



Applicant Handbook 2021

Examination Session
January 21st – January 23rd, 2021

Applications Welcomed
September 18th – November 16th, 2021

*A Computer-Based Exam available at Prometric Test Sites
located throughout the world*



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Mission of the Medical Dosimetrist Certification Board

The mission of the Medical Dosimetrist Certification Board (MDCB) is to steer the advancement of the Medical Dosimetry profession by establishing and maintaining certification and continuing education standards to enhance quality patient care.

Nondiscrimination Policy

The MDCB does not discriminate on the basis of age, color, disability, ethnic or national origin, gender, race, religion, sex, sexual orientation or any other protected classification under USA state or federal law in administration of its application, examination or certification activities.

TABLE OF CONTENTS

1. GENERAL INFORMATION.....	4
a. Description of the Medical Dosimetrist	
b. What is Certification?	
c. Potential Benefits of Certification	
d. How was the Certification Exam Developed?.....	5
e. Use of the CMD Designation	
f. The Certification Handbook	
2. EXAMINATION APPLICATION AND CONDUCT.....	6
a. The Application	
b. Eligibility Criteria for the Exam.....	7
c. Instructions for Completing the Application.....	10
d. Application Deadlines.....	16
e. Fees	
f. The Application Process	
g. Testing Accommodations.....	17
h. How to Appeal Denied Application Status	
i. Communication Regarding the Authorization to Test.....	18
j. Test Center Requirements	
k. Examination Arrival Time.....	19
l. Late Arrival	
m. Rescheduling and Withdrawal	
n. Test Center Rules	
o. Emergencies.....	21
3. EXAMINATION DESIGN.....	21
a. Structure	
b. Test Specification Matrix.....	22
c. Performance-Based Testing (PBT).....	24
d. Sample Questions.....	25
e. MDCB Practice Tests for Purchase.....	28
4. REFERENCE MATERIALS.....	28
5. STYLE GUIDE.....	28
6. EXAMINATION RESULTS.....	31
a. Examination Scores	
b. Score Confirmation	
7. CERTIFICATION AND ACCEPTANCE - GENERAL GUIDELINES.....	32
8. MAINTENANCE OF CERTIFICATION.....	34
a. Registry of Certified Medical Dosimetrists	
b. Annual Fees and the Five-year Continuing Education Cycle	
c. Maintenance of Certification Policies.....	35
9. REVOCATION OF CERTIFICATION AND APPEALS.....	35

GENERAL INFORMATION

Description of the Medical Dosimetrist

The Medical Dosimetrist is a member of the radiation oncology team working in collaboration with the medical physicist and radiation oncologist. Through knowledge of radiation oncology treatment machines and equipment and application of principles of physics, anatomy and radiobiology, the dosimetrist generates life-saving radiation therapy treatment plans.

What is Certification?

Certification is a voluntary process by which a nongovernmental agency formally recognizes specialized knowledge, skills and experience in a designated area. Certification establishes the minimum standard in the specialty and offers recognition for those who have met this standard.

Certification in Medical Dosimetry offered by the MDCB represents a recognized standard of knowledge and education. Professionals working in the field of Medical Dosimetry can therefore demonstrate mastery of their specialization by meeting the MDCB's eligibility criteria, passing the examination and participating in the MDCB's ongoing Maintenance of Certification program.

A primary purpose of certification is protection of the public by providing a means of measuring knowledge through a standardized comprehensive examination. Because the Medical Dosimetrist provides services of critical importance to individuals facing life-threatening illnesses, it is beneficial for the general public as well as other health-care providers to be able to recognize Medical Dosimetrists who have demonstrated minimal knowledge in the necessary subject areas. Certification is intended to define the field of Medical Dosimetry and to protect and promote the safety and health of individuals requiring the services of a Medical Dosimetrist.

Clinical experience in the area of Medical Dosimetry is therefore required for initial certification. The exam is designed for an individual who has successfully achieved a course of study in Medical Dosimetry. Current clinical experience in Medical Dosimetry is identified by the knowledge and skills described in the test specifications matrix included in this Handbook. Each candidate must therefore assess their own body of knowledge, skills and understanding of the specialty in deciding when to apply for the exam.

Potential Benefits of Certification

Certification offers potential benefits for the professional, the employer and the public which include:

- Creating a standard for professionals in a particular discipline.
- Identifying professional achievement.
- Offering validation of skills and knowledge and increasing professional credibility.
- Furthering knowledge in targeted areas.
- Demonstrating continuing competence through the requirements of maintenance of certification process.
- Assuring the public and employers that the certificant has met and continues to meet rigorous requirements.
- Providing possible employment advantages over non-certified job candidates.

How was the Certification Exam Developed?

The MDCB was formed more than 30 years ago to address a need identified by the Dosimetry community in the United States to develop a certification exam that characterized Medical Dosimetry as a distinct clinical specialty. The MDCB remains dedicated to the validation, through certification, of a specialized body of knowledge for all professionals working in the field of Medical Dosimetry. The MDCB exam has been administered since 1988. Initially, volunteer subject matter experts identified areas of knowledge and practice for testing, assisted with validation of the examination, developed appropriate test questions.

The examination continues to be updated for relevancy to current practice through a Job Analysis Survey conducted at a minimum of every five (5) years in conjunction with the MDCB test vendor, Prometric. This methodology is designed to meet stringent certification industry standards and recognized best practice guidelines. An electronic survey examines more than 150 work-related task and knowledge statements and is distributed to all MDCB certificants and AAMD members totaling more than 5,000 professionals in the field of Medical Dosimetry. Through recognized test industry procedures, volunteer subject matter experts use this data to identify areas of knowledge for testing from the content domains identified and write exam questions to target those areas.

As required by best practices, following the conduct of a Job Task Analysis a Standard Setting Study is conducted to determine a passing score. The passing score identifies what the minimally qualified candidate will know. Each candidate's ability is measured against the determined cut (or passing) score.

Use of the CMD Designation

Certified Medical Dosimetrist (CMD) is the professional designation granted by the MDCB. The CMD credential signifies that an individual has passed the MDCB examination and properly maintains certification in good standing. The MDCB grants limited permission to individuals who have met all the certification eligibility criteria, passed the exam, and received the notification of certification from the MDCB to use the CMD designation granted to them. Use of the CMD credential by individuals who have not been granted certification, or who have failed to properly maintain certification in good standing is prohibited. Improper use of the credential will result in disciplinary action.

The Certification Handbook

The Certification Handbook ("the Handbook") is updated for each test administration and describes what is required of each candidate preparing to take the certification exam including valuable information about logistics, content, eligibility, and required procedures. Refer to it for guidance and instructions. General information regarding the exam is available on the MDCB website, www.mdcb.org.

Each applicant must be aware of the information outlined in the handbook and the most current information regarding exam administration, eligibility, application requirements, deadlines, and adherence to the Ethical Standards of the MDCB. Candidates must meet the eligibility requirements in effect at the time of application. Applicants are solely responsible for the timely submission of complete applications.

The MDCB reserves the right to amend or modify the terms or conditions of testing and nothing contained in this Handbook shall be deemed a guarantee or warranty of any

type or kind. The MDCB will settle any disputes, which may arise, based on information in the Handbook as well as information provided by Prometric, the testing company that administers the examination for MDCB.

EXAMINATION APPLICATION AND CONDUCT

The Application

The application for the examination is an online process linked to www.mdcb.org. You may modify and/or supplement your application with additional information at any time during the application process. With the exception of the request for the Route 2 re-applicant work history references, the MDCB will communicate only with the exam applicant regarding the application. **It is the personal responsibility of each exam candidate to ensure completion of the application by the deadlines outlined. All required elements (application, supporting documentation and full payment) must be submitted before review of your application will commence.**

Documentation not provided as outlined in the instructions for completing your application may result in the denial of your application. Electronic copies of required documentation must be in pdf, tiff, bmp or jpg format. Submission of large or inaccessible file formats will delay or prevent review of your application. **If your information remains incomplete at the time of the final application deadline it will be denied.** The application and all supporting documents received by the MDCB will be reviewed by the MDCB Eligibility Committee and staff only and will remain confidential.

Residents of Cuba, Iran, North Korea, Sudan, Syria and Venezuela or any other country or region to which the U.S. has embargoed goods are not eligible to apply for the exam.

Route 1 Eligibility Criteria

- First-time certification candidates must be graduates of a USA Joint Review Committee on Education in Radiologic Technology (JRCERT) accredited Dosimetry program of at least twelve (12) months and hold a Bachelor's degree. A copy of the **official diploma*** and its corresponding **official transcript** from the JRCERT accredited Dosimetry program must be submitted. For applicants who have completed a certificate program, in addition to the JRCERT program official diploma, an **official Bachelor's degree diploma** must be provided. The name on these documents must be consistent and match the name on the application or an official name change decree must accompany your application.

*When the official diploma cannot be provided by the exam deadline date, a letter executed by the program director on official letterhead will be accepted in lieu of the official diploma. *The letter serves only as a waiver for the diploma and not for other required documentation.* For students attending a certificate program with a non-English BS (or higher) diploma, an English translation must be provided,

Please note:

The MDCB will provide an aggregated score report for each JRCERT accredited Dosimetry program. The purpose of providing the score report is only for programmatic assessment, evaluation, and accreditation. The report is not to be used to either publically report or determine individual student results. The MDCB expects each program director to use their score report in a moral and ethical manner.

A current listing of JRCERT accredited Dosimetry programs is located at <http://www.jrcert.org/>.

International Eligibility Criteria

- Graduation from a Non-U.S. academic program with a Bachelor of Science degree in Radiation Therapy, Radiation Science, Radiography, Physics or Medical Physics.
- A minimum grade of C or 70-79% in Anatomy and/or Physiology, Brachytherapy, Clinical Lab, Computer Technology, Cross-sectional Anatomy, Radiation Oncology, Radiation Physics, Radiobiology and Treatment Planning.
- Completion of 1,000 clinical curriculum hours in Medical Dosimetry treatment planning during Bachelor of Science degree (or higher) course of study.

Only candidates residing and practicing outside the U.S. should apply as an international candidate. Individuals with non-US degrees practicing in the US must apply as Route 1 candidates. It is the responsibility of the candidate to submit all required documentation in English and to demonstrate "foreign equivalency" of the related science degree submitted by providing documentation from **only** one of the following organizations recognized by the MDCB: **The Foundation for International Services, Inc. (FIS), OR the International Education Research Foundation (IERF)**. All documentation that is reviewed by the FIS or IERF must be evaluated on a "course-by-course" basis. Foreign equivalency documentation from any other organization will not be considered. Canadian applicants will not be required to submit foreign equivalency evaluation.

Eligibility Criteria for Re-examination

- Applicants will be required to submit a full application if the prior application (or re-application) preceded the September 2011 exam. **Second and third attempt re-applicants whose original application was prior to 2011 and submitted ARRT registry (or foreign equivalent), Bachelor's degree or Bachelor of Science degree as the educational requirement are able to again submit ARRT registry (or foreign equivalent), Bachelor's degree or Bachelor of Science degree for the educational criteria using the Route 2 application.**
- Dates of all previous MDCB exam applications must be provided as part of the application.
- All re-applicants will be required to show evidence of 8 MDCB-approved CEU. The CEU cannot be CEUs previously submitted and must have been completed within three years of the re-application.

If you have taken the exam in the past and failed more than 3 times since 2006 you must comply with the **"Three Attempt Rule"** as follows:

Starting in 2006, all exam candidates will be subject to a three-attempt rule in which a candidate who has failed the exam on the third attempt will not be eligible for examination for two calendar years. After the two-year waiting period the applicant may submit another full application. The prevailing eligibility requirements will apply. A "no show" or withdrawal for any exam administration will not be counted as an attempt.

Instructions for Completing the Application

The Application is available at <https://mdcb.learningbuilder.com>.

- **At no time should an applicant with a previous record create a new record. Applicants unable to access a prior record/application should contact the MDCB office at info@mdcb.org with the subject line "Applicant Unable to Access Application".**
- First-time applicants: click on the orange button "Register as an Applicant" on the index page at <https://mdcb.learningbuilder.com>.
- **Please make note of your login and password information.** This is how you will access the system to review the progress of your application and make any updates to your application or contact information.
- **Please note the 7-digit MDCB number** that is generated upon beginning your application. This will be your MDCB Identification number and will also be used as a means of identification by Prometric, the test vendor.
- Complete all the fields of the profile information. Improper formats or incomplete information may result in the delay of your communication with the MDCB and Prometric.
- **Complete your name as it appears on the government photo identification that you will be presenting at the test center on the day of your exam or you will not be permitted admission to write the exam at that time. This includes any designation such as Jr. II, etc.**
- Include the email address with which the MDCB and Prometric, the test vendor should communicate with you. Please add info@mdcb.org to your email address book to assure receipt of all notifications.
- Include a mailing address.
- If your name is now different than the name that appears on the documentation you will be providing to complete your application, once you click on the **"Submit Application"** button, upload the legal document that references your name change.
- If you require ADA accommodations, before submitting your application, once you click on the Submit Application button, upload signed documentation from the licensed medical professional that detail your requirements.
- Once you have completed your profile information, select the appropriate application, i.e. Route 1 or re-application and complete the "Examination Fee" portion of the application. For re-applicants who have previously applied with ARRT registry, Bachelor's degree or Bachelor of Science degree for the educational criteria, applicants will be asked if they have ever applied for the exam between 2006 - 2010. Once previous status is confirmed, access to the Route 2 application will be provided.
- Documentation not provided as required by the early deadline will result in "Request for Additional Information" status and will be returned to the candidate for correction by the late deadline. Submission of additional documentation does not guarantee approval. All applicants are notified on the same date of exam status. Documentation not provided as required after the early deadline will result in denial status, whereby candidates will be required to submit an appeal with documentation to supplement the appeal.

Route 1 Candidates:

Submitting Academic Requirements:

- Select the JRCERT accredited Dosimetry program you attended from the drop-down menu.
- Enter the date the program ended.
- Confirm your agreement to release your scores to your program director.

- Upload a scan of your **official JRCERT diploma/certificate** in a pdf, tiff, bmp or jpg format only. Be sure the entire document is visible in the document window. Applications with documents that are not a scan will be returned to the applicant for update. *When the official diploma cannot be provided by the exam deadline date, a letter executed by the program director on official letterhead will be accepted in lieu of the official diploma.*
- Upload a scan of your **official transcript with a confer date which corresponds to your certificate/diploma in a pdf, tiff, bmp or jpg format only.** Be sure the entire document is visible in the document window. *Applications with documents that are not a scan or where the confer date on the transcript do not correspond will be returned to the applicant for update.*
- If the JRCERT program you attended was a certificate program, upload a scan of your Bachelor's degree (or higher) diploma in a pdf, tiff, bmp or jpg format only. For students attending a certificate program with a non-English BS (or higher) diploma, an English translation must be provided,

Submit Your Application when payment and all the steps outlined above are completed. *Applicants who may not have the official documents required by the first application deadline can submit payment before the final application deadline to avoid incurring late application deadline fees.* Once you click on the "**Submit Application**" button you will be able to upload the following if applicable to you:

- Name change documentation
- ADA documentation.

Once you have uploaded all required documentation, click the "Submit Application" Button. You will receive email confirmation once your application has been successfully submitted.

International Candidates:

Submitting Academic Requirements:

- Complete the name of the institution from which you received your Bachelor of Science degree.
- Identify the major you completed at the institution, i.e. Radiation Therapy, Radiation Science, Radiography, Physics or Medical Physics.
- Upload a scan of your **official diploma** in a pdf, tiff, bmp or jpg format only. The official diploma must include the **graduation (confer) date.** Diplomas that do not include the confer date must be accompanied by a letter from the institution printed on letterhead that confirms the confer date. Be sure the entire document is visible and clear in the scanned document.
- Upload a scan of your **official transcript** that corresponds to your diploma in a pdf, tiff, bmp or jpg format only. The official transcript must include the **graduation (confer) date.** The confer date must correspond to the diploma confer date. Transcripts should include all courses completed with grade earned for each course and an explanation of the grading scale. Transcripts that do not include grades earned for each course, grading scale and the confer date must be accompanied by a letter from the institution printed on letterhead that confirms grades, grading scale and the confer date. The letter should include the title and contact information of the signatory. Be sure the entire document is visible and clear in the document window.
- Upload your foreign equivalency evaluation from either FIS or IERF only. Foreign equivalency evaluation must be evaluated on a "course-by-course" basis to ensure the applicant has achieved a minimum grade of

C or 70-79% in Anatomy and/or Physiology, Brachytherapy, Clinical Lab, Computer Technology, Cross-sectional Anatomy, Radiation Oncology, Radiation Physics, Radiobiology and Treatment Planning.

Submitting Clinical Hours:

- Upload documentation that confirms completion of 1,000 clinical curriculum hours in treatment planning during Bachelor of Science degree (or higher) course of study. Documentation provided must be official documentation either in the form of a transcript or a letter from the institution printed on letterhead indicative of 1,000 clinical hours in medical dosimetry treatment planning during the completion of the degree. The letter should include the title and contact information of the signatory. *Hours for: (1) treatment delivery, (2) on the job training or (3) which the candidate received a salary do not qualify as in-curriculum hours.*

Submitting Additional Requirements:

- Indicate the country in which you are currently practicing.
- Upload a signed letter from your current employer on organizational letterhead indicating your dates of employment.

Submit Your Application when payment and all the steps outlined above are completed. Once you click on the “**Submit Application**” button you will be able to upload the following if applicable to you:

- Name change documentation
- ADA documentation.


Once you have uploaded all required documentation, click the “**Submit Application**” button. You will receive email confirmation once your application has been successfully submitted.

Re-application Candidates:

Candidates with a prior application that does not precede the September 2011 exam
Candidates submitting a re-application must have a prior application or re-application that does not precede the September 2011 exam.

- Submitting the Continuing Education Requirement:
 - Determine what activities are approved for CE at <https://mdcb.learningbuilder.com/>.
 - On your application, click on the blue “Add Activity” button.
 - Enter your Search criteria and select the orange “Search” button. Start with a Broad Search by using Keyword or Course Number and no other Search criteria.
 - Click the orange “Select” button for the Course you wish to add to your Application. The activity submitted must have been completed no more than three (3) years prior to the year of the application deadline, November 16th, 2020. Now that it is added to your learning plan, you can upload a file and submit the activity for review.
 - You will need to add and submit documentation for a minimum of 8 credits to your application that **have not previously been submitted on an application:**
 1. The documentation you provide must be a certificate or transcript in pdf, tiff, bmp or jpg format only and must include your name, the name of the provider and the date the

activity was completed, number of credits and the MDCB activity name and number.

2. The activity number for the activity you select must correspond to the activity number on your documentation.
3. All activities submitted for review **MUST BE PRE-APPROVED** MDCB activities listed in the directory of courses.
4. Several activities from a single provider must be presented in a transcript format, not as individual certificates, for each activity.
5. The date you completed the activity must be between the activity start and end dates identified. Please click on the blue button  next to the activity number to determine the start and end date.
6. If an activity you have submitted is rejected, you can determine the reason for rejection by clicking on the "list" icon next to the activity and reviewing the rejection message.

- Indicate the dates of your previous attempts.

Re-applicants with a prior application not preceding the September 2011 exam can **submit the application** when payment and all the steps outlined above are completed.

Route 1 re-applicants whose initial application preceded the September 2011 exam:

- Will be required to submit a Route 1 application.
- Submitting Academic Requirements;
 - Select the JRCERT accredited Dosimetry program you attended from the drop-down menu.
 - Enter the date the program ended.
 - Confirm your agreement to release your scores to the program director.
 - Upload a scan of your **official JRCERT diploma/certificate** in a pdf, tiff, bmp or jpg format only. Be sure the entire document is visible in the scanned document window. Applications with documents that are not a scan will be returned to the applicant for update.
 - Upload a scan of your **official transcript** which corresponds to your diploma in a pdf, tiff, bmp or jpg format only. The confer date (graduation date on your diploma should correspond to the confer date on your diploma/certificate. Be sure the entire document is visible and clear in the scanned document window. Applications with documents that are not a scan will be returned to the applicant for update.
 - Upload a scan of your Bachelor's degree diploma in a pdf, tiff, bmp or jpg format only if the JRCERT program you attended was a certificate program.

Submit Your Application when payment and all the steps outlined above are completed. Applicants who may not have the official documents required by the first application deadline can submit payment before the final application deadline to avoid incurring additional fees. Once you click on the "**Submit Application**" button you will be able to upload the following if applicable to you:

- Name change documentation
- ADA documentation.

Once you have uploaded all required documentation, click the "**Submit Application**" Button. You will receive email confirmation once your application has been successfully submitted.

Route 2 re-applicants whose initial application preceded the September 2011 exam will be required to submit a Route 2 application:

- Select either the “ARRT or Foreign Equivalent” **OR** “Academic Transcript for Bachelor’s Degree” or Bachelor of Science degree option that corresponds to the eligibility criteria for which you qualify. **ARRT or Foreign Equivalent** applicants select the organization that is applicable from the drop-down menu.

ARRT applicants:

- Provide your registration number for the organization.
- Provide the expiration date of your registration with the organization.
- Submit a scan of your current ARRT card or foreign equivalent with an expiration date of November 16th, 2020 or later. **No substitution will be accepted for the ARRT card or foreign equivalent.**

Bachelor's Degree or Bachelor of Science Degree applicants:

- Complete the name of the institution from which you received your Bachelor of Science or Bachelor of Applied Science Degree.
- Identify the major you completed at the institution.
- Upload a scan of your **official diploma** in a pdf, tiff, bmp or jpg format only. Be sure the entire document is visible in the scanned document window. Applications with documents that are not a scan will be returned to the applicant for update.
- Upload a scan of your **official transcript** that corresponds to your diploma in a pdf, tiff, bmp or jpg format only. The **confer date** (graduation date on your diploma should correspond to the confer date on your diploma/certificate. Be sure the entire document is visible and clear in the document window. Applications with documents that are not a scan will be returned to the applicant for update.
- If you received your Bachelor, Bachelor of Science or Bachelor of Applied Science Degree in an institution outside the US or Canada, please upload your foreign equivalency evaluation from either FIS or IERF only.


Submitting Clinical Experience*:

- Identify the institution(s) where you completed a minimum of 5,460 full-time hours experience in Medical Dosimetry. Work History must have been completed no more than six (6) years prior to the year of the application deadline, November 16th, 2020.
- Identify your job title.
- Identify dates you worked at each institution.
- Identify the number of total hours worked at each institution.
- Provide two references for each job experience with their role (CMD or Physicist) and a work email address for each reference. **Applications that do not include the references work email address will be returned to the applicant for update.**

Submitting Continuing Education:

- Click on the blue “Add Activity” button.
- Enter your Search criteria and select the orange “Search” button. Start with a Broad Search by using Keyword or Course Number and no other Search criteria.
- Click the orange “Select” button for the Course you wish to add to your Application. The activity submitted must have been completed no more

than three (3) years prior to the year of the application deadline, November 16th, 2020.

- Now that it is added to your learning plan, you can upload a file and submit the activity for review.
- You will need to add and submit documentation for a minimum of 24 credits to your application:
 1. A maximum of 16 credits will be approved for applications training courses.
 2. The documentation you provide must be a transcript in pdf, tiff, bmp or jpg format only and must include your name, the name of the provider and the date the activity was completed, number of credits and the MDCB activity name and number.
 3. The activity number for the activity you select must correspond to the activity number on your documentation.
 4. All activities submitted for review MUST BE PRE-APPROVED MDCB activities listed in the directory of courses and documentation must include the MDCB number.
 5. Several activities from a single provider must be presented in a transcript format, not as individual certificates, for each activity.
 6. The date you completed the activity must be between the activity start and end dates identified. Please click on the blue button  next to the activity number to determine the start and end date.
 7. If an activity you have submitted is rejected, you can determine the reason for rejection by clicking on the "list" icon next to the activity and reviewing the rejection message.

Submit Your Application when payment and all the steps outlined above are completed. Applicants who may not have the official documents required by the first application deadline can submit payment before the final application deadline to avoid incurring additional fees. Once you click on the "**Submit Application**" button you will be able to upload the following if applicable to you:

- Name change documentation
- ADA documentation.

Once you have uploaded all required documentation, click the "**Submit Application**" Button. You will receive email confirmation once your application has been successfully submitted.

***Please note: For exam eligibility purposes, "active clinical Medical Dosimetry experience in the field" is defined by the MDCB as experience in a medical setting creating clinically deliverable treatment plans for radiation oncology patients under the direction of two employees within your department who must be either certified Medical Dosimetrists (with active status on the CMD Verification page linked to the MDCB website) or Medical Physicists. These two references will be contacted directly by the MDCB to attest to the length and content of your experience to supplement your online application. The total length of clinical experience required by your eligibility route must be verified by these two references. For each work experience needed to meet the clinical Medical Dosimetry experience requirement two references must be identified. For example, if you have worked in different institutions during this time, two additional people will be required to verify the second portion of your experience.**

Detailed instructions will be provided during the online application process which is located at www.mdcbl.com.



Application Deadlines

Applications should be submitted from September 18th, 2020 to November 16th, 2020:

- 1) Regular Application Deadline (without late fee) at 11:59 pm EST, November 6th, 2020. Deadline for "Request for Additional Information" status. *All foreign applicants must submit their application by this deadline.*
- 2) Final Application Deadline (with late fee of \$75) at 11:59 pm EST, November 16th, 2020. Deadline to submit corrective documentation for "Request for Additional Information". *U.S. applicants only.*

ALL APPLICATIONS THAT ARE INCOMPLETE OR UNPAID AFTER THE FINAL APPLICATION DEADLINE WILL BE DEEMED INELIGIBLE.

Fees

Payment must be made when submitting the online application with a credit card in U.S. dollars. Debit cards are not accepted.

Application Fee: \$ 200

An application fee is required of all candidates. Applicants who may not have the official documents required by the first application deadline can submit payment before the final application deadline to avoid incurring additional fees.

Exam Fee: \$ 375

An exam fee must be submitted for each request to take the exam, including re-applications.

Late Fee: \$ 75

A late fee is required for applications submitted after the Regular Application Deadline until the Late Application Deadline. Applications received from 12:00 am EDT November 7th, 2020 until 12:00 am EDT November 16th, 2020 will be deemed late.

Absolutely no refunds will be issued FOR ANY REASON once payment has been submitted whether applicant submits application, is deemed ineligible, withdraws the application, withdraws from the exam once deemed eligible or is a "no-show" on the day of the exam. A candidate who arrives 15 minutes or more after the scheduled exam start time will be considered a "no show." A \$250 "no-show" fee will be assessed on the succeeding application.

The Application Process

Before candidates can sit for the exam, they must:

- (A) Submit a complete application that meets the MDCB's eligibility requirements and pay for the exam by the final registration deadline and deemed eligible.
- (B) Receive an Authorization to Test (ATT).
- (C) Contact Prometric to schedule a location at which to take the computer-based exam.

(A) Submitting a complete application:

- All applications must be submitted online through the MDCB CE Center at <https://mdcb.learningbuilder.com>.
- Applicants must review the criteria for the routes to eligibility carefully to determine the documentation required to submit an application.

- Applications should be submitted **only** once to avoid duplication of fees. You may initiate your application and modify and/or supplement it with additional information later.
- All applicants will be required to confirm adherence to the MDCB Ethical Standards and terms and conditions stated in the handbook in conjunction with submission of exam fees.
- Electronic copies of required supplementary documentation should be uploaded in pdf, tiff, bmp or jpg format only. Submission of large or inaccessible file formats will delay or prevent review of your application.
- All supporting documentation must be legible.
- All regular communication with candidates will be via the application website only.
- **All required elements (application, supporting documentation and full payment) must be submitted before review of your application will commence. If your information remains incomplete/or not submitted at the time of the final application deadline it will be denied.**
- **It is the candidate's responsibility to ensure his/her application is complete and accurate, including the submission of any attachments applicable.**
- The MDCB is the sole and only judge of each candidate's qualifications to sit for the MDCB Certification Exam. In consideration of the individual exam candidate's application, the moral, ethical and professional standing will be reviewed and assessed by the MDCB Board; the Board may make inquiry of the persons named in the application form and of such persons as the Board deems appropriate with respect to moral, ethical and professional standing.

Testing Accommodations

The MDCB will provide reasonable accommodations for exam candidates with disabilities that are covered under the Americans with Disabilities Act (ADA). Requests for testing accommodations must be made as indicated during the online application process.

- (B) Receiving the Authorization to Test (ATT)
- For applications that have been reviewed and accepted, exam candidates will receive an emailed Authorization to Test letter (ATT) no later than 35 days before the exam.
 - If the MDCB has approved a Testing Accommodations Request, the candidate will receive a Notice of Approval from the MDCB and the Authorization to Test.
 - If any candidate whose application has been accepted loses the confirmation or has not received a confirmation well in advance of the test date, he/she should immediately contact the MDCB via email to info@mdcb.org with the subject line, "Missing ATT."

How to Appeal Denied Application Status

- Responses to all candidates will be forwarded via email on **November 23rd, 2020**.
- Denied status notifications will indicate the reason for denial and how to submit an appeal to contest a decision of ineligibility.
- If an applicant has been denied, he/she will be provided one (1) appeal attempt for the current application process.
- Applicants who believe that they have met the eligibility requirements as stated may appeal decisions of ineligibility once only. The eligibility requirements themselves cannot be appealed, only the ability to meet the criteria can be appealed.
- Appeals submitted requesting reconsideration of applications must indicate the specific findings of ineligibility being contested and provide evidence of meeting

those findings. Candidate must provide documentation that supports his/her claim. The eligibility committee will review the appeal and furnish a decision.

- Appeal documentation must be submitted to the appeals portion of the application by the MDCB by 11:59 pm EST **December 4th, 2020**.
- Responses to appeals will be provided by **December 9th, 2020**.
- The decision regarding appeals is final and cannot be reversed.
- If the applicant is still deemed ineligible, he/she is eligible to register again and submit another examination fee at a later date.

(C) Contacting Prometric to schedule a computer-based exam location

- Prometric will not schedule an exam location unless you are in possession of an ATT and the test registration #, which is your MDCB number. Instructions on how to schedule an exam location with Prometric will be included with the ATT. For more information about Prometric test centers, visit the website: www.prometric.com.
- Once the candidate has completed online scheduling of an exam location with Prometric, an electronic confirmation will be sent to the candidate containing the candidate's name, identification number, address of the test center, the date of the test, and name of the test.
- If the candidate is registering by phone using the toll-free number, the candidate must give the Prometric operator his or her email address to receive an electronic confirmation.
- The exam will be administered at Prometric computer-based test centers throughout the US and Canada. Prometric also has many other international test site locations.
- The MDCB does not provide recommendations for hotels near test centers. It is the exam candidate's responsibility to make his/her own hotel and travel arrangements for the exam.
- If the MDCB has approved a Testing Accommodations Request, the candidate will receive a Notice of Approval from the MDCB along with the Authorization to Test letter. Candidates who have had Testing Accommodations Requests approved by the MDCB must call Prometric's special conditions coordinator at 1-800-443-1684 to schedule an exam location.

Communication Regarding the Authorization to Test

After eligibility status has been determined, the candidate will be notified by email. If you do not receive your Authorization to Test (ATT) within 35 days in advance of the scheduled test date, please forward an email to info@mdcb.org with the subject line: "Missing ATT" to expedite receipt of your ATT.

TEST CENTER REQUIREMENTS

- Original, valid (unexpired), government issued photo and signature bearing identification is required in order to take an exam. **Name on identification must match name on application.**
- The Prometric scheduling confirmation.
- Exam candidates are subject to the following security measures upon every entry into the test room:
 - Scanning with a metal detector wand prior.
 - Raising of pants legs above ankles, emptying and turning all pockets inside-out and raising shirt sleeves above wrists.

Please see the video regarding test day at: <https://www.prometric.com/test-takers/what-expect>.

Examination Arrival Time

Candidates must arrive 30 minutes prior to the test time. The total seat time is 270 minutes. The total test time is 230 minutes. Candidates will be required to review a tutorial prior to the exam and complete a post-exam survey.

Late Arrival

Candidates will not be permitted to take the exam if they present themselves more than fifteen (15) minutes after the scheduled start time of the exam. Admittance will be refused to the exam and candidates will be required to re-apply as a re-applicant and submit all fees. Please familiarize yourself with the location of the exam site before the day of the test.

Rescheduling

Applicants approved to sit for the exam for a specific exam date are required to sit for the exam for which they have been approved. Any applicant who determines she/he requires a change in date to sit for the exam must request a date change in writing addressed to the MDCB headquarters office prior to the late application deadline. Candidates will not be able to postpone their exam date any further than the next immediate exam date. **Once the late application deadline passes, no applicant will be able to reschedule the exam, nor will a refund be issued for either the exam or application fee.** A fee of \$125 will be assessed for rescheduling. In addition, if the candidate chooses not to sit for the rescheduled exam date, the applicant must apply as a re-applicant and resubmit all fees.

Withdrawal

A candidate who has been deemed eligible to sit for the MDCB exam may withdraw at any time **prior to the day of the exam**. Candidates who intend to withdraw before the exam date, must email intent to withdraw to info@mdcb.org with the subject line "Intent to Withdraw." No refund will be issued to candidates who have been approved to sit for the exam but withdraw from the exam prior to the exam date. Candidates who withdraw will be required to reapply to sit for exam and will incur a **rescheduling fee** of \$125. If a candidate reports for the exam he/she can no longer withdraw.

Test Center Rules

Candidates are required to be professional, civil and respectful at all times while on the premises of the test center. All exams are continuously monitored by video and audio recording, physical walk-throughs and through an observation window. The Test Center Administrator (TCA) is authorized to dismiss you from the test session for a violation of any of the Test Center Regulations, including exhibiting abusive behavior towards the TCAs or other candidates. If you are found to have violated any of the regulations during your exam, the TCA is required to notify Prometric and the MDCB. Prometric, alone or in conjunction with the MDCB, shall then take any further action necessary to sanction your conduct, up to and including invalidation of your test score and/or pursuit of civil or criminal charges.

To ensure that all candidates are tested under equally favorable conditions, the following regulations and procedures will be observed at each test center:

- Candidates should not call their individual test centers regarding instructions to take the exam. **Test centers are not advised of MDCB protocols until just before the exam date.**
- Candidates are admitted only to their assigned test center.
- Candidates should arrive 30 minutes prior to their scheduled exam time for registration and check in.
- Candidates arriving more than 15 minutes after the scheduled exam will not be admitted.
- All candidates will receive a yellow colored locker key tag upon check in. The yellow key tag indicates that the **CANDIDATE CAN ONLY ACCESS THEIR LOCKER FOR FOOD, DRINK, OR MEDICINE.** Instructional color key tag signage is placed near the lockers for candidate reference.
- **CANDIDATES WILL BE REQUIRED TO BRING A SILENT, HAND-HELD, SOLAR OR BATTERY-OPERATED SCIENTIFIC CALCULATOR TO PERFORM MATHEMATIC CALCULATIONS RELATED TO TEST QUESTIONS.** Alpha, programmable or paper-tape calculators are **NOT** permitted. Because of the vast number of calculators available in the marketplace, MDCB is unable to verify brand/models of calculators that meet the requirements. The use of a calculator that does not meet this description constitutes grounds for immediate dismissal from the test. Candidates must supply their own equipment. **PROMETRIC, THE TEST VENDOR, WILL NOT PROVIDE A CALCULATOR.** Borrowing of equipment during the test is **NOT** permitted. All calculators will be checked prior to the examination.
- Candidates may be provided with two (2) erasable note boards or scratch paper to use during the examination. The note board or scratch paper must be returned to the test center administrator at the completion of testing or the candidate will not receive a score report. Due to security concerns the color of the boards alternate depending on the day of the week.
- Candidates will be provided with a survey at the end of the exam to comment on the exam administration. MDCB will conduct a post-exam survey for comments on exam items.
- The MDCB exam does not provide for a scheduled break. Each time you leave the test room you must sign-out. Test candidates are not permitted to leave the building during a break.
- All candidates must inform the TCA before accessing a stored item during a break. Candidates are permitted to access their locker only for food, drink, or medicine. Repeated or lengthy departures from the test room will be reported to the MDCB.
- Upon return from a break, without exception, you will be subject to all security checks, present valid ID, sign-in and, if required by the test sponsor, provide a fingerprint to be re-admitted to the test room.
- You must return to your assigned, original seat after any break.

Prohibited Items and Examinee Conduct in the Test Center

- **Weapons are not allowed in any Prometric Test Center. In the state of Georgia, however, where right to carry laws, supersede test center rules, exam candidates who are in possession of a concealed firearm will be permitted into test labs. In such cases test center staff will file a Center Process Report to report that the candidate was permitted to test with a weapon in compliance with state law. In the event that an individual violates the law by failing to keep a firearm concealed, Standard Operating Procedure provides steps for test center staff to follow to de-escalate the situation as quickly and as safely as possible.**
- Unauthorized personal items cannot be brought into the test room. Such items include, but are not limited to: outerwear, hats, food, drinks, purses, briefcases, notebooks, pagers, watches, cell phones, recording devices and photographic equipment.

- Written notes, published materials and other testing aids are strictly prohibited, except where allowed by the MDCB. Test center staff will refer to the applicable Client Practices for allowances.
- Only soft ear plugs (with no wires/cords attached) and center-supplied tissues are permitted in the test room.
- Clothing or jewelry items allowed to be worn in the test room must continue to be worn at all times. Removed clothing or jewelry items must be stored in the locker provided during check-in.
- All materials issued by the TCA must be returned at the conclusion of testing. If scratch paper is provided, it must be returned before new scratch paper will be issued by the TCA during your exam.
- Talking to other candidates in the test room, referring to their screens, testing materials or written notes is strictly prohibited.

MDCB practice policies shall supersede these regulations if a conflict exists.

Emergencies

Every attempt will be made to administer all examinations as scheduled. However, should any problems occur due to the testing vendor Prometric, the exam will be rescheduled as determined by the MDCB at no cost to the candidate.

The MDCB and Prometric will continue to review the guidance, policies, and mandates of local and national governments, information provided by the World Health Organization (WHO) and the US Centers for Disease Control (CDC) in the planning of the administration of the CMD exam.

During a severe weather event, candidates should check <https://www.prometric.com/closures> before heading to their local test center.

MDCB EXAMINATION DESIGN

Structure

The examination contains 155 questions. The time allowed for completion is 3 hours and 50 minutes. The examination is administered in English only. A small percentage of randomly imbedded un-scored items are included on the exam to obtain and evaluate statistical information for new items. These items are not included in the score calculation. This practice is consistent with industry standards for this type of exam. All scored items have previously been vetted for reliability and validity.

The test content outline below identifies the areas that will be included in the exam (as derived from the 2018 Job Task Analysis). The percentage of scored questions in each of the major categories is shown below.

Test Specification Matrix

MDCB Test Specifications Matrix Derived from the 2018 Job Task Analysis	
Domain	Weight
I. Radiation Physics	16%
1. Radioactive decay	
2. Production of X rays and particle beams	
3. Characteristics of X rays and particle beams	
4. Interaction of radiation with matter	
5. Treatment machine characteristics: (e.g., LINAC, MR, proton, photon, orthovoltage and superficial X rays, gamma source)	
6. Geometric characteristics (e.g., magnification, minification)	
7. Radiation measurement	
8. Imaging modalities (e.g., MRI, PET, CT, ultrasound, SPECT, KV/MV, CBCT)	
9. Hounsfield unit conversion to CT density table in treatment planning systems	
10. Radiation units (e.g., activity, exposure, absorbed dose, and dose equivalent)	
II. Localization	8%
1. Acquisition of patient data	
2. Patient positioning	
3. Patient immobilization and motion management techniques	
4. Treatment simulations, TPS localization of patient	
5. Rigid image registration, deformable registration, image fusion	
6. IGRT (e.g., SGRT, CBCT, ultrasound guidance, KV-KV, MV-MV, infrared, fluoroscopy, CT on rails, fiducials)	
III. Treatment Planning	40%
1. Isodose distributions and dose metrics (photon, electron, proton, plan evaluation including DVH, conformality and other plan indices)	
2. Site specific clinical oncology (e.g., disease, anatomy, modes of spread, common treatment techniques, dose and fractionation schemes)	
3. Radiobiology (e.g., dose tolerances, hypofractionation, time dose fractionation calculation, BED, RBE, LET)	
4. Cross-sectional anatomy	
5. Treatment delivery systems machine differences, limitations, and advantages	
6. Special treatment procedures (e.g., TBI, TSEI/TBE, IORT, SRS, SBRT)	
7. Planning methodologies (e.g., forward, inverse, compensator, robust planning)	
8. DICOM data transfer	
9. Computer systems management (e.g., archiving and backup, routine maintenance, scripting)	
10. Adaptive radiotherapy	
11. Autoplanning	
12. Autocontouring	
13. Implanted devices	
14. The accuracy and limitations of IGRT techniques	

IV. Dose Calculation Methods	15%
1. External beam dose calculation and algorithms	
2. Effects of beam modifying devices (e.g., wedges, bolus, partial transmission blocks, compensators, MLC)	
3. Special calculations (e.g., off axis, re-treatments, gap calculations, entrance/exit dose)	
4. Corrections for tissue inhomogeneities and density overrides	
5. Deformable dose accumulations	
6. Sources of uncertainty and limitations in computer-based treatment planning (e.g., effects of dose grid matrices)	
V. Brachytherapy	6%
1. Radioactive source characteristics	
2. HDR and LDR treatment planning	
3. HDR and LDR delivery systems	
4. Brachytherapy treatment device verification (e.g., seeds applicators)	
5. Secondary/independent calculation	
6. Surveying (e.g., background pre and post implant, shielding, bedside dose)	
7. Regulatory requirements for radioactive sources (e.g., NRC vs state requirements)	
VI. Radiation Protection	7%
1. ALARA and maximum permissible dose equivalent based on NCRP recommendations, regulatory guidelines (e.g., ICRU, NCRP)	
2. Radiation monitoring for personnel and patients	
3. Treatment vault shielding requirements	
VII. Quality Assurance and Standard of Care	8%
1. TPS commissioning and quality assurance	
2. Clinical data: plan checks, chart reviews, image reviews	
3. Measurement equipment (e.g., diodes, ion chambers, TLD, survey meters)	
4. Record and verify systems and EMR	
5. Treatment beam QA measurement and analysis (e.g., IMRT, electron cut out factors)	
6. AAMD Scope of Practice	
7. Incident reporting for patient safety (e.g., quality improvement, RO-ILS, root cause analysis, process improvement)	
8. Factors and limitations of deliverable plans	
9. QA requirements of simulation and treatment equipment	

All images on test questions are provided in a head first supine position unless otherwise noted.

Performance-Based Testing (PBT)

In 2020, for the first time, a small number of performance-based test (PBT) questions will be included on the CMD exam. Performance-based questions measure candidates' ability to apply learned skills and knowledge. It is considered to be the next generation in certification testing. Currently, the MDCB utilizes the Proknow DS platform for each PBT item on the exam.

Approved exam candidates will be instructed to set up a free temporary account to access the MDCB ProKNOW DS platform (mdcb.proknow.com) using the email address the candidate provided to the MDCB during the application process. When setting up an account, go to mdcb.proknow.com. Enter the email address associated with your MDCB account and leave the password section blank. Select "click here to set or reset your password" to complete setup.

The following video tutorial will assist with account setup and log in:

<https://vimeo.com/420044409>. This process should be completed once a candidate is approved for the examination. This will allow exam candidates the opportunity to familiarize themselves and practice within the platform.

On the exam, candidates will navigate directly from the PBT multiple choice item to the third-party platform, ProKnow DS, to find detail to answer the question. Within the question there will be a link which will take you directly to the patient data set referenced in the exam question. Once the data set has loaded, you may resize the window to move back and forth between the data set and the exam question

Candidates will be able to view plans. They will not be required to contour, optimize, or create plans. The checklist below details the tasks that candidates should master within mdcb.proknow.com as part of the preparation for the examination. The following video demonstration will demonstrate each of the knowledge skills listed below:

<https://vimeo.com/420044597>.

Knowledge Skills Checklist for Performance Based Items

1. **Log in to mdcb.proknow.com**. This site will be separate from any other Proknow.com site that you may have utilized in the past.
2. Turn on/off all contours and individual contours
<https://support.proknow.com/hc/en-us/articles/360019978694-Patient-Structures>
3. Turn on/off all doses & individual doses / add new dose level / change a currently displayed dose level. **All Dose is displayed in Absolute Dose (Gy)**
<https://support.proknow.com/hc/en-us/articles/360019979134-Patient-Dose>
4. Navigate/scroll through images in all 3 planes (axial, sagittal, and coronal) using both the keyboard and the mouse
5. Pan and zoom images in all 3 planes
6. Window level adjustment / Reset window/level
7. Probe Tool for measuring distance and for measuring dose profiles
8. View DVH. Turn on/off all structures/individual structures
<https://support.proknow.com/hc/en-us/articles/360020179393-Patient-DVH>
9. Hide/show DVH statistics (min/max/mean/volume)
10. Change DVH view (cumulative dose / differential dose / relative / absolute)
11. When navigating within your mdcb.proknow.com account, do not adjust any file or account settings.

Sample Multiple Choice Questions

This section contains questions or incomplete statements followed by four options. Choose the best option in each case.

1. A cork or bite block should be placed in the patient's mouth to avoid unnecessary irradiation of the tongue and floor of mouth when simulating and treating the:
 - A. tonsillar area.
 - B. maxillary antrum.
 - C. larynx.
 - D. parotid.
2. Which of the following best describes the energy spectrum for *bremsstrahlung* radiation?
 - A. increasing
 - B. decreasing
 - C. continuous
 - D. discrete
3. The average life of a radioactive isotope with a half-life of 8 days would be:
 - A. 4.0 days.
 - B. 5.5 days.
 - C. 11.5 days.
 - D. 16.0 days.
4. A patient is to be given a 4600 cGy midplane dose in 23 fractions by parallel opposed fields to the mediastinum. The dose to the spinal cord each fraction is 209 cGy. If a spinal cord block is added to the posterior field only, the dose to the spinal cord each fraction is 94 cGy. The spinal cord dose through the treatment course is limited to 4000 cGy. How many fractions must the posterior cord block be inserted?
 - A. 4 fractions
 - B. 5 fractions
 - C. 6 fractions
 - D. 7 fractions
5. Based on clinical experience with total body irradiation (TBI) before bone marrow transplantation and hemibody irradiation, the most important dose-limiting tissue is the:
 - A. lens of the eye.
 - B. spinal cord.
 - C. lung.
 - D. skin.
6. The energy loss rate of a 10 MeV electron in water is approximately:
 - A. 0.51 MeV/cm.
 - B. 0.69 MeV/cm.
 - C. 1.25 MeV/cm.
 - D. 2.00 MeV/cm.
7. Which of the following clinical machines produce(s) photon beams?
 - A. Mobetron
 - B. Cyberknife
 - C. Synchrotron
 - D. Cyclotron
8. Which of the following causes of potential errors in a patient setup for prostate IMRT results in a systematic error?
 - A. organ motion
 - B. stool in the rectum
 - C. bladder filling
 - D. incorrect shifts from reference point

Sample Drag & Drop Questions

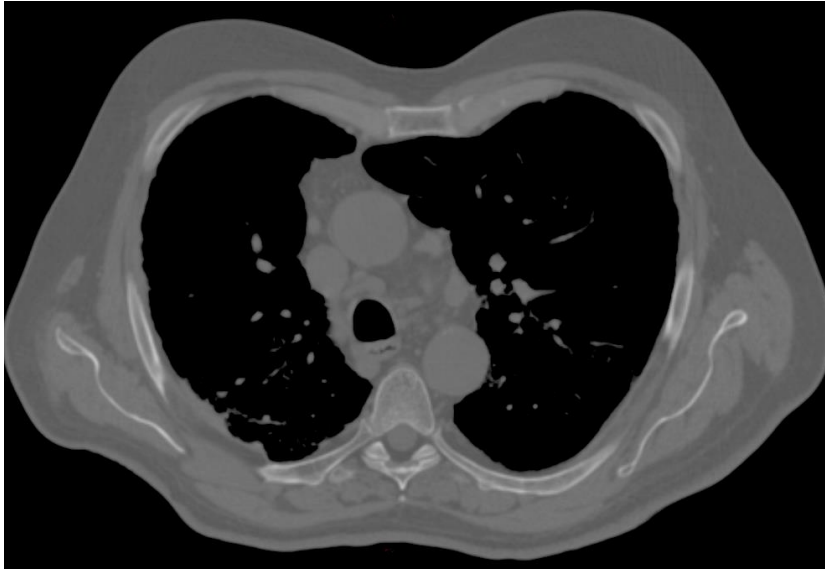
In a Drag & Drop question, the exam candidate will be asked to match a “source box” to a “target box” as per the sample below. The target box is outlined in red. The source box is outlined in blue.

9. Regarding IGRT technologies, link the modalities to the most appropriate disadvantage:

A. Electromagnetic field tracking	Poor image quality
B. MRI -IGRT	Potential for higher imaging dose
C. Fluoroscopic kV-based tracking	Spatial distortion
D. Ultrasound - IGRT	Requires implanted fiducials

Sample Hot Spot Questions

10. On the axial CT below, identify and click on the Superior Vena Cava with your Cursor:



Answers to Sample Questions

1. B
2. C
3. C
4. D
5. C
6. D
7. B
8. D

9. A- requires implanted fiducials; B- spatial distortion; C- potential for higher imaging dose; D- poor image quality

10.



MDCB Practice Tests

The MDCB publishes study guides periodically which can be purchased at www.MDCB.org.

In addition, a complimentary brief ONE-TIME practice exam is provided for exam candidates to become familiar with the exam platform. Once a candidate has been approved to sit for the exam, access will be provided to the practice exam portal.

The MDCB does not endorse pass rates guaranteed by any Medical Dosimetry review course provider. Only the MDCB can warrant the validity of pass rates for the MDCB exam.

REFERENCE MATERIAL

References used for MDCB exam item writing include popular textbooks covering subjects in radiobiology, physics, dosimetry, cross sectional anatomy, and principles of radiation oncology practice such as the following:

- Gibbons, John, Khan's the Physics of Radiation Therapy. 6th ed. 2019.
- Khan, Faiz M. Treatment Planning in Radiation Oncology. 4th ed. 2016.
- Perez, Carlos A. and Brady, Luther W. Principles and Practice of Radiation Oncology. 7th ed. 2018.
- Fleckenstein, P. Anatomy in Diagnostic Imaging, 3rd ed. 2014.

Other popular texts can be found at the AAMD store and Medical Physics Publishing websites. In addition, item writers draw questions from reports that are relevant to current dosimetry practice published by the AAPM, ABS, ASTRO, ICRU, ICRP and NCRP as well as published RTOG clinical trials and NCCN guidelines. Because the practice of medical dosimetry and radiation technology evolves rapidly, it is not possible for MDCB to rely solely on textbooks and published reports for up-to-date information in all subject areas. Dosimetrists are expected to be aware of recent advances in the field and have a general knowledge of topical literature including key journal articles that have impacted the practice. In addition, dosimetrists should understand recent technological advances in radiation delivery equipment and imaging such as Cyberknife, TomoTherapy, GammaKnife, cone beam CT, etc.

Examples of relevant recent journal articles include the following:

- QUANTEC Special Issue. International Journal of Radiation Oncology Biology Physics. Volume 76, Issue 3, Supplement, S1-S160 March 2010.
- Otto K. Volumetric Modulated Arc Therapy: IMRT in a Single Arc. Med Phys. 35. 310-317 (2008).

STYLE GUIDE

The following common terms/acronyms will be utilized on the exam wherever applicable:

2D, 3D, 4D – two 3-dimensional, three-dimensional, four-dimensional coordinate system
AAPM – American Association of Physicists in Medicine

ABR – American Board of Radiology
ACR – America College of Radiology
AIDS – acquired immunodeficiency syndrome
ALL – Acute Lymphocytic Leukemia

AML – Acute Myelogenous Leukemia

ARRT – American Society of Radiologic Technologists

ART – adaptive radiotherapy

ASTRO – American Society of Radiation Oncology

AVG – average intensity projection

BED – biologically effective dose

BID – bi-daily

BIRADS – Breast Imaging, Reporting and Data System

BMD – bone density meter

BQ – Becquerel

bremsstrahlung

BSF – backscatter factor

CBCT – cone beam computed tomography

CE – continuing education

CET – coefficient of equivalent thickness

cGy – centiGray

CI – Conformality Index

C/kg – Coulombs per kilogram

CLL – Chronic Lymphocytic Leukemia

CMD – certified medical dosimetrist

CML – Chronic Myelogenous Leukemia

CNS – central nervous system

CRT – conformal radiation therapy

CSF – cerebral spinal fluid

CT – computed tomography: computed tomographic (image)

CTDI – CT dose index

CTV – Clinical Target Volume

Curie (mili Curie)

D – absorbed dose

DIBH – deep inspiration breath hold

DICOM – digital imaging and communications

DIR – Deformable Image Registration

DRR – digitally reconstructed radiograph degree

d_{max} – depth

D_{max} – dose

DVH – dose volume histogram

EDW – enhanced dynamic wedge

Electron Rule of Thumb –

	Bentel	Khan
90% (therapeutic)	E/4	E/3.2
80%	E/3	E/2.8

EMR – electronic medical record

$$EQD_2 = \frac{BED}{1 + \frac{2}{\alpha/\beta}}$$

EUD – effective uniform dose

EPID – electronic portal image detector

FDA – Food and Drug Administration

FDG – fluorodeoxyglucose

FFF – flattening free filter

FLAIR – T2-weighted-Fluid-Attenuated Inversion Recovery

FOV – field of view

GE – gastroesophageal

GI – gastrointestinal

GU – genitourinary system

GTV – Gross Target Volume

GY – Gray

GYN – gynecological

H_e – dose equivalent

HDR – high dose rate high energy [adj]

HI – heterogeneity index

HIPAA – Health Insurance Portability and Accountability Act of 1996

HIV – human immunodeficiency virus

HU – Hounsfield units

HVL – half value layer

ICRU – International Commission on Radiological Units

IGRT – image guided radiation therapy

IDL – isodose line

IMRT – (Intensity-Modulated Radiation Therapy)

IP – intensity projection

ITV – Internal Target Volume

IV – intravenous; intravenously

lateral scatter spread

JRCERT – *Joint Review Committee on Education in Radiologic Technology*

kV CBCT – kilovoltage cone beam computed tomography

kV - kilovoltage

LAN – local area network

LDR – low dose rate

LET – linear energy transfer

LINAC – linear accelerator

MALT – mucosa-associated lymphatic tissue

MeV – mega electron volts

mg-Ra-eq – milligram radium equivalent (mg-Ra-eq)

MIN – minimum intensity projection

MIP – maximum intensity projection

MLC – multileaf collimation; multileaf collimators

mR/h – Roentgen milli

MRI – magnetic resonance imaging

MSAD – multiple scan

MSF – multiple static fields

mSv – (mili Seivert)

MTD – maximum tolerance dose

MU – monitor units

MVCT - megavoltage CT Imaging

MV – (photons)

NCCN - National Comprehensive Cancer Network

NCRP – In the United States, the National Council on Radiation Protection and Measurements

NRC – In the United States, the Nuclear Regulatory Commission

NPO – nil per os

NSAIDs – nonsteroidal anti-inflammatory drugs

NTCP - Normal Tissue Complication Probability

OAF – off-axis factor

OAR – organ at risk

ODI – optical distance indicator

OER – oxygen enhancement ratio

off-axis dose

OSLD – optically stimulated luminescence dosimeters

P – permissible dose equivalent

PACS – picture archiving and communication system

PDD – percentage depth dose

PET – position emission tomography

PHI – protected health information

Power law

PRV – Planning Risk Volume

PSA – prostate-specific antigen

PTV – Planning Target Volume

QA – Quality Assurance

Q or QF – quality factor

QUANTEC – Quantitative Analysis of Normal Tissue Effects in the Clinic

RBE – relative biological effectiveness

RO-ILS – Radiation Oncology Incident Reporting System®

RSO – radiation safety officer

RTOG – Radiation Therapy Oncology Group

SAD – source-to-axis distance

SAR – scatter-air ratio

SBRT – stereotactic body radiation therapy

SCD – source to collimator

SDD – source-to-diaphragm distance

SFD – source-to-film

SIB – simultaneous integrated boost

SRS – stereotactic radiosurgery

SSD – source-surface skin distance

STIR – short tau inversion recover or short T1

SUV – standard uptake value

Sv – Sievert

TAD – target-to-axis distance

TAR – tissue-air ratio

TBI – total body irradiation

TCP – tumor control probability

TD – tolerance dose	TRUS – transurethral ultrasound study
TE – echo time	TSEI – total skin electron radiation
TERMA – total energy released per unit	TSI – total skin irradiation
TG – Task Group (i.e. AAPM TG Reports)	TURP – transrectal resection of the prostate
TGF – transforming growth factor	UV – ultraviolet
TLD – thermoluminescent device	VSD –Virtual source distance
TMR – tissue-maximum ratio	WAN – wide area network
TNM – tumor node metastasis	X ray [n]
TPR – tissue-phantom ratio	X-ray [adj]
TPS – treatment planning system	x-ray [v]
TR – repetition time	Z – atomic number

EXAMINATION RESULTS

Approximately 6 weeks after the examination, scores are provided to candidates at <https://mdcb.learningbuilder.com>. The MDCB exam is a pass/fail exam. Scores are **not** based on a curve as is typical for non-certification testing and represent only individual overall performance. Each candidate's ability is measured against a determined passing (cut) score identified by the Standard Setting Study, a recognized industry practice. Thus, each candidate is measured against the same standard. Candidates are **not** required to have a passing score in each of the seven domains of the exam in order to achieve a passing score. Passing scores are based on the total number of exam questions correct.

The exams are graded electronically, and the collective data reviewed and analyzed by a PhD psychometrician/statistician. Several quantitative indicators are used by the psychometrician to help determine the reliability and validity of the collective examination scores. Examples of these parameters include the biserial, p-values, and equater values. The biserial statistic compares the statistical relationship on each question for examinees based on their performance on the question and the test as a whole; the p-value statistic analyzes the percentage of examinees who have gotten a question correct; and the equater values analyze statistical relationships between previous and current questions. These are only a small component of the overall values collectively psychometrically analyzed.

Actual scores are not provided. Fail reports with detail will be provided, in order that candidates can assess their performance in each of the content areas. The results of the exam will remain confidential and are provided only to the exam candidate and the MDCB. An aggregate score for all Route 1 candidates for a particular program will be made available to program directors of the JRCERT program. Successful candidates will receive a wall certificate and earn the right to use the title "Certified Medical Dosimetrist".

CMD candidates can be assured of the reliability of the score reporting. Every examination is initially scored in the test center, then scored a second time in the operational scoring system at Prometric's data center and scored a third time by an independent Prometric statistical system, and the scores from these three systems are compared to be certain that the correct results are reported.

Score Confirmation

Candidates, who wish to have results confirmed by the MDCB testing company, can request a "confirmation of score." Please note that the confirmation process is solely meant to verify the accuracy of your exam result. Raw or scaled scores will not be provided. You must submit your request in writing by mail.

The deadline for requesting a score confirmation is 30 days after the date your results were posted for your review.

The fee for an exam score confirmation is \$250.

CERTIFICATION AND ACCEPTANCE - GENERAL GUIDELINES

This section applies to, but is not limited to test conditions, test security and test validity. The Medical Dosimetrist Certification Board shall either retain or reserve the sole right to determine whether or not scores on the examination are valid or invalid. The acceptance of a candidate's application to take the examination or the scoring thereof or the release of said test results to any party shall not act in any way to amend the right of the Medical Dosimetrist Certification Board to determine whether such scores achieved thereon are valid or invalid in whole or in part. A determination that an examination and the scores achieved thereon are invalid can be made at any time by the Board. The Board also reserves the right to cancel any scores that may already have been reported when subsequent information raises doubt of reported score validity.

Unlike cases of individual candidate misconduct, occasionally testing irregularities occur that affect a group of test takers. Such problems include, without limitation, administrative errors, defective equipment or materials, improper access to test content and/or the unauthorized general availability of test content, as well as other disruptions of test administrations (e.g., natural disasters and other emergencies). When group testing irregularities occur, Prometric will conduct an investigation to provide information to the Board. Based on this information, the Board will direct Prometric either not to score the test or to cancel the test score. When it is appropriate to do so, the Board will arrange with Prometric to give affected test takers the opportunity to take the test again as soon as possible, without charge. Affected test takers will be notified of the reasons for the cancellation and their options for retaking the test. The appeal process does not apply to group testing irregularities.

Confidentiality and Conduct Agreement

When a candidate applies to take the examination, he or she is demonstrating his/her understanding of, and agreement to conform to the level of professionalism and ethics expected by the Medical Dosimetrist Certification Board in relation to test taking and must comply with the MDCB Ethical Standards. The MDCB Ethical Standards are available at www.mdcb.org. By making application to sit for the examination, applicants are acknowledging their understanding that the examination and its contents are proprietary and confidential. Candidates are prohibited from disclosing or reproducing any portion of the examination in any fashion or from recreating or attempting to recreate any portion of the examination or any test item for any reason. Candidates are prohibited from dissemination of any information concerning test content to any individual or any entity for any purpose whatsoever. Any conduct that the Medical Dosimetrist Certification Board reasonably believes to be designed or intended to breach test security or to disseminate examination content can result in the invalidation of test scores and can result in civil and/or criminal prosecution. The Ethical Standards apply to persons holding certification credentials from the MDCB and to persons applying for examination and certification by the MDCB in order to become Certified Medical Dosimetrists.

Any candidate's conduct during or following the examination which the Medical Dosimetrist Certification Board reasonably believes to be in violation of the foregoing conditions can result in score cancellation. Candidates agree and understand that test scores can be cancelled if there is reason to believe through test administrator observations, statistical analysis and/or other evidence that any test score or scores may not be valid or that any candidate was engaged in collaborative, disruptive, or other unacceptable behavior during or after the administration of the examination.

Candidate Misconduct

The Medical Dosimetrist Certification Board administers an examination that serves an important public function, and no misconduct will be tolerated.

In an instance where the Medical Dosimetrist Certification Board believes individual candidate misconduct has occurred, the candidate is notified and is given an opportunity to provide additional information.

If, during the administration of an examination, a test administrator believes misconduct is taking place, certain options shall be available to the test administrator.

1. A test administrator can dismiss a candidate from the test and report that to the Medical Dosimetrist Certification Board, stating the reason that the action was taken.
2. A test administrator can choose not to dismiss a candidate from the test; however, under such circumstances, the test administrator will file an irregularity report with the Medical Dosimetrist Certification Board, describing his or her observations.

In either event, when a test administrator reports that a candidate may have committed an act of misconduct during an examination, the candidate's test record is reviewed, and the Medical Dosimetrist Certification Board reserves the right thereafter to take appropriate action, including the cancellation and/or invalidation of the relevant test score.

The Medical Dosimetrist Certification Board has the unqualified right to question any test score the validity of which is in doubt because a score appears to have been obtained unfairly or because the Medical Dosimetrist Certification Board has reason to believe there has been a breach in test security. In the event that the Medical Dosimetrist Certification Board determines that a candidate's individual test results be withheld, or that a group of results will be withheld, the Board will notify the candidate or the group.

Upon written request or application in accordance with the appeal procedure, a candidate can request a hearing. The determination as to whether an appeal shall be granted is made by the Medical Dosimetrist Certification Board taking into consideration the circumstances of the invalidation decision.

Ethical Standards Procedure for Individual Candidate Misconduct

In the event a candidate's scores are withheld or canceled due to specific individual misconduct as deemed by the MDCB, the Ethics Complaint Procedures for ethical violations will be followed. Candidates should review the Standards at <http://www.mdcb.org/about-mdcb/ethical-standards>. The Ethical Standards outline the procedures for Summary Suspension, Hearing and Appeals processes. Adverse decisions of the Board/Ethics Committee will result in revocation or suspension of the CMD designation, as well as, publication to appropriate authorities.

MAINTENANCE OF CERTIFICATION

Registry of Certified Medical Dosimetrists

Medical dosimetrists become certified by the MDCB upon passing the examination and are eligible to use the credential of Certified Medical Dosimetrist, CMD. All Certified Medical Dosimetrists, who meet maintenance of certification requirements, will appear in the MDCB's public Certificant Directory.

Annual Fees and the Five-Year Continuing Education Cycle

As a recognized member of the health-care field providing critical care to individuals facing life-threatening illnesses, once an individual becomes a CMD, it is his/her sole responsibility to confirm renewal of his/her credential, including annual payment, maintenance of the appropriate number of continuing education credits for each recertification cycle, making necessary updates to contact information and adhering to the Ethical Standards set forth.

Certification is valid for one (1) year. **Each CMD must pay an annual registration fee to have their credential registered beginning with the first year following successful exam results.** This registration process permits use of the CMD credential. A wall certificate with seal will be issued for each five-year period upon receipt of the annual registration fee and completion of 50 MDCB approved continuing education credits. The CMD credential is to be renewed by December 31st of each calendar year. A 30-day grace period, with monetary penalty, will be allowed until January 31st. Failure to submit this renewal fee may result in loss of the CMD credential. Dosimetrists who have not paid the registration fee will not be allowed to use the credential "CMD" and will not be listed in the registry of Certified Medical Dosimetrists. Reinstatement of the credential can be achieved only via the terms of the Lapsed Credential Policy or by again passing the MDCB certification exam.

Along with being registered each year, the MDCB's Maintenance of Certification Documentation Program also requires 50 hours of participation in MDCB approved educational activities in each individual's five-year renewal cycle and must be recorded by each individual in their personal learning plan. The MDCB is responsible for establishing and managing credentialing and renewal processes for CMDs. Credential renewal is granted to those CMDs who have demonstrated current cognitive capability in the field of Medical Dosimetry by appropriately documenting participation in continuing education activities. The MDCB defines continuing Medical Dosimetry education as activities that are planned, structured and related to the practice of Medical Dosimetry. The Scope of Practice of a Medical Dosimetrist and Practice Standards for the Medical Dosimetrist are AVAILABLE ON THE AAMD WEBSITE and define relevance to the practice of Medical Dosimetry for the Medical Dosimetrist.

Please note: Credit accumulation for those who are successful in the 2021 exams does not commence before January of 2022.

The MDCB also conducts regular audits of all continuing education documentation. CMDs who are nearing the expiration of a current CMD five-year cycle, will be advised of non-compliance and potential for the CMD credential to lapse at the end of the year if no documentation for the 5 year/50 credit qualification is provided.

Maintenance of Certification Policies

Please refer to the MDCB website to find policies relevant to Maintenance of Certification, for example:

- Temporarily Disabled CMD Policy
- Lapsed Credential for CE Non-compliance Policy
- Lapsed Credential for Non-payment of Fee Policy.

REVOCATION OF CERTIFICATION AND APPEALS

The MDCB has the right to revoke any certificate that it has administered in the event that the recipient engages in conduct which is a violation of the Ethical Standards of the MDCB. Additionally, fraud on the part of any candidate in the application process is grounds for denial or revocation of certificate. A review process is provided for any candidate whose certificate has been revoked. Candidates who desire to appeal must do so in writing within 45 days of receiving notification of revocation of certificate. All appeals requests must be made to the President of the MDCB in writing via the address below.

Medical Dosimetrist Certification Board
1120 Route 73, Suite 200
Mount Laurel, NJ 08054

Toll-free (866) 813-MDCB or (866) 813-6322
info@mdcb.org

Certification Making a Difference