostic utility
4. Prognostic utility

VIII. NON-CORONARY CARDIAC

(Structural and Functional Pathology) (8-12%)

A. Myocardium and Chambers

1. Cardiac structural disease (e.g., cardiac masses, aneurysms, shunts)
2. Left atrial anatomy (e.g., appendage, PFO recognition, size)
3. Left ventricle (e.g., size, function, EF, myocardial infarction)
4. Right ventricle (e.g., size, function, fatty infiltrate due to ARVD)
5. Septal defects (ASD/VSD)

B. Valves

1. Mitral valve (e.g., recognition of annular/valvular calcification, mitral stenosis, vegetations, planimetry of valve area)
2. Aortic valve (e.g., trileaflet vs. bicuspid, calcific disease, stenosis with valve planimetry, signs of insufficiency)
3. Pulmonic and tricuspid valves (stenosis)

C. Pericardium

1. Pericardium (masses)
2. Constriction (e.g., calcification, dilated)
3. Effusion (evidence for tamponade)

IX. NON-CARDIAC

(NonVascular Anatomy and Pathology) (4-6%)

A. Vascular

1. Aortic pathology [e.g., variant anatomy, congenital (TGV), coarctation, PAU, dissection, aneurysm]
2. Pulmonary artery pathology (e.g., embolism, congenital)
3. Pulmonary venous anatomy (e.g., anomalous return, stenosis, anatomy for ablation)
4. Other great vessel pathology and variants (e.g., SVC syndrome, persistent left SVC)

B. Non-Vascular

1. Common lung diseases
2. Mediastinal and hilar pathology
3. Tumors
4. Pulmonary nodules
5. Pleural effusion
6. Other non-vascular (e.g., upper abdominal and chest wall disease)

Appendix C: References

The following is a list of references and guidelines that may be helpful in reviewing for the exam. This listing is intended for use as a study aid only. CBCCT does not intend the list to imply endorsement of these specific references, nor are the test questions taken directly from these sources. Links to publishers and associations are provided from the “References” link of the CBCCT website which can be found under Resources tab at www.cbcct.org

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Appendix D: Sample Questions

The following are sample questions provided to give a brief indication of what the questions on the exam will look like. The certification exam is composed of up to 170 multiple-choice questions. Each question contains four options only one of which is the correct, or best, answer. Certification examinees will have four and one-half (4½) hours to complete the exam. Some questions include interpretation of images and figures. Images may be grayscale or color; static or cine.

1. What percentage of symptomatic patients with a calcium score of zero will have hemodynamically significant stenosis?

- A. <1%
- B. 1-10%
- C. 15-25%
- D. >25%

2. Which of the following examinations is generally thought to produce the lowest radiation effective dose (E)?

- A. Coronary CT angiography with field of view focused on the heart, but without ECG dose modulation.
- B. Myocardial perfusion imaging utilizing a dual isotope protocol with 30 mCi Tc^{99m} and 3mCi of Tl²⁰¹.
- C. Myocardial perfusion imaging utilizing a two day protocol with Tc^{99m} (30mCi for both injections).
- D. Diagnostic invasive coronary angiography via the femoral approach.

3. The arrow in the image exhibit below points to which of the following branches?

- A. Sinoatrial nodal
- B. Conus
- C. Ramus intermedius
- D. AV-nodal



4. What is the major advantage of using prospective axial scanning over retrospective helical scanning for calcium scoring?

- A. A reduction in radiation dose
- B. A reduction in bloom artifacts
- C. A shorter breath hold
- D. Improved temporal resolution

5. Based on the image shown below, which of the following findings would be expected on the multiphase functional cine images?

- A. Reduced LV systolic function
- B. Diastolic septal bounce
- C. Regional wall motion abnormality
- D. Systolic anterior motion of the mitral valve



Correct Answers: 1: B; 2:D; 3:A; 4:A; 5:B

NOTES:

Rev.2-10