CERTIFICATE PROGRAM

DOSIMETRY CERTIFICATE CANDIDATE HANDBOOK

CAMRT ACTRM

2021

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Table of Contents

INTRODUCTION

The field of medical dosimetry in Canada has gone and continues to go through radical change. In the past, departments have trained radiation therapists "in house" on the competencies required to produce treatment plans of optimum quality and quantity. Although this practice still goes on, there is a general trend towards credentialing. In the United States, a Certified Medical Dosimetrist (CMD) can be achieved with the successful completion of an exam.

With the advances in technology and ever-changing standards, it has become apparent that there is a need for a more formal national pathway to achieve competency in the practice of dosimetry. Following a formal request from the CAMRT membership in 2004, a working group was established to develop a Canadian certificate program. This program will provide the knowledge and expertise necessary to generate radiation dose distributions and calculations and will include overall functionality and clinical relevance of radiation oncology principles.

The working group consisted of four committee members and several corresponding members based on their experience and expertise in the fields of dosimetry and education. There was also a commitment to ensure representation from all regions across Canada.

The Dosimetry Certificate provides a mechanism to satisfy both the needs of continuing education and professional development to CAMRT members working in radiation therapy. Candidates who successfully complete the didactic, clinical and research/quality improvement (research/QI) components are eligible to receive the Dosimetry Certificate and use the credential **CDC** (Canadian Dosimetry Certificate).

Individuals with questions about the Dosimetry Certificate are encouraged to become familiar with the CDC Handbook. Further questions can be addressed by contacting:

CAMRT
1300-180 Elgin St. Ottawa ON K2P 2K3
Tel: 1-800-463-9729 or (613) 234-0012 extension 226
Email: dosimetry@camrt.ca
Web site: http://www.camrt.ca/professional-development/certificate-programs/cdc/

The Canadian Organization of Medical Physicists (COMP) has reviewed and endorsed the Dosimetry courses and program.

COMP Canadian Organization of Medical Physicists
OCPM Organisation canadienne des physiciens médicaux

Purpose of the CDC Program

The Dosimetry Certificate is intended to provide a mechanism for radiation therapists to demonstrate knowledge and competence in the field of dosimetry, to promote standards of excellence, and to identify those who have met a nationally recognized standard in the art and science of medical dosimetry.

This certificate is intended to:

- be dynamic and progressive in nature
- address the current and future challenges in Dosimetry
- become the Canadian "gold standard" for those working in this clinical area
- provide a Canadian credential that is respected, valued and sought by employers
- provide an opportunity for continuing professional development
- enhance safe and effective practice as described by the *CAMRT Member Code of Ethics and Professional Conduct– see www.camrt.ca.*

The CAMRT recognizes this Certificate as a post entry-to-practice credential in the discipline of Radiation Therapy.

The CDC Committee strives to remain current with the advancements in Dosimetry. As such, the CDC Handbook is updated regularly.

Program Eligibility

The CAMRT Certificate in Dosimetry is available to:

- Radiation Therapists who have been certified by the CAMRT
- Internationally educated radiation therapists who are graduates of programs similar to a Canadian accredited program.
    - Documentation required from IEMRTs*
        - **Notarized copy** of diploma/degree/certificate from entry-level education program.
        - **Letter from entry-level education program** verifying length of program to include both didactic and clinical components.
        - **Letter of Attestation – APPENDIX A**

**Required documentation not received within 30 days of program registration will result in a program cancellation/partial refund.*

CAMRT strongly recommends candidates obtain required documentation prior to program registration and send by courier within the required timeframe.

Candidates may only begin working on the Summary of Clinical Competence or the Research/QI Proposal Component upon approval of received documentation from CAMRT.

Contact dosimetry@camrt.ca for further information.

Certificate Program Registration

Prior to CDC program registration, the following prerequisites are required:

- Eligibility requirement for the CDC registration is 75% or more on the final examinations for BOTH Dosimetry 1 and 2. The 5-year timeline allowed to complete all program requirements **begins with the successful completion of Dosimetry 2**.
- Successful completion of Dosimetry 1 must have occurred within 5 years of the CDC registration date.
  A minimum of two (2) years' work experience post-certification as a radiation therapist. The **verification form**, which will be made available in the candidate's personal profile on the CAMRT website at the time of registration, must be submitted to CAMRT before starting the clinical component. ***Candidates are encouraged to download the form and provide it at the time of registration.***

Forms not received within 30 days of program registration will result in a program cancellation/partial refund. ***CAMRT strongly recommends candidates obtain required documentation prior to program registration and have it ready to upload at the time of registration or to send by courier within the required timeframe.***

Candidates may only begin working on the Summary of Clinical Competence ***upon approval*** *of received documentation from CAMRT.*

Program Overview

The CDC program has three (3) components:

1. Didactic component
2. Clinical component
3. Research/QI Proposal component

Dosimetry 3, the clinical component, and research/QI proposal component can be worked on simultaneously, however all components must be completed within the established 5-year timeframe. The change in program eligibility will allow candidates more time to focus on the clinical and research/QI proposal components.

After review of all components by the CDC Committee, the Dosimetry Certificate is granted to the therapist. The credential granted is **CDC**.

It is the intent that those who earn the CDC will continue their professional development. Ongoing continuing education is recommended to remain current in the dynamic field of dosimetry.

Didactic Component

The didactic component consists of three courses. Candidates must achieve a minimum score of 75% on the final examinations of all courses in order to apply these to the CDC.

- CAMRT's Dosimetry 1 course (or equivalent*)
- CAMRT's Dosimetry 2 course
- CAMRT's Dosimetry 3 course

Therapists holding a valid CMD registration are exempt from Dosimetry 1 and can register for Dosimetry 2.* ***Candidates must submit proof of current CMD registration to obtain equivalency for Dosimetry 1.*

See **APPENDIX B** *for course objectives.*

Candidates must pass the courses and achieve a minimum mark of 75% on the final examination of each of the didactic courses to be applied to the CDC.

See **APPENDIX C** *for exam blueprints.*

Candidates are allowed two (2) rewrites within two (2) years of their initial attempt on the Dosimetry 1, Dosimetry 2 and Dosimetry 3 exams (if required). A rewrite fee will apply.

Candidates who feel they have the essential knowledge gained through relevant work experience and professional development may **challenge** the final exams in each of the three dosimetry courses. A minimum mark of 75% must be achieved on each challenged exam. **No rewrites are allowed for Challenge exams.**

If the candidate fails the challenged exam and wishes to continue in the program, they must take the required course.

Clinical Component

The candidate must register into the CDC program before beginning the clinical component. Only competencies performed after program registration will be accepted.

The clinical component is a practicum that requires the candidate to be practicing in dosimetry and complete a Summary of Clinical Competence under the supervision of an eligible Clinical Advisor.

It is the candidate's responsibility to identify a suitable clinical advisor and clinical setting for the clinical component of this program.

The Summary of Clinical Competence (SCC) is a list of required techniques for treatment planning that must be assessed by the clinical advisor. The candidate is responsible for ensuring that all sections of the Summary are completed. **A resubmission fee will apply for any incomplete submission.**

Random audits will be conducted to ensure the proper process has been followed.

Recognition of Prior Experience

Candidates with 5 years or more full-time experience within the last seven years as a Dosimetrist in Radiation Therapy are only required to complete one case per category. The Supervisor/Manager will attest to this experience by signing and dating the form within the SCC.

Clinical Advisors

It is the candidate's responsibility to identify a Clinical Advisor (CA) at the clinical site and to ensure the clinical advisor is made aware of their role. *See* **APPENDIX D** *for the Role of a Clinical Advisor*. *If the candidate has more than one clinical site, a Clinical Advisor must be assigned at each site and must sign all areas of the SCC where a CA signature is required.*

The clinical advisor must

- be a dosimetrist with a current CDC designation or a qualified clinical medical physicist working in the appropriate discipline
- have ***five years' experience*** in either dosimetry/medical physics
- not be currently registered in the Dosimetry program
- identify others delegated to assess the candidate and ensure they are credentialed and competent in their practice
- perform the assessment on the candidate for all procedures/associated competencies or delegate the assessment to another credentialed staff
- attest to overall competency of the candidate by signing at the end of each module.

The clinical advisor will observe and assess each procedure/competency and sign and date the Summary of Clinical Competence (SCC) on the date the competency is verified.

Delegated Assessor(s)

It is the ***Clinical Advisor's*** *responsibility to identify delegated assessors (DA) at their clinical site and to ensure they are aware of their role.*

The delegated assessor must:

- be a dosimetrist with a current CDC designation or a qualified clinical medical physicist working in the appropriate discipline
- have ***five years' experience*** in either dosimetry/medical physics
- not be currently registered in the Dosimetry program

All professionals acting as delegated assessors must be identified on the **delegated assessors' form** in the Summary of Clinical Competence.

Clinical Advisors outside of Canada*

The following must be submitted at the time of application** into the program:

- A ***notarized* copy** of the clinical advisor(s) credentials (degree, diploma, or certificate)
- A letter from the clinical advisor's employer verifying that the chosen clinical advisor has a minimum of 5 years' experience in dosimetry/medical physics.

**If your clinical environment does not include a dosimetrist with a current CDC designation or a qualified clinical medical physicist working in the appropriate discipline, please contact dosimetry@camrt.ca for further direction.*

Required documentation not received within 30 days of program registration will result in a program cancellation/partial refund.* ***CAMRT strongly recommends candidates obtain required documentation prior to program registration and send by courier within the required timeframe.

Candidates may only begin working on the Summary of Clinical Competence upon approval of received documentation from CAMRT.

Summary of Clinical Competence

The purpose of a Summary of Clinical Competence is to allow the therapist to record treatment plans performed under the supervision of a clinical advisor or delegated assessor that attests to the therapist's competency in the performance of dosimetry and other related procedures and associated competencies.

The clinical advisor/delegated assessor attest to the competent performance of the therapist for each treatment plan/competency. Each treatment plan/competency must be dated and accompanied by the clinical advisor's signature. To assist the therapist and the clinical advisor/delegated assessor, guidelines for assessment of the various treatment plans/competencies are provided in the SCC.

There are eleven (11) categories to be completed in this Summary of Clinical Competence with a total of 110 required entries.

- Seventy-five (75) of the entries must be actual current ***clinical cases (CC).***
- The remaining thirty-five (35) entries may be planned on previous cases if a current clinical case is not available or a technique is not used at your center. (i.e. planned but not used for treatment). Entries planned on previous cases are to be referred to as ***non-clinical cases (NC).***

All plans must be independently executed.

The 11 categories in the Summary of Clinical Competence are:

1. Breast / Chest wall
2. Pelvis
3. Prostate
4. Lymphoma
5. CNS (excluding whole spine axis)
6. ENT
7. Upper GI

8. Lung
9. Sarcoma
10. Miscellaneous section (electrons, brachytherapy, image registration, cranial spinal, stereotactic, extended distance)
11. Calculations section

Any exceptional or extenuating circumstances (e.g. if a technique is not available to the candidate) must be submitted **in writing** to the Certificate in Dosimetry Committee for review and consideration of alternate options.

Documentation of Competencies

- Indicate which planning system or systems were used.
- All plans must be completed independently.
- Each category must include a variety of different techniques.
- A brief description must accompany each entry.
- A plan cannot be entered in more than one category. For example: A plan recorded in the conformal technique category for prostate cannot be entered in the composite multi-phased category.
- Each entry must be marked as a clinical case (CC) or non-clinical case (NC).

Proficiency for achievement of competency for the purpose of this program is characterized as follows:

- When presented with situations, the MRT performs relevant competencies in a manner consistent with generally accepted standards and practices in the profession, independently, and within a reasonable timeframe. The MRT anticipates what outcomes to expect in a given situation, and responds appropriately, selecting and performing competencies in an informed manner.

- The MRT recognizes unusual, difficult to resolve and complex situations which may be beyond their capacity. The MRT takes appropriate and ethical steps to address these situations, which may include consulting with others, seeking supervision or mentorship, reviewing literature or documentation, or referring the situation to the appropriate healthcare professional.

Research/Quality Improvement Proposal Component

The final component of the CDC certificate is the completion of a **research/QI proposal**:

1. Complete portions of the Ethics Guidelines and Screening Tool from ARECCI at the Alberta Innovates link:
   https://albertainnovates.ca/programs/arecci/

   - Complete the ARECCI Ethics Screening Tool and submit along with the proposal.
   - Complete the ARECCI Ethics Guidelines Tool and keep for your records.

2. Submit a proposal related to dosimetry for evaluation by the CDC Committee. Any work related to the proposal must not be started until it is accepted by the CDC committee.

See APPENDIX E & F for further information.

CDC candidates are strongly encouraged to find a mentor prior to initiating the proposal.

Although not a mandatory requirement for the granting of the CDC, it is highly encouraged that the candidate completes the project and submits their final paper for publication in *The Journal of Medical Imaging and Radiation Sciences* (JMIRS) or other appropriate peer reviewed journals. For further information on JMIRS submission requirements, see http://www.jmirs.org/authorinfo.

Candidates have **two proposal resubmission opportunities** on the same topic, within their five-year time frame. After 3 unsuccessful submissions, the candidate must select a new proposal topic in order to continue.

The proposal must be the candidate's own work however it can be in collaboration with others. The proposal component can be submitted at any time after the candidate has registered into the program. It must be accepted by the CDC Committee within the five-year timeframe. Any changes and resubmissions requested by the CDC Committee must also fall within the five-year timeframe.

Program Extension

Extensions beyond the five-year time frame are available under **exceptional circumstances**. Please contact specialtycertificates@camrt.ca **prior to the end of your program**, for information regarding an extension.

There is a fee associated with an extension request.

Submission of Clinical Component

Candidates must submit the completed Summary of Clinical Competence and Research/QI Proposal to the CAMRT for review and approval by the CDC Committee. These can be submitted electronically (in one file) to dosimetry@camrt.ca or mailed to the CAMRT Office.

Incomplete Clinical Component – Resubmission Fee

Any submission deemed incomplete by a Reviewer will be subject to a resubmission fee.

Continuing Professional Development Component

The CAMRT is committed to lifelong learning and therefore advocates continuing professional development (CPD) for maintenance of competence in Dosimetry.

APPENDIX A

INTERNATIONALLY EDUCATED MEDICAL RADIATION TECHNOLOGISTS

CERTIFICATE PROGRAM REGISTRATION ATTESTATION STATEMENT

Included with this signed statement, is the required documentation to finalize my Certificate Program Application with the Canadian Association of Medical Radiation Technologists.

Candidate Name: _____

Certificate Program: _____

Title of Program Completed: _____

Name of Diploma/Degree: _____

Educational Institution for theoretical instruction: _____

Institution for Clinical Training: _____

Length of Total Program: Theoretical (months) [ ] Clinical (months) [ ]

By signing below, I verify that:

- ✓ All statements and documentation in this application are accurate. I understand that a false or misleading statement, omission or misrepresentation may compromise my registration request.
- ✓ The documentation attached regarding my education program and/or my clinical advisor is original and has not been modified in any way.
- ✓ I authorize CAMRT to contact any authority, institution, association, body or person in any jurisdiction to verify the statements in my application and related documents.
- ✓ I understand that I may be required to submit further information if required.

_____ _____

Signature of Applicant Date (month/day/year)

APPENDIX B

Dosimetry 1 – COURSE OUTLINE

Chapter 1 – Back to Basics

- Construction of a phantom in a 3-Dimensional (3-D) treatment planning computer
- SAD technique
- Inhomogeneity effects
- Shielding effects
- Half-blocked beam dose profile characteristics
- Wedge effects
- Parallel pair fields
- 4 field box
- Manual calculation factors
- Single electron beam

Chapter 2 – Pre-Planning Concepts

- Image acquisition and assessment
- Immobilization
- Volume definitions
- Site specific simulation principles

Chapter 3 – Treatment Planning Fundamentals

- Prescription points & normalization
- 3D treatment planning systems
- Plan Generation
- Wedging
- Field in Field Compensation
- Use of bolus
- Plan evaluation
- Normal tissue tolerance dose

Chapter 4 – Large Volume and Adjacent Field Planning

- Extended SSD
- Total Body Irradiation
- Adjacent fields
- Skin gaps
- Overlapping Adjacent Treatment Areas
- Matching photon and electron fields
- Craniospinal Irradiation

Chapter 5 – Tissue Inhomogeneities & Treatment Planning Algorithms

- Tissue Inhomogeneities & Hounsfield units
- Body inhomogeneity
- Energy selection
- Treatment planning algorithms

Dosimetry 2 – COURSE OUTLINE

Chapter 1 – IMRT Treatment Planning

- understand the IMRT terminology
- discuss the equipment used to plan and deliver IMRT
- understand the treatment planning concepts such as planning constraints, plan evaluation endpoints, structure importance, and optimization algorithms
- discuss the treatment planning quality assurance process specific to IMRT delivery
- understand the basic principles of VMAT
- discuss the advantages and challenges involved in VMAT planning

Chapter 2 – Image Guided RT

- understand the importance and advances in Image Guided RT
- discuss the equipment used for on-line correction process
- brief introduction to Adaptive Planning and its role in the future
- understand the role of the Radiation therapist during IGRT
- differentiating between MV, KV and CBCT imaging modalities
- discuss the importance of additional QA for imaging devices

Chapter 3 – Respiratory Motion Management

- understand respiratory motion management
- discuss the issues of motion in radiotherapy and its impact of treatment planning & treatment delivery
- discuss respiratory motion management techniques
- understand the use of slow, breath hold, and 4D-CT
- generating appropriate target volumes
- understanding 4D-CT treatment planning
- discuss DIBH and its advantages and disadvantages
- introduction to respiratory-gated IMRT and VMAT

Chapter 4 – Stereotactic Radiosurgery

- introduction to Linear Accelerator- based SRS
- discuss the historical aspect of radiosurgery
- identify indications for SRS and SRT
- understand patient set-up and immobilization procedures
- define stereotactic localization
- identify the goals of stereotactic treatment planning
- discuss VMAT for SRS and SRT
- understand how to compare and evaluate SRS/SRT treatment plans

Dosimetry 3 – COURSE OUTLINE

Chapter 1 – Planning Aspects of Stereotactic Ablative Body Radiotherapy

- Principles of simulation practices for SBRT patients
- Treatment Planning techniques specific to SBRT
- Treatment Delivery essentials for SBRT patients

Chapter 2 – Functional Imaging In Radiation Oncology With Focus On PET-CT

- Principles of nuclear imaging
- PET and PET-CT imaging
- PET-CT in radiation oncology
- Novel image guidance techniques in radiation oncology
- Appendix: PET-CT imaging protocols

Chapter 3 – Basics Of Radiobiological Modeling and Outcomes

- Effect of dose fractionation
- Interpreting Dose-Volume Histograms
- Dose-Response models (TCP and NTCP)
- Biologically-based optimization
- Use of outcome data in Treatment Planning

Chapter 4 – Brachytherapy – Current And Future Trends

- Historical development of brachytherapy
- Principles and physics of brachytherapy
- Clinical considerations for interstitial, intracavitary, intravascular, topical and other special techniques
- Role of imaging in brachytherapy

APPENDIX C

CAMRT Dosimetry 1 – Exam Blueprint

Item presentation - % of question types	
Multiple Choice 100%	
Exam structure	
Exam length – 2.0 hours Number of questions 100	
Exam delivery format	
Online	
Course Content and question weighting	
Chapters **Questions from the text book and assignments are also included**	**Approximate Percentage weighting of number of questions/chapter**
1 – Back to Basics	19%
2 – Pre-Planning Concepts	21%
3 – Treatment Planning Fundamentals	25%
4 – Large Volume and Adjacent Field Planning	19%
5 – Tissue Inhomogeneities & Treatment Planning Algorithms	16%

CAMRT Dosimetry 2 – Exam Blueprint

Item presentation - % of question types	
Multiple Choice 100%	
Exam structure	
Exam length – 2.0 hours Number of questions – 100	
Exam delivery format	
Online	
Course Content and question weighting	
	Approximate Percentage weighting of number of questions/chapter
1 Intensity Modulated Radiation Therapy	34%
2 Image Guided Radiation Therapy	13%
3 Respiratory Motion Management	22%
4 Stereotactic Radiosurgery	31%

CAMRT Dosimetry 3 – Exam Blueprint

Item presentation - % of question types	
Multiple Choice 100%	
Exam structure	
Exam length – 2.0 hours Number of questions 100	
Exam delivery format	
Online	
Course Content and question weighting	
Chapters	**Approximate Percentage weighting of number of questions/chapter**
1 – Planning aspects of stereotactic ablative body radiotherapy	19%
2 – Functional imaging in radiation oncology with focus on PET-CT	25%
3 –Basics of radiobiological modeling and outcomes data analysis for radiation treatment planning	30%
4 – Brachytherapy – Current and Future Trends	26%

APPENDIX D

The Role of a Clinical Advisor

To maintain the integrity of CAMRT Certificate programs, it is essential that all parties involved in the training and evaluation of certificate program candidates follow the procedures set out in the Program Handbook and Summary of Clinical Competence (SCC). A CAMRT Certificate indicates a level of competence above entry-to-practice that has been verified through the requirements of the program.

Clinical Advisor's responsibilities include:

- review the Program Handbook and SCC with the candidate.
- mentor and support candidates in their skill development
- assess first hand competency/procedures performed by the candidate and verify competence by signing and dating each procedure in the SCC on the date the competence is established and/or
- delegate assessment duties to individuals who have the expertise and qualifications outlined in the Program Handbook.
- ensure all delegated assessors have read the most current version of the Program Handbook and SCC. These documents are updated on an annual basis, so clinical advisors and delegated assessors must review the handbook and SCC with each new candidate.
- attest to overall competency by signing at the end of each module
- verify the overall competence of the candidate at the end of the clinical placement

During clinical placements, the following criteria must be upheld:

All competencies must be **performed** independently by the candidate on a patient. A candidate cannot be deemed competent if they have only observed or simulated a procedure, unless otherwise indicated in the SCC.

The clinical advisor/delegated assessor must witness competent practice for a procedure/competency multiple times prior to the date of the final assessment. A signature in the SCC verifies that the technologist has **consistently shown** they have the knowledge, skill and judgement to be declared competent in each aspect of practice. It is recognized in some circumstances that procedures are not performed frequently; however, it is appreciated that there is a transference of skills between many procedures. ***It is the responsibility of the clinical advisor or delegated assessor to ensure this expected level of competence as evidenced by their signatures in the appropriate areas.***

If there are procedures in the SCC that are not performed at your clinical site it is the responsibility of the candidate to contact CAMRT to determine an alternate option (if any).

Detailed guidelines for assessment of competency are found in each module of the SCC. The guidelines listed provide an overview of the expectation for assessment by the clinical advisor or delegated assessor.

It is recognized being a clinical advisor or delegated assessor adds to your already heavy workload and responsibilities in your daily practice. The CAMRT appreciates your professionalism and commitment to help the candidate continue their education in an ever-changing healthcare environment.

APPENDIX E

Research/Quality Improvement Proposal Component Specifics

1. **Complete portions of the Ethics Guidelines and Screening Tool from ARECCI at the Alberta Innovates link:**

   https://albertainnovates.ca/programs/arecci/
   - Complete the ARECCI Ethics Screening Tool and submit along with the proposal.
   - Complete the ARECCI Ethics Guidelines Tool and keep for your records.

2. **Submit a proposal related to dosimetry for evaluation by the CDC committee. Any work related to the proposal must not be started until it is accepted by the CDC committee.**

A detailed research/QI proposal must be submitted in Microsoft Word or in PDF file format and must include the following:

- Title
  - Should be concise yet informative
- Introduction/Background
  - Comprehensive literature review of current papers on or related to the project
  - Identify gap in literature that supports the conduct of the proposed project
  - Demonstrate relevance of project to the field of dosimetry
- Question / Purpose of the project
  - Objectives and questions to be addressed by the proposed project
- Project design and data collection
  - Describe the methods/equipment (e.g. sample size, eligibility criteria, name and version of treatment planning system) that will be used to carry out the project, what data will be collected and how it will be analyzed.
- Clinical significance of the project
  - Demonstrate how this will impact dosimetry practice locally or more broadly.
- Research Ethics
  - State that Research Ethics Board review requirements have been pursued, according to local policies.

After the submission of the proposal, the committee will review and determine acceptability:

- **Accepted**
- **Conditionally accepted** - the candidate needs to revise the proposal based on committee feedback and resubmits
- **Not accepted** - the project needs significant work or a new topic must be selected.

Candidates will be afforded two opportunities to resubmit on the same proposal topic. After 3 unsuccessful submissions on the same topic the candidate must select a new topic for proposal development in order to continue.

APPENDIX F

Research/Quality Improvement Proposal Evaluation Criteria

Ethical and Legal Issues

Patients: No reference should be made in any part of the manuscript to any patient's identity. Information such as names, initials, hospital numbers, dates and personal histories must be omitted. Written consent must be obtained from patients for the use of any photographs in which they are pictured.

Drugs: Whenever possible, drug trade names should be replaced by the appropriate generic term or the appropriate generic term should appear in brackets.

Copyright: If applicable, copyright permission must be obtained by the candidate and included with their submissions.

CONTENT

- Does the proposal relate to dosimetry?
- Does the topic address a gap in the literature?
- Is the methodology clearly and concisely covered and described?
- Can others duplicate the work, if appropriate?
- Is the statistical analysis, where required, appropriate for the data?

LITERATURE REVIEW

- Is the literature adequately covered?
- Has the literature review been performed using an appropriate method?
- Does the conclusion relate specifically to the purpose of the proposal?

REFERENCES

- Are the references used relevant to the topic?
- Are the number of references used adequate?
- Are an appropriate variety of journals and other sources included?
- Are all references cited in the proposal?
- Are the references cited correctly?
- Are an appropriate number of early or historical references used?
- Are an appropriate number of current references used?

PRESENTATION

- Is the proposal documented according to the required format?
- Are each of the sections presented in an organized fashion?
- Is the project written in current scientific terminology?
- Is the title of the proposal clear and definitive?
- Is the length of the proposal report adequate for presentation of the subject?
- Are all abbreviations kept to a minimum, in acceptable terms and clearly defined with regards to their meaning, when first introduced?
- Are quotes from other sources properly referenced?

Are proper grammar and punctuation used throughout the report?