

University of California, Irvine
Department of Radiation Oncology

Medical Dosimetry Program Handbook

2017 - 2018



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I. Mission Statement

The mission of the Medical Dosimetry Program is to provide the necessary knowledge-base and clinical skills such that upon successful completion the graduating student is able to function safely and competently as an independent **Medical Dosimetrist** and contribute to the profession and health care of the public. Furthermore, the graduating student should be fully prepared to take, and pass, the medical dosimetry certification board (MDCB) examination.

II. Medical Dosimetrist

A Medical Dosimetrist is an integral member of the radiation oncology team who has the necessary skills to develop a computer-based radiation treatment plan that meets a radiation oncology physician's dose prescription with minimum radiation dose to healthy organs nearby and can be readily implemented by the radiation therapists in the radiotherapy treatment unit.

III. Medical Dosimetry Program Goals

Goal 1

A graduating student should be able to function safely, competently and with minimum supervision as an entry-level medical dosimetrist.

Outcomes:

- a. The student should have knowledge of treatment planning using basic as well as advanced treatment techniques.
- b. The student should have knowledge, understanding and implementation of treatment planning protocol parameters.
- c. The student should have knowledge, understanding and implementation of simple hand calculations pertaining to emergency simulation-and-treatment cases.
- d. The student should have knowledge, understanding and handling of record-and-verify systems.

Goal 2

A graduating student will possess the necessary knowledge for critical thinking and problem-solving skills to situations that may be encountered in the radiation oncology clinic.

Outcomes:

- a. The student should have the knowledge to recommend/advise the radiation oncology physician whether a specific treatment technique may be more suitable for a patient, identifying pros and cons of the recommended technique.
- b. The student should have the knowledge and confidence to work with radiation therapists and medical physicists on the most efficient patient setup for a special treatment procedure.

Goal 3

A graduating student will possess the skills to communicate effectively with any member of the radiation oncology team regarding any circumstance that involves a patient treatment.

Outcomes:

- a. Oral presentations and written reports on self-study projects given during training should prepare the student for this task.

- b. One-on-one presentation of a plan to a radiation oncology physician that includes justification of the process that lead to that final plan and periodic treatment planning competency tests administered during training should provide, to the student, the required communication skills.

Goal 4

A graduating student will possess the understanding, appreciation, need and importance for continuing education and patient confidentiality.

Outcomes:

- a. Continuing education and patient confidentiality through HIPAA and other departmental training are the core fundamentals not only of the medical dosimetry program but the UC Irvine Radiation Oncology Department as a whole.

IV. Program Structure and Governance

The Department of Radiation Oncology at the University of California, Irvine (UC Irvine) has a strong educational track record represented by an ACGME accredited radiation oncology residency training program and a CAMPEP accredited medical physics residency program. JRCERT accreditation of the Medical Dosimetry Program was awarded in April 2017 for a period of 18 months and a 5-year JRCERT accreditation is expected to follow thereafter.

For a Medical Dosimetry Student this environment provides a great opportunity for interaction with other trainees that fosters mutual share of clinical knowledge. Also, the Medical Dosimetry Student is encouraged to contact JRCERT (www.jrcert.org) if the program is not fulfilling any JRCERT requirements.

Details of the program structure and governance are outlined as follows:

A. Medical Dosimetry Program within the Organization

The program is administered by the Division of Medical Physics within the Department of Radiation Oncology. Radiation Oncology is one of the Departments within the Comprehensive Cancer Center which is one of the centers within the UC Irvine School of Medicine. The Program Director is also the Director of Medical Physics.

The Medical Dosimetry Student is employed as an Assistant Specialist Step I, at no salary, by the Department of Radiation Oncology, who grants the student a certificate upon successful completion of the dosimetry program.

B. Program Staff:

The Radiation Oncology Department staff consists of:

- 4 board certified radiation oncology faculty
- 3 board certified medical physics faculty
- 4 radiation biology faculty
- 1 assistant hospital physicist
- 3 board certified medical dosimetrists

- 8 registered radiation therapists
- 2 radiation oncology registered nurses
- 1 medical assistant
- 1 department administrator
- 1 clinical operations manager
- 2 administrative office staff
- 2 reception staff
- 4 radiation oncology residents
- 1 medical physics resident

The Medical Dosimetry Student is an active member of the department, albeit in his/her trainee capacity. To this extent, the student is primarily mentored by the medical dosimetry staff and medical physics faculty as a whole, with the physics faculty taking a lead role with respect to the didactic portion of the training. The student also benefits from mentorship by the clinical and radiation biology faculty. The clinical faculty mentors the Medical Dosimetry student on the clinical aspects of treatment planning which complements the technical aspects. Interaction with the radiation therapists provides training in the area of CT-simulation as it relates to treatment planning as well as patient set-up and accurate and safely treatment delivery.

C. Procedure for Granting Certificates

A certificate of graduation from the program is granted to the Medical Dosimetry Student upon successful completion of all aspects of the didactic and practical components. The didactic component includes didactic projects (e.g. self-studies), didactic tests (e.g. physics, radiobiology and clinical) and examinations (e.g. RAPHEX, RABEX and MDCB Mock Exams), while the practical component includes treatment planning rotations and treatment planning competency test evaluations for specific treatment sites.

Medical Dosimetry Student's performance is evaluated on a monthly basis. Should the student be deemed insufficiently conversant with a particular didactic/practical area during a rotation, this area will be carried to the next rotation as an added objective to be completed simultaneously with the current rotation.

The graduation certificate includes the name of the institution, name of the student, program duration and area of training (namely Medical Dosimetry). It is signed by the Program Director, Department Chair, Medical School Dean and University Chancellor and bears the University seal.

D. Training Curriculum Essentials

As mentioned in the previous section, the UC Irvine Medical Dosimetry Program consists of didactic and practical clinical training components:

The didactic component consists of attendance of physics, radiobiology, clinical lecture series and Departmental journal club. Attendance of Departmental and multidisciplinary clinical conferences is also expected. Attendance is mandatory and is documented. In addition, the student is assigned a one-month self-study project and at the end of the project the student is expected to generate a report and an oral presentation. There are

twelve self-study topics assigned to the Medical Dosimetry Student during the academic year.

The practical component consists of five treatment planning rotations covering the main treatment sites and using different planning techniques. Duration of a treatment planning rotation is 1 month. Each rotation has its own goals and objectives content, and competency test evaluations. The 2017-18 didactic and clinical training schedule is shown in Appendix I.

Treatment plans covered during clinical rotations and self-study projects are included in a Medical Dosimetry student's portfolio which he/she must maintain and update throughout the training year.

E. Mechanism of Recruitment and Admissions of Medical Dosimetry Students

Recruitment of medical dosimetry students follows a similar process to that of a junior faculty. An advertisement, compliant with the university's requirements for equal employment opportunity and diversity, approved by the Department Chair and the Dean's office, is placed in the UCI Radiation Oncology website.

Applications are solicited and evaluated by an internal Medical Dosimetry Evaluation Committee (MDEC) which consists of the Program Director and Co-Director, Physics faculty, Dosimetry staff, Radiation Therapy staff and a Radiation Oncology Physician. The application packet includes resume, list of professional references and letters of recommendation.

The applications are evaluated for compliance with entry requirements. **A mandatory prerequisite for admission is that the candidate has a Bachelors Degree in Radiation Therapy or equivalent and has had 3-years of recent radiation therapy experience at a minimum post-graduation prior to applying to the medical dosimetry program.** Applicants that do not fulfill this requirement are not considered for the program.

A short list is created and candidates are invited for telephone and/or onsite interviews. The onsite interviews are of one day duration during which candidates meet with Department faculty and staff. The interviewees are then evaluated by the interviewers. The evaluations are reviewed by MDEC and candidates are ranked according to performance. The top candidate is offered the position. Should he (she) decline, the position is offered to the next applicant on the list until the position is filled.

F. Collaborative Arrangements

The UC Irvine Medical Dosimetry Training Program is exclusively offered at UC Irvine Department of Radiation Oncology. However, due to collaborative agreement with other institutions in the area as part of the Radiation Oncology residency program, the Medical Dosimetry Student may participate as **casual observer only**, on the treatment planning process for Tomotherapy treatments at Long Beach Memorial Medical Center (LBMMC) and for Cyberknife treatment planning at Orange Coast Memorial Center (OCMC).

There is no official clinical rotation to any of these sites as part of the medical dosimetry student training so visit to any of these centers is scheduled in the last few months of the 1-year training. It is expected that these opportunities should broaden the Medical Dosimetry Student training experience.

G. Program Director

The Program Director is a medical physicist with over twenty five years of clinical experience. He is board certified by the American Board of Radiology (ABR) in Therapeutic Radiological Physics and by the American Board of Medical Physics (ABMP) in Radiation Oncology Physics. He is also a fellow of the Canadian College of Physicists in Medicine (CCPM) and the American Association of Physicists in Medicine (AAPM). He is active on AAPM committees and is a founding member of the Society of Directors of Academic Medical Physics Programs (SDAMPP).

The Program Director is also a Clinical Professor and Director of the Medical Physics Division in the Department of Radiation Oncology, UC Irvine. The Program Director primary responsibility is to oversee the smooth operation of the didactic and practical training being imparted to the medical dosimetry student. In addition, the Program Director chairs the Medical Dosimetry Training Program Education Committee (MDTPEC) which is a steering committee in charge of recommending changes, improvements and/or additions to the current dosimetry program based on acquisition of new technology and new standards outlined by national organizations.

H. Program Co-Director

The Program Co-Director is a medical physicist and a UC Irvine Clinical Professor with over 20 years of clinical and research experience. He is board certified by the American Board of Radiology (ABR) in Therapeutic Radiological Physics. He is a member of the Society of Directors of Academic Medical Physics Programs (SDAMPP), International Atomic Energy Agency (IAEA) faculty member, Varian Medical Systems speaker on treatment planning using ECLIPSE software, active member in multiple national and international radiation oncology societies and chairs the Medical Dosimetry Evaluation Committee (MDEC).

The Medical Dosimetry Program Co-Director is responsible for the content, rotation schedules, objectives, expectations and evaluations of each of the monthly rotations that the medical dosimetry student will undergo during his/her training. The Medical Dosimetry Program Co-Director maintains a direct and regular communication with the medical dosimetry staff preceptors and with the medical dosimetry student to ensure that each clinical rotation is carried out according to expectations.

It is also the responsibility of the Medical Dosimetry Program Co-Director and administrative staff, to ensure that all required orientation training material and courses, program's updated handbook, reference bibliography and publications are available to the student at the beginning of the program.

Finally, the Medical Dosimetry Program Co-Director and administrative staff are responsible for the preparation of accreditation/re-accreditation material that the program may undergo.

I. Medical Dosimetry Preceptors

The Medical Dosimetry Program preceptors consist of 3 medical dosimetry staff, one faculty medical physicist, a hospital medical physicist and senior radiation therapist. The three medical dosimetrists are board certified by the Medical Dosimetry Certification Board (MDCB) and two of them have over 10 years of on-the-job work experience. Two of our Medical Dosimetrists hold Master degrees in Medical Physics and Medical Dosimetry, respectively and our third dosimetrist is a former senior radiation therapist at UC Irvine, Department of Radiation Oncologist and trained as a Medical Dosimetrist at UC Irvine as well.

The faculty medical physicist has a Ph.D. in medical physics, is board certified by the American Board of Radiology (ABR) and has over 13 years of clinical experience. The hospital medical physicist has a Ph.D. in physics and over 10 years of work experience with the department's radiation oncology medical physics group on linac dose calibration, VMAT/IMRT plan quality assurance (QA) and image fusion.

The medical dosimetry team is proficient in 3D external beam and brachytherapy treatment planning involving any anatomical site. Treatment techniques offered are 3D conformal radiotherapy (3D-CRT), intensity-modulated radiotherapy (IMRT), volumetric-modulated radiotherapy (VMAT) with RapidArc, stereotactic radiosurgery (SRS), stereotactic body radiotherapy (SBRT) and high-dose rate brachytherapy (HDR) treatments.

The Medical Dosimetry Preceptor's responsibility is to work closely with the Medical Dosimetry Student in accomplishing the objectives for a specific rotation. A Medical Dosimetry Preceptor would prepare a clinical test case in accordance with a clinical rotation and provide the student the necessary initial guidance for the student to carry out the objective. Clinical rotations and their corresponding objectives are designed so that the medical dosimetry student gains treatment planning experience gradually. Treatment planning competence test evaluations for each anatomical site are administered by the Medical Dosimetry preceptors towards the end of the rotation to assess the student's knowledge. It is the responsibility of the Medical Dosimetry Preceptor to immediately inform the Medical Dosimetry Program Co-Director if an objective is not met.

V. Training Requirements

A. Requirements for Successful Program Completion

Successful completion of the Medical Dosimetry Program requires the student to acquire a specific set of treatment planning skills as well as the associated didactic knowledge base. To acquire the treatment planning skills, the student must document successful completion of treatment plans (external beam 3D-CRT, IMRT, VMAT with RapidArc, brachytherapy, hand-calculations, assign self-studies) as well as demonstrate fundamental knowledge of

quality assurance, radiation dosimetry, special procedures (e.g. stereotactic radiosurgery [SRS], stereotactic-body radiotherapy [SBRT]), and radiation safety practices.

Furthermore, by the second half of the training year, the Medical Dosimetry Student should be working on actual clinical treatment plans for any anatomical site and using a specified treatment technique and have the knowledge and confidence to present his/her work to the radiation oncologist after prior evaluation of the treatment plan by a medical dosimetry preceptor. In other words, by this time the student should conduct himself/herself as another member of the medical dosimetry staff and perform accordingly.

The didactic component comprises regular radiobiology, physics and clinical material tests through the year as well as nationally proctored RAPHEX and RABEX examinations and in-house MDCB Mock examinations. The RAPHEX and RABEX exams are standardized tests covering basic didactic material essentials. If the student fails one or both examinations, remedial counseling is provided in areas that require student improvement. Another evaluation tool used for preparation is the annual American College of Radiology (ACR) in-training examination offered to the radiation oncology residents. The Medical Dosimetry Student is tested on the physics and radiobiology components of this examination and a minimum of 75% passing score is used to assess the student's performance. This test exam takes place prior to the scheduled RAPHEX, RABEX and MDCB Mock exams.

Successful completion of the program can be summarized as achieving a "Meet Expectations" according to internal benchmarks and "Passing Scores" at tests and examinations.

B. Design and Content

There are two main components to the training; namely didactic and practical. These are described below.

- **Didactic component**

Consists of the following:

- (a) Radiation Oncology Physics Lecture Series (3 hours/week)
- (b) Radiation Biology Lecture Series (1 hour/week, September - January)
- (c) Clinical Lectures (1 hour/week)
- (d) General Adult Tumor Board Conference (1 hour/week)
- (e) Brain Tumor Board Conference (1 hour/week)
- (f) Gynecologic Oncology Tumor Board (1 hour/week)
- (g) Radiation Oncology New Case Conference (1/2 hour daily)
- (h) Chart Reviews (1 hour/week)
- (i) Film Reviews (1/2 hour daily)
- (j) Treatment Planning Rounds (1 hour/week)

All the above are year-round activities unless stated otherwise, save for public holidays (e.g. Thanksgiving, Christmas, New Year). Attendance is mandatory.

Items (c-g) provide instruction in the areas of clinical oncology and anatomy and physiology from a point of view of disease involvement and standard of care required. In other words, these presentations are designed to cover all the relevant aspects related to the tumor site in question from a multidisciplinary approach. These include etiology, anatomic presentation, radiological and pathological findings and recommendations for clinical management. Furthermore, it is expected that the prospective Medical Dosimetry Student had covered part of this material during his/her radiation therapy training since a B.S. in radiation therapy with at least 3-years of recent work experience is a requirement for admission to the Medical Dosimetry Program.

The assigned self-study projects consist on reviewing, understanding and practical application of concepts found in publications like AAPM task group reports, ICRU reports, RTOG reports, QUANTEC reports, publish treatment techniques for Total-Body-Irradiation (TBI), Total-Skin-Electron Irradiation (TSEI), Fetal Dose recommendations and MDCB Code of Ethics and AAMD/MDCB Scope of Practice. Each assignment is designed to be completed in one-month time.

- **Practical Clinical Component**

The practical component consists of seven treatment planning rotations. Each rotation has its own learning objectives and is of 1-month duration. During these rotations, the Medical Dosimetry Student is required to participate in all aspects of Medical Dosimetry. These include consultation and assistance in patient simulation, CT imaging and set-up, multimodality image-based treatment planning, intensity modulated radiation therapy (IMRT), volumetric-modulated radiation therapy (VMAT), and high-dose rate brachytherapy treatment planning. The student is required to document all clinical activities in a log book which in time, evolves into a portfolio that outlines his/hers clinical training experience. This is further complemented with a series of past clinical treatment planning cases that the student is required to reproduce into a clinically acceptable treatment plan. During the second half of the training program the student is expected to work on current treatment plans and produce clinically acceptable and high quality treatment plans using whichever treatment technique that may be required for that plan.

In a program of this size, it is deemed appropriate for the student to work with dosimetrists and physicists and be involved in all daily clinical activities (treatment planning, patient simulation, etc.) and gain practical skills and confidence gradually. However, for those treatment procedures not regularly offered in the clinic such as Total-Body-Irradiation (TBI) or Total-Skin-Electron-Therapy (TSET) the student is assigned a self-study followed by an oral presentation and written report on the topic that subsequently is added to the student's log/portfolio.

There is an active brachytherapy program in the Department that includes High Dose Rate brachytherapy program (HDR) and radioactive microsphere administration for liver tumors. The medical dosimetry student is an active participant in this effort. Gaining competence in this area of clinical practice is integral to the student's training.

At UC Irvine Department of Radiation Oncology, IMRT and VMAT, in the form of RapidArc™, are used extensively to treat different tumor sites. Treatment delivery is performed with a Trilogy™ and state-of-the-art TrueBeam STX linacs. The latter is used for stereotactic radiosurgery (SRS), stereotactic radiotherapy (SRT), and stereotactic-body radiotherapy (SBRT). Infrared motion tracking, respiratory gating and 4DCT are also used for these treatments. The Dosimetry Student receives treatment planning training in these areas.

Finally, as previously mentioned, during the second half of training the Medical Dosimetry Student is expected to work/generate treatment plans of patients that await radiation treatment. During this time a 2-month treatment planning project based on clinical operation experience will be assigned to the student.

- **Medical Dosimetry Student Portfolio**

A Medical Dosimetry Student is expected to have a portfolio where he/she will keep a log of patients planned per treatment site and technique, projects performed and self-studies covered. This portfolio will become a personal information resource that can be useful to him/her once becoming a medical dosimetrist professional.

The portfolio must contain:

- 100 1D/2D/3DCRT plans (including field-in-field) demonstrating progressive skill development
- 25 multi-field IMRT plans for various sites and following clinical protocols
- 40 VMAT plans for various sites and following clinical protocols
- 10 Intracranial SRS/SRT treatment plans
- 10 SBRT treatment plans
- 30 HDR plans distributed among the following cases: tandem and ovoids, cylinder, CAPRI, interstitial, mammosite, SAVI and biliary
- Evidence of skill in patient chart preparation
- Image registration
- Immobilization/CT-simulation
- Self-Study reports and powerpoint presentations

C. *Sample Training Plans*

The Medical Dosimetry Program is a one-year program that starts on July 01 and ends on June 30. The training is structured such that the student gains experience gradually in performing dosimetric tasks under the direction of faculty physicists, staff dosimetrists, radiation therapists, radiation oncologists and radiation oncology residents. Feedback and mentoring are provided on a continuing basis as tasks are undertaken. In cases where progress in the program falls short of expectation, there is a provision for the Medical Dosimetry Student to be counseled by faculty physicists, dosimetrists and the program director until the required level of competence is attained. If necessary, the training program may be extended.

Successful completion of a rotation requires satisfactory completion of all activities outlined in the rotation (clinical, didactic, etc). Attendance at a minimum of 70% of clinical conferences is required. Attendance is documented, so are clinical and didactic

activities (e.g. clinical tasks, presentations, clinical development projects, where applicable, as pertinent to the particular rotation).

The first 7 months of the Medical Dosimetry Student training consist of monthly rotations where, initially, the student learns about operation of the treatment planning software (e.g. image transferring, target/organ-at-risk contouring, Boolean operations of creation of optimization structures, generation of treatment fields, etc). Next, the student progresses to the design of simple treatment plans where simple treatment planning techniques (e.g. 2D, 3DCRT) are applied to simple treatment sites (e.g. prostate, brain, etc). The next step consists in learning more advanced treatment techniques like intensity-modulated radiation therapy (IMRT) and volumetric modulated arc therapy (VMAT) applied to simple treatment sites. In other words, the program is designed to train the medical dosimetry student systematically and progressively advance to the generation of treatment plans using sophisticated techniques and applied to more challenging treatment sites (e.g. head and neck, anorectal, etc). Appendix I provide the 2017-18 schedules for the practical treatment planning rotations.

D. Disciplinary Actions

University policies relating to performance and disciplinary actions apply. These consist of:

- verbal counseling,
- followed by written counseling,
- followed by a letter of warning
- and finally dismissal,

in escalating order, should the issues in question persist.

There have not been issues encountered in students' progress in the program to date in view of the rigorous selection criteria for Medical Dosimetry Student candidates. More specific details on Medical Dosimetry Student's recruitment are provided in the appropriate section(s) of this document.

E. Evaluation of the Curriculum

The training objectives are reviewed periodically by the Medical Dosimetry Training Program Education Committee (MDTPEC). This review occurs in response to

- (i) feedback received from the medical dosimetry student,
- (ii) recommendations received from faculty and staff
- (iii) new techniques and clinical modalities introduced to the Department's clinical practice.
- (iv) new national standards for medical dosimetry

There are several instances of use of the mechanisms enumerated above over the past several years, (e.g. inclusion of 4D CT-simulation, RapidArc™, etc.) into the training curriculum.

The method employed in evaluation of each rotation is divided into the following parts:

- (a) clinical activities
- (b) assigned self-studies
- (c) attendance record of didactic lectures, clinical conferences and rounds
- (d) professional conduct (interaction with team members, etc)
- (e) test and/or examination scores

The process of modification of the program has been outlined in (i-iv) above. The Medical Dosimetry Student is informed of any pending changes at the time of orientation when he/she starts the program if these changes are known at the time. New modalities that arise during the training period are brought to the attention of the student in advance of their inclusion in the particular clinical rotation. The student's agreement is taken into consideration when these changes are incorporated. Appendix II includes the different evaluation formats (monthly evaluations, treatment planning competency evaluation, etc).

VI. *Medical Dosimetry Students*

A. *Admissions*

Medical Dosimetry Student recruitment is initiated by the preparation of an advertisement. The advertisement has to fulfill the following criteria to comply with University practices:

- compliance with equal opportunity employment legislation
- gender equality
- ethnic diversity
- veterans
- disabled persons
- compliance with State and Federal rules, regulations and applicable employment laws

Furthermore, the advertisement has a summary of the following information and requirements for the Medical Dosimetry Program:

- program length
- entry qualifications; namely a BS or equivalent in radiation therapy with at least 3-years of recent work experience post-graduation
- synopsis of the training program content (didactic and clinical content)
- facilities available for training
- periodic evaluations

Prospective candidates are required to submit the following application material:

- three letters of recommendation
- statement of interest
- resume

The name and contact information where applications are to be sent and the deadline for receipt of applications are clearly stated in the advertisement.

The advertisement is passed on to the Department Chair's office for review and approval. It is then sent to the University's Office of Equal Opportunity and Diversity and Office of the Dean of the School of Medicine for review of compliance with applicable rules and regulations summarized above. The advertisement, once it has received the required University approvals, is then ready to be posted.

The applicants are screened based on their academic standing, work experience and letters of reference by the Medical Dosimetry Evaluation Committee (MDEC). A short list of the top three or four candidates is drawn by the program co-director. These candidates are invited for an interview. The interview consists of one-on-one meetings with the Department's chair, faculty and staff. The candidates are given a tour of the Department and the opportunity to ask questions about the Department and the Medical Dosimetry Program. Mutual expectations are outlined. The interview lasts half day. Each interviewer is provided with an evaluation form to assess each candidate. These evaluation forms serve to score the candidates and are used in their ranking.

Upon completion of the interviews, a meeting of the MDEC is convened by the Program Co-Director, who chairs it. At this meeting, candidates' evaluations are reviewed. A ranking of the candidates is established. The committee recommends that the top candidate is recruited. All pertinent documentation (evaluation forms and scoring of candidates) relating to the recruitment process is kept on file in the Department's administrative office. These records include candidates' applications and faculty evaluation forms. This is a university requirement. These documents are confidential material and protected by privacy laws.

An offer letter is prepared by the Department administrator. This letter sets out the terms and conditions of the offer consistent with University policies. The letter is co-signed by the Program Director and the Department Chair.

B. Recruitment Efforts

The advertisement is posted on the Radiation Oncology's website and provides ample time for prospective applicants to submit their credentials for consideration as well providing a deadline for receipt of applications.

C. Enrollment

The program admits one medical dosimetry student a year.

D. Evaluation of Student Progress and Medical Dosimetry Evaluation Committee

(MDEC)

During the course of training, evaluation of the medical dosimetry student performance is carried out by the Medical Dosimetry Evaluation Committee (MDEC) composed of the following members:

- (a) D. Roa, Ph.D., DABR, Program Co-Director and MDEC Chair
- (b) M. Al-Ghazi, Ph.D., FCCPM, DABR, DABMP, FAAPM, Program Director, Medical Physics Director and Faculty Physicist
- (c) V. Sehgal, Ph.D., DABR, Faculty Physicist Preceptor
- (d) S. Dietrich, AS, R.T.T., CMD, Dosimetry Program Preceptor
- (e) Jonathan Gonzales, M.S., RT, CMD, Dosimetry Program Preceptor
- (f) M. Baldytchev, M.S., CMD, Dosimetry Program Preceptor
- (g) Q. He, Ph.D., Hospital Medical Physicist Preceptor
- (h) L. Pinedo, B.S., R.T.T., Senior Radiation Therapist Preceptor

MDEC meets monthly and provides written evaluation of the Dosimetry Student for the preceding month period. The MDEC chair then discusses the evaluation with the student. The student is given the opportunity to comment on the evaluation. The student then signs the evaluation with his/her comments and this is kept in the student's file.

During each rotation, assignments have their respective mentors. Successful completion of the rotation is based on the Medical Dosimetry Student having:

- (a) attended a minimum of 70% of didactic lectures, rounds and clinical conferences (tumor boards, etc.),
- (b) has an overall score of "meets expectations" in the specific goals for the rotation and
- (c) has an overall performance of "Good" in the General Professional Interactions portion of the rotation.
- (d) has achieved at minimum 75% passing scores in scheduled tests and examinations

E. New Student Orientation

University/School of Medicine Orientation: The Medical Dosimetry Student attends a one day orientation session on July 01, the first day of commencing the program. This start date is the first day of the academic year for the School of Medicine. It also coincides with the beginning of the medical residency programs in all UC Irvine School of Medicine disciplines.

The dosimetry student therefore, attends the same orientation day as the medical residents, including the Department's clinical radiation oncology residents. During the orientation day, the dosimetry student is made familiar with University of California and School of Medicine policies and procedures. He/she is provided with an orientation packet. This is an extensive packet and is available in hard copy only. It can be provided upon request.

Medical Dosimetry Student Orientation: The next day the Medical Dosimetry Student must attend the UC Irvine Department of Radiation Oncology and its facilities. This orientation includes:

- Meeting with the program director and physics faculty
- Detailed explanation of the program structure and content
- Definition of mutual expectations
- Introduction to departmental facilities
- Arrangement to meet with the department's administrator, signature of program related documents on and other employment formalities.
- Informed of the requirement to take and complete the mandatory safety training.

F. Maternity/Paternity and Vacation/Sickness Policy Leave

The Department of Radiation Oncology neither encourages nor discourages pregnancy by its medical dosimetry student during the one year of dosimetry training. The Department does, however, have an obligation to ensure that:

- The pregnancy does not hinder training opportunities for the pregnant student.
- That a student's pregnancy does not have a negative impact on the student's training.

In accordance with the above general policy and the fact that pregnancy in medical personnel is an increased risk, the Department suggests very cautious utilization of educational leave by the pregnant student. Should a complication occur, resulting in the need for disability, the eight and six weeks rules remain in effect.

The Program Director and Co-Director should be advised of the Medical Dosimetry Student's pregnancy within a reasonable period of time to allow for a possible modification of the student's schedule, which may minimize the workload near term (i.e. an easier rotation), and to ensure that maternity leave does not coincide with a critical student's education experience.

The Program Director and Co-Director should also be notified so that the Medical Dosimetry Student may be counseled regarding any potential radiation safety issues. The Radiation Safety Office may also be notified to counsel the student and arrange for additional monitoring as needed.

Any complications attributed to the pregnancy which may require a student to be absent for longer than six weeks in any academic year will be handled on an individual basis. At the discretion of the Program Director, reduction in educational leave or extension of the one-year program would be possible options involving excess disability time (see Appendix III for more information).

Paternity leave will be granted for five working days (Monday through Friday). Should a longer time be required, it will be handled on an individual basis. Paternity leave in excess of eight weeks total absence will be handled in a similar fashion to excessive

maternity disability.

During the 1-year Medical Dosimetry training the student is entitled to a total of 6 days plus the yearly scheduled departmental holidays. Refer to Appendix III for details.

The Medical Dosimetry Student may be excused from his/her duties during training due to personal illness and/or family emergency. Sick leave policy follows university and departmental guidelines and detail information is provided in Appendix III.

G. Safety

The UC Irvine Medical Center's (UCIMC) Radiation Safety Officer provides medical dosimetry students, physics and radiation oncology residents with an annual radiation safety in-service as part of their training. In addition, the Medical Center's Environmental and Health and Radiation Safety Offices perform periodic drills as part of the Medical Center's safety program required to maintain JCAHO accreditation.

All faculty, staff, residents and students are required to complete an on-line safety training course. This is documented in their respective personnel files. The details are outlined below.

Online safety Training

As an employee of the University of California, Irvine (UCI), the Medical Dosimetry Student, like all UCI personnel, is required to complete the **mandatory** web-based safety training course offered by the UCI online learning center. This requires that the medical dosimetry student is issued a username and password to the website:

<http://uclc.uci.edu>

This is an extensive and comprehensive training course consisting of modules on such topics as: confidentiality, infection control, hazardous materials and their materials safety data sheets (MSDS's), fire safety, electrical safety (including high voltage), radiation safety, various code calls (code blue, code red, etc.) and many other aspects of workplace safety for healthcare personnel. Each module consists of a set of lessons. Each lesson culminates in a test that must be completed successfully. Upon successful completion of the entire course, a certificate is issued and kept in the student's personnel file.

As a member of the department, the Medical Dosimetry Student is issued a radiation monitoring badge. His/Her radiation exposure record is reviewed monthly by the Radiation Safety Officer and the Director of Medical Physics in accordance with the Medical Center's ALARA program.

Policies and procedure manuals for the department, Medical Center and University are kept up to date and are available online to the student as well as the entire University community. This is required by law.

H. Dress Code

The Medical Dosimetry Student must wear proper attire corresponding to gender and a white lab coat that is provided by the Radiation Oncology Department. A UC Irvine Medical Center identification badge should be worn at all times during working hours and within the Medical Center premises. No jewelry, display of tattoos or any other form of garment/ornament not in-line with proper attire is allowed.

I. Code of Ethics and Grievance/Complaint Policy

The Medical Dosimetry Student is expected to conduct himself/herself with respect towards other members of the Radiation Oncology Department, University as whole and most importantly to patients that the Medical Dosimetry Student may come in contact.

The Medical Dosimetry Student is expected to adhere and follow an honorable conduct throughout the training and show professionalism and responsibility which are consistent with the UCI standards for excellence.

The Medical Dosimetry Program at UC Irvine, Radiation Oncology Department would adhere to well-established University of California procedures and protocols and to its Medical Dosimetry Program Grievance and Complaint Resolution Policy as described in Appendix IV.

J. Dismissal

The unlikely event of dismissal will be initiated only after the sequence of disciplinary actions described in section V have been exhausted. At this point a letter of dismissal describing all prior actions taken will be redacted, a copy will be given to the student and dismissal will become effective immediately. No tuition refund or any other monetary restitution will be granted.

VII. Program Administration

A. Structure within the Hospital or Medical Center

The Medical Dosimetry Program is operated within the Division of Medical Physics. The latter is a Division within the Department of Radiation Oncology, which in turn is one of the Departments within the University of California, Irvine School of Medicine (SOM). SOM is accredited by the American Association of Medical Colleges (AAMC). The University of California, Irvine (UCI) is part of the University California System comprising ten campuses and three National Laboratories and is the largest academic system in the nation.

The Department of Radiation Oncology at UC Irvine is located in the Chao Family Comprehensive Cancer Center. This is a National Cancer Institute Designated Comprehensive Cancer Center and is one of 40 such institutions in the United States. It is located on the grounds of the UC Irvine Medical Center (UCIMC). UCIMC is the teaching hospital for UCI School of Medicine and is the only Level I trauma center in Orange County. It is also the only university medical center in the county providing specialty care for a population of approximately four million people. UCIMC ranked amongst the top 100 hospitals in the nation for the past decade. It is accredited by the Joint Commission on

Accreditation of Healthcare Organizations (JCAHO) with JCAHO scores consistently in the 90th percentile. Accreditation documents are posted for public viewing at suitable locations in the facility.

The Department of Radiation Oncology provides the full spectrum of clinical, research and educational services commonly found in an academic setting.

B. Role of the Program Director and Medical Dosimetry Training Program Education Committee (MDTPEC)

The program director has overall responsibility for the training of the Medical Dosimetry student. This responsibility starts with overseeing the preparation of the advertisement, initial screening, recommendation for candidate selection to the Medical Dosimetry Evaluation Committee (MDEC) chaired by the Program Co-Director, recommendation of training program improvement to the MDEC, official appointment of the selected candidate, participation in the design and implementation of the training program, participation on ongoing evaluation and follow-up on the student's progress, advising the student on placement upon completion of the program and follow-up regarding board examination until this is successfully achieved.

The role of the Medical Dosimetry Training Program Education Committee (MDTPEC) is as follows:

- (a) based on monthly evaluations acts as a steering committee that can recommend changes/improvements to the medical dosimetry program,
- (b) reviews the training curriculum periodically and provides recommendations consistent with national training standards to insure that the program remains current and in compliance with accepted practices,
- (c) seeks feedback from appropriate faculty and staff (radiation oncologists, radiation biologists, physicists, dosimetrists, therapists and the medical dosimetry student) pertaining to opportunities for program improvement.

MDTPEC membership is composed of the following faculty and staff:

- M. Al-Ghazi, Ph.D., Program Director and Committee Chair
- Roa, Ph.D., Faculty Physicist and Program Co-Director
- Kuo, M.D., Faculty Radiation Oncologist
- V. Sehgal, Ph.D., Faculty Physicist Preceptor
- S. Dietrich, AS, R.T.T., CMD, Dosimetry Program Preceptor
- Gonzales, M.S., R.T.T, CMD, Dosimetry Program Preceptor
- Badytchev, M.S., CMD, Dosimetry Program Preceptor
- Q. He, Ph.D., Hospital Medical Physicist Preceptor
- Pinedo, B.S., R.T.T, Chief Radiation Therapist Preceptor
- Medical Dosimetry Student

The committee meets at the call of its chair and at a minimum twice annually. Minutes are kept. This committee is chaired by the Medical Dosimetry Program Director.

VIII. Resources

A. Faculty and Staff

Medical Dosimetry Program Director

Muthana S. A. L. Al-Ghazi; Ph.D., PPhys, FCCPM, DABR, DABMP, FAAPM
Clinical Professor and Director of Medical Physics

Medical Physics Faculty

Dante E. Roa; Ph.D., DABR
Clinical Professor and Program Co-Director

Varun Sehgal; Ph.D., DABR
Clinical Professor

Qichi (Byron) He; Ph.D.
Hospital Physicist

Medical Dosimetry Staff

Salam Dietrich; AS, R.T.T., CMD
Senior Medical Dosimetrist

Jonathan Gonzales; M.S., RT, CMD
Senior Medical Dosimetrist

Maxim Badytchev; M.S., CMD
Senior Medical Dosimetrist

Radiation Biology

Charles Limoli; Ph.D.
Professor and Academic Vice Chair

Munjal Acharya; Ph.D.
Assistant Professor

Clinical Radiation Oncology

Nilam S. Ramsinghani; M.D., DABR, FACRO,
Clinical Professor and Chair,

Jeffrey V. Kuo; M.D., DABR
Clinical Professor,

Parima Daroui; M.D., Ph.D., DABR
Associate Professor

Steve Lee; M.D., DABR
Clinical Professor, Radiation Oncology Residency Program Director

The faculty and staff are responsible for imparting expertise to the Medical Dosimetry Student commensurate with their respective specialties.

B. Finances

A \$12,000.00 annual tuition fee for either in-state or out-of-state is charge to the student interested in the Medical Dosimetry Program. There is no stipend or salary given to the student during the year of training. The student is responsible for covering textbook(s) expenses as well as local, national and international meeting attendance expenses.

C. Facility

Clinical Facilities

The department offers the full range of radiotherapy services; external beam, intensity modulated radiation therapy (IMRT), including VMAT, brachytherapy and radiopharmaceutical therapy. Hardware and software employed in the clinical program at present is detailed below.

The facilities available for training are:

- Varian Trilogy dual energy (two photon and 6 electron energies) linac (with 120 leaf millennium MLC, electronic portal imaging, EPID, IMRT, RapidArc™, SRS/SRT, cone-beam CT, on-board-imaging, respiratory gating, infrared tracking)
- Varian TrueBeam STX with the Edge Package for Stereotactic Treatments
- ARIA information management system
- Eclipse treatment planning system with IMRT, RapidArc™, virtual simulation, CT/MRI/PET-CT image fusion and BrachyVision capabilities planning capabilities
- Multimodality Image Management (MIM Vista) software used for image fusion of multiple image sets originating in different modalities (CT, MRI, PET-CT, etc.)
- High dose rate, HDR, brachytherapy remote afterloading system (VarioSource iX) with image-based brachytherapy treatment planning system and a full set of applicators.
- Acuity simulator
- 16-slice Philips 85 cm aperture CT-simulator with 4DCT capabilities
- CDR SBRT frame for performing stereotactic body radiotherapy
- Access to UCIMC's several CT and MRI imagers and PET-CT scanner for multi-modality image-based treatment planning. The PET-CT scanner is especially equipped for radiation therapy treatment planning. These imaging facilities are housed in the Radiology Department on the UCIMC campus within close proximity of the Department of Radiation Oncology. Treatment planning systems in the Department are connected to the CT, MRI and PET-CT scanners over the hospital network. Imaging studies are readily transferable to the planning systems over the hospital network.
- Fully equipped mould room for fabrication of immobilization and field shaping and modifying devices
- Fully equipped radioisotope laboratory

- Apparati for delivery of radiopharmaceuticals (Y-90 Therasphere and Sir-sphere) for the treatment of hepatocellular carcinoma and liver metastases
- Intra-beam intraoperative radiotherapy system

Classrooms and Conference Rooms

The Department has a conference room where classes, meetings and conferences are held. It is equipped with standard audiovisual facilities.

There are classrooms and conference rooms throughout the Medical Center as can be found in a University Medical School. These are equipped with audiovisual equipment used for instructional purposes.

Research Facilities

Facilities for making posters and talks for presentation at regional and national conferences are available in the Department (standard office software, e.g. PowerPoint). Software for data analysis and production of manuscripts is also available in the Department. In addition there is an Instructional Media Center at UCIMC. This offers professional services to the Medical Center and University community to produce specialized research project reports should their services be sought. Given the extensive array of software packages available in the Department, almost all project reports have been produced within the Department.

Libraries

There are extensive library resources available to the Medical Dosimetry Student. These are as follows:

- A collection of reference textbooks available in the residents' office
- Departmental library and faculty personal book and journal collections immediately accessible to the Medical Dosimetry Student
- The Medical Center library
- The University libraries
- On-line access to the digital library that is available to the Medical Dosimetry Student from his(her) desktop computer.

UC Irvine has a comprehensive collection of books and journals devoted to research. In addition, this institution as a member of the University of California (UC) System, consisting of ten Campuses and three National Laboratories, make available to members of the system their respective library resources. It is quite possible that this is one of the largest library collections in the world available on-line as well as through inter-library loan extending all the way to the Library of Congress.

IX. Summary of Strengths

The program strengths are exemplified by the spectrum of clinical activities the medical dosimetry student undertakes and is exposed to during his/her clinical training period. It is a

practical clinical immersion in a primarily clinical Department. The fact that we have one medical dosimetry student for the number of faculty and staff (total of 6 faculty and staff) associated with the training means that the student gets ongoing daily attention and direction. This is in addition to an extensive didactic component to strengthen the student's background knowledge. As outlined earlier, the didactic component spans the entire range of topics. It is not limited to radiation oncology physics only, but also includes comprehensive training in radiation biology and clinical radiation oncology through attendance of didactic lectures, clinical case conferences and tumor board meetings.

X. *Appendices*

1. [Academic Schedule](#)
2. [Monthly Evaluation](#)
3. [Treatment Planning Competencies](#)
4. [Competency Checklist](#)
5. [Pregnancy Policy](#)
6. [Vacation Policy](#)
7. [Sick Leave Policy](#)
8. [Grievance and Complaint Policy](#)
9. [Family Accommodations for Childbearing and Childrearing](#)
10. [Family Care and Medical \(CFRA\) and Pregnancy Disability](#)
11. [Reasonable Accommodation Policy](#)