Scope of Practice of a Medical Dosimetrist
Practice Standards for the Medical Dosimetrist
Updates 2019

AAMD Taskforce

Conflicts of Interest
None to disclose
Speakers

Paula A Berner, BS, CMD, FAAMD
- Task Group Chair – 2019
- Task Group Chair – 2013-2014
- AAMD Fellow 2014
- AAMD President 2007-2008
- Co-chair, AAMD Education Committee 2007-2013
- Founding member of the AAMD Education and Research Foundation 2007
- 30 years experience as a medical dosimetrist

Naomi R. Schechter, MD
- Associate Professor of Clinical, USC
- Director of Quality and Safety, Rad Oncal
- Chair, Integrated Patient Safety Committee, Keck Hospital and Norris Comprehensive Cancer Center
- Chair, ACR Practice Parameters Committee
- Vice-Chair, ASTRO Patient Safety Committee
- Member, ASTRO MDQA Committee
- Over 20 years of experience
- UCSF, MSKCC, MDACC, Kaiser Oakland, USC
- H&N and Breast Cancer Specialization

Daniel Bailey, PhD, DABR – AAPM Liaison to AAMD

Paula A Berner, BS, CMD, FAAMD – Task Group Chair

Minsong Cao, PhD, DABR – AAPM Member

Shiv Srivastava, PhD – AAPM Member

Walter L Tang, MS – Chair, AAPM Sub-committee on the Training and Practice of Medical Dosimetry

AAMD Scope of Practice Task Group members

All AAPM members are members of AAPM sub-committee on the Training and Practice of Medical Dosimetry
Stacy L. Anderson, MS, RT(T), CMD – Medical Dosimetry Educator
Daniel Bailey, PhD, DABR – AAPM Liaison to AAMD
Paula A. Berner, BS, CMD, FAAMD – Task Group Chair
Jason Bryan, BS, CMD – Member at Large
Minsong Cao, PhD, DABR – AAPM
Suzanne Evans, MD, MPH – ASTRO Representative
Rola Georges, MS, CMD – Member at Large (Proton Dosimetrist)
Robert Inshetski, BAS, R.T.(T)/(CT), CMD – MDCB Representative
Brian Napolitano, MHL, CMD – AAMD BoD Member
Shiv Srivastava, PhD – AAPM
Mellonie Brown-Zacarias, MET, CMD, RT(T) – Member at Large

AAMD Practice Standards Task Group members
All medical physicists are members of the AAPM Sub-committee on the Training and Practice of Medical Dosimetry

Learning Objectives

- Brief History
- Define
  - Qualified Medical Dosimetrist
  - Scope of Practice
  - Practice Standards
  - Ethics
- How these fit together
- Decision making model
- Language Changes
- New Sections
- Sections with Significant Revisions
- Gems
History

- 2001 Standards of Medical Dosimetry Practice
  - Divided into 3 sections
    - Clinical performance
    - Quality performance
    - Professional performance
  - This format followed ASRT guidelines
    - ASRT could approve the document
  - This document did not describe the tasks that the medical dosimetrists performed in their daily practice.
  - Was not helpful in writing position descriptions for medical dosimetrists.
  - Was not the best format to guide a medical dosimetrist in the performance of their duties.

History

- 2013 / 2014 revised documents.
- Divided single document into 2 separate documents.
  - Scope of Practice of the Medical Dosimetrist
  - Practice Standards for the Medical Dosimetrist
- Incorporate all the advances in radiation oncology since 2001.
- Incorporate the role of the medical dosimetrist as technology had advanced radiation oncology.
- Scope of Practice
  - Designed to be used as a quick reference for RO, QMP, QMD, ROA
- Practice Standards
  - A format was selected that defines practice standards by specific aspects of radiation oncology and treatment techniques.
  - A brief description to each section was provided so that individuals not familiar with terminology and techniques would have a reasonable understanding of each section.
  - Allow for revision as the profession continues to evolve
Define Qualified Medical Dosimetrist

A Qualified Medical Dosimetrist is an individual who obtains the basic competency to practice in collaboration with a Radiation Oncologist (RO) and/or a Qualified Medical Physicist (QMP).

The QMD is educated to independently perform duties and complete responsibilities under the direction of a RO and a QMP.

The individual uses critical thinking and problem-solving skills as well as exercises their discretion and judgment in the performance of medical dosimetry procedures.

It is expected that an individual will hold themselves qualified to practice in Medical Dosimetry when the knowledge and skills to perform dosimetric tasks has been established.

Define Qualified Medical Dosimetrist

Basic Competence
Define Scope of Practice

“Definition of the rules, the regulations, and the boundaries within which a fully qualified practitioner with substantial and appropriate training, knowledge, and experience may practice in a field of medicine or surgery, or other specifically defined field. Such practice is also governed by requirements for continuing education and professional accountability.”


Assumptions Related to Scope of Practice

The purpose of regulation – public protection - should have top priority in scope of practice decisions, rather than professional interests.

Changes in scope of practice are inherent in our current healthcare system.

Collaboration between healthcare providers should be the professional norm.

Overlap among professionals is necessary.

Practice arts should require licensees to demonstrate that they have the requisite training & competence to provide a service.
Scope of Practice

- Conduct Actions
  - Direct according to rule
  - Bring uniformity to
- Regulations
- Limits that define acceptable behavior
  - What should not be done

Fully Qualified Practitioner
Qualified Medical Dosimetrist

- Continuing Education
- Training
- Professional Accountability
- Practice Based Experience
- Knowledge Skills
Scope of Practice

**Professional**
- Derived from professional documents.
- Offers the broadest parameters for scope of practice.
- Recommended as the initial resource in defining an individual’s scope of practice.

**Individual**
- Must be cognizant of the fact that there are finite limits to expansion of scope of practice without completing additional formal education.
- Examples of additional formal education:
  - Graduate programs in medical dosimetry
  - Graduate programs in medical physics
  - Physician assistant programs
  - Medical school

- Foundation is education and training.
- Evolves over the professional lifetime of the QMD.
- Clinical experience.
- Continuing education.
- Formal course work.
- Developments in radiation oncology and healthcare.
Scope of Practice / Self-determination

**Individual**
- Professional Scope and Practice Standards.
- State or national laws or regulations.
- Institutional policies and procedures.
- Self-determination.
- Professional liability and risk management.

**Self-determination**
- The QMD will consider their skills and expertise, in conjunction with the clinical setting and the skills and expertise of other members of the radiation oncology team.
- Individual judgement regarding what falls within an individual scope of practice may well change over time, but always remains focused on providing practice based services that the QMD is clinically competent to perform.

Define Practice Standards

- Simply stated – Practice Standards are guidelines used to determine what a medical dosimetrist should or should not do.
- A “Standard” as it relates to professionals is a guide to established practices that are considered sufficient and acceptable.
- Practice Standards may be defined as a “benchmark of achievement which is based on a desired level of excellence”.

17

18
Define Code of Ethics

- Principles to help professionals conduct their business with honesty and integrity.
- Expectations governing behavior in professional practice.
- Helps a professional choose what to do when faced with a problem in their professional activities that raises a moral issue.
Code of Ethics

AAMD

- AAMD Code of Ethics
  - https://www.medicaldosimetry.org/about/aamd-mission-statement/#code

MDCB

Ethical Standards

- https://mdcb.org/about-mdcb/ethical-standards

How do they fit together?

- Practice Standards
- Code of Ethics
- Patient Safety
- Scope of Practice
How do they fit together?

- How many of you have been sued as a medical dosimetrist?

Scope of Practice 2019

- Gems:
  - Language changes
  - New Section
  - Updated/ Revised sections

- Gems:
  - “dosimetric treatment planning” changed to “radiation treatment planning”
  - “under the direction of” changed to “in collaboration with”
  - II. Professional Competency
The Scope of Practice of a Medical Dosimetrist is designed to assist the QMD in defining their role in the technical services they provide in patient care. This document defines a QMD, their basic responsibilities, and addresses the educational requirements, board certification, and requirements for maintenance of certification.

...stressing the importance that the QMD be an active participant in the collaborative team approach to patient care...

AAMD Task Group

In the preamble the QMD is encouraged to be an active participant in the radiation oncology team. Don’t just sit at your desk and run plans all day.
Professional Competency

Professional competency is the habitual and judicious use of communication, knowledge, technical skills, clinical reasoning, emotions, values and reflection in daily practice for the benefit of the individual and community being served.

AAMD Task Group

New section – II. Professional Competency

AAMD

An international society established to promote and support the medical dosimetry profession.

Is committed to advancing the science, education, and professional practice of medical dosimetry.

Periodically reviews and updates the professional practice guidelines for the QMD.

This periodic review is done to continually advance the technical services provided by the QMD, and to improve the quality of dosimetric planning for patients.

AAMD Task Group

Scope of Practice – Preamble

The AAMD is your professional organization and is the owner of your professional documents.
Describe task to be performed.
What are the basic parameters of legal practice?
Special education required to perform task?
Is task consistent with Scope of Practice?
Do you possess the knowledge to perform the task?
Are you competent to perform the task?
Is performing task reasonable and prudent?
Would other medical dosimetrists with same qualifications as you perform task?
Accept consequences of action?
Perform task and accept responsibility.

AAMD Task Group
Decision-making model – Answer NO to any question then you STOP

Practice Standards 2019

- Gems:
  - Language changes
  - New sections
  - Revised sections

Gems:
- “dosimetric treatment planning” changed to “radiation treatment planning”
- “under the direction of” changed to “in collaboration with”
- I. The Profession of Medical Dosimetry
- IV. Process of Radiation Therapy
  - G. Segmentation (Contouring)
  - H. Image Fusion
Practice Standards 2019

- Gems:
  - Language changes
  - New sections
  - Revised sections

- Gems:
  - II. Preamble - paragraph 4
  - III. Introduction - paragraph 2
  - IV. The Process of Radiation Therapy
    - All sections updated and revised
    - New organization of Radiation Treatment Planning
  - VI. New title
  - VII. Quality Improvement
  - VIII. Documentation and Communication

The Profession of Medical Dosimetry

Medical dosimetrists are unique in health care. Medical dosimetrists receive their basic education in a technological and scientific discipline, while their practical training is grounded in the clinical applications of dosimetric principles. Medical dosimetrists in radiation oncology, in collaboration with the radiation oncologist, develop, optimize, and monitor patient treatment plans and provide oversight to high level treatment procedures.

Section I. The Profession of Medical Dosimetry

AAMD, 2017 Salary Survey of Currently Active Medical Dosimetrists, September 1, 2018, Mills MD, PhD
The medical dosimetrist is now a recognized occupation by the US Bureau of Labor Statistics and is listed in the 2018 Standards Occupational Classification Manual. This manual describes the occupation of medical dosimetrists as "generate radiation treatment plans, develop radiation dose calculations, communicate and supervise the treatment plan implementation, and consult with members of the radiation oncology team".


"These Practice Standards for the Medical Dosimetrist shall be considered the baseline for quality medical dosimetry practice. The goal was to make these standards applicable to the medical dosimetrist in any setting. As a "Living" document, these Practice Standards will be reviewed and modified as needed. These Practice Standards are not intended to supersede any laws. Currently there are no laws governing the practice of medical dosimetry."

AAMD: Just a little history on the Practice Parameters . . .
Practice Standards - Preamble
“Board eligible medical dosimetrists, including recent graduates of Joint Review Committee on Education in Radiologic Technology (JRCERT) accredited medical dosimetry educational programs, should practice under the guidance of a QMD and a QMP until successful completion of the medical dosimetry certification exam.”

AAMD Taskforce
Intended to be an aid for recent graduates.
Practice Standards - Preamble 35

Clinical Evaluation:
“The QMD should be cognizant of any limitations that would possible impact radiation treatment planning or radiation treatment delivery. These limitations may include poorly chosen immobilization devices, suboptimal positioning, inadequate scan volume, physical or mental inability of patient to cooperate for treatment, etc. Where appropriate the QMD should discuss any potentially modifiable factors with the RO so that a decision could be made regarding the utility of re-simulation.”

AAMD Taskforce:
Encouragement for QMD to become more involved in simulation procedure
Practice Standards – The Process of Radiation Therapy – Clinical Evaluation 36
“After the radiation treatment planning process is complete, the QMD shall ensure that all treatment parameters are clearly documented and orders are approved by the responsible RO, that the checks by the Qualified Medical Physicist (QMP) are complete, prior to the initiation of radiation therapy.”

AAMD Taskforce
Emphasizing the central role of the dosimetrist!
Practice Standards – The Process of Radiation Therapy – Clinical Evaluation

“For a patient undergoing external beam radiation, the QMD should maintain discussions with the RO and Radiation Therapists (RTTs) regarding the treatment sites, and changes in the treatment area that may affect depth or volume of calculation. Any changes should be evaluated to determine the necessity of an adjustment in the original radiation treatment plan, as per the direction of the RO.”

AAMD Taskforce
Embrace your pivotal role!
Practice Standards-The Process of Radiation Therapy – Clinical Evaluation
“Any changes in the planned treatment prescribed by the radiation oncologist, such as adjustment in immobilization, new calculations, or design of a new dosimetric treatment plan must be documented on the record and approved by the radiation oncologist.”

AAMD Taskforce
Dosimetrists play a central role in quality assurance and patient safety!
Embrace your central role on the QA team!

“The QMD must clearly know the physician-directed treatment goals for the radiotherapy patient.”

AAMD Taskforce
By definition written
OK to converse to confirm clarity!

Practice Standards – The Process of Radiation Therapy – Establishing Treatment Goals
The QMD, in consultation with the RO, evaluates the patient in order to provide knowledge and guidance for the following:

- Delineation of previously irradiated areas through review and/or reconstruction of previous treatment plan(s).
- Dose tolerances of normal tissues and critical structures.
- Selection of the therapeutic modalities to achieve treatment goals.
- Delineation of the specified critical structure volumes.
- Reproducible positioning, immobilization and verification of patient positioning.

“As a member of the radiation oncology team, the QMD maybe called upon to serve as a witness to the informed consent.”

AAMD Taskforce
Take an active role!
You play a key role on the team. Your knowledge and guidance is appreciated!

Practice Standards – The Process of Radiation Therapy – Establishing Treatment Goals

AAMD Taskforce
Consider serving as witness for consent!

Patient Education:

*The responsibility to educate the patient and the family may be shared by many members of the radiation oncology team.* The QMD should be prepared to provide accurate and appropriate patient education in accordance with departmental/institutional policies. This communication should facilitate the establishment of a positive relationship with the patient, family members, and health care providers while preserving all measures of patient confidentiality.

Accurate and appropriate patient education by the QMD includes, but is not limited to:

- Assessment of the patient’s need for information.
- Provide reassurance and privacy.
- Address patient questions and concerns regarding the procedure.
- **Refer questions about diagnosis, treatment, or prognosis to the patient’s physician.**
- Accurate explanation and instruction at a level that the patient can comprehend and retain.
- Specific information may include delivery of radiation, instructions for the daily maintenance of treatment field markings, and instruction on self-care procedures.

AAMD Taskforce

Get involved in patient education!

Mutually beneficial to interface with the patient. Important to understand confidentiality.

Value your contribution. Meet patient at their level.

Refer to MD prn.
Simulation:

The QMD, in accordance with departmental/institutional policy, should participate in the development of optimal treatment strategies using critical thinking skills and technical knowledge during the simulation process that results in attainable radiation therapy plans.

This participation may include, but is not limited to the following:

- Acquisition of patient data via computer generated data sets from medical imaging devices such as CT, PET, MR, etc.
- Acquisition of patient data via manual methods such as physical measurements and wire contour.
- Input into the use or necessity of ancillary treatment devices and patient immobilization techniques.
- Any additional patient positioning techniques needs for simulation.

AAMD Taskforce

Reinforcing input of QMD at simulation

Inviting QMD to step away from computer and check patient set-up preemptively

Encouraging QMD to use their experience & weigh in at simulation, to optimizing planning options.
Fabrication of Treatment Aids:

The QMD should be involved in the **consultation**, **development** and **fabrication** of treatment aids and devices.

Compensating filters, bolus, masks, body cradles, etc. are designed to improve treatment accuracy and reduce treatment toxicity

AAMD Taskforce

Encouraging the QMD to work “in collaboration with the QMP and the RO to design and fabricate optimal treatment aids as necessary”

Segmentation/Contouring:

“The RO is ultimately responsible for the integrity and accuracy of segmentation performed for his/her patient.”

AAMD Taskforce

Defining scope of practice of the QMD and RO
“The QMD should be aware that requests to determine gross tumor volumes (GTV’s) and clinical target volumes (CTV’s) are outside the scope of practice of the QMD, and that the QMD who submits to these requests is in violation of the Medical Dosimetry Certification Board Ethical Standards, specifically standard 12.”

Medical Dosimetry Certification Board, Job Task Analysis, November 2018.

Medical Dosimetry Certification Board. Ethical Standards and Ethical Complaint Procedures of the Medical Dosimetry Certification Board, August 15, 2011.

in a 2-year period, the Radiation Oncology Healthcare Advisory Council (RO-HAC) identified more than 60 RO-ILS events containing an issue with contours, including problematic plans with critical structures not contoured and normal tissues incorrectly or incompletely delineated

“The QMD, at the direction of the RO, may be called upon to perform duties related to segmentation.

The QMD should be skilled at this task and is encouraged to review the atlases and references in “Standardizing Normal Tissue Contouring for Radiation Therapy Treatment Planning: An ASTRO Consensus Paper” for any questions about the delineation of normal tissues.”

AAMD Taskforce

“However, there undoubtedly will be some normal tissues that are more challenging and the QMD may not be able to assist with these structures despite an earnest effort.”

“The QMD should not be asked to complete segmentation tasks that exceed their training, knowledge of anatomy, knowledge of the patient, or their scope of practice.”

AAMD Taskforce
Encouraging QMD to do what they can do, comfortably, within their scope of practice. For example, would not be expected to perform PE or contour primary tumor GTV or CTV.
Image Fusion

The practice of modern radiotherapy involves the quantitative use of several types of imaging data.

Imaging data from various modalities are used in treatment planning, treatment delivery, and treatment monitoring.

There may be numerous and diverse datasets to match for treatment planning, delivery, etc.

AAMD Taskforce

Technical training is required before independently performing imaging manipulation techniques, and each image match used for treatment planning or delivery should be checked by both the RO and the QMP.

AAMD Taskforce

The RO who ultimately approves the anatomical matching
The QMP for audit of the technical aspects of image matching
Image Fusion

The QMD in collaboration with the RO and the QMP, may participate in, but is not limited to, the following:

All aspects of image registration, fusion, and deformation registration, including acquiring image sets and importing information software, if applicable.

Selection of anatomical region of interest and the fusion/registration/deformation to match desired anatomy.

Rescaling, as needed, for use in the TPS.

Exporting to TPS, if applicable.

Practice Standards 2019

- **Gems:**
- **Revised sections cont.**
  - IV. The Process of Radiation Therapy
    - L. Radiation Treatment Planning
    - 1. Classical Radiation Treatment Planning
    - a. 2D Radiation Treatment Planning
  - L. Radiation Treatment Planning cont.
  - 2. Modern Radiation Treatment Planning
    - a. 3D Conformal Radiation Treatment Planning
    - b. IMRT Treatment Planning
    - c. 4D Treatment Planning
    - d. The Role of the QMD in Modern Radiation Therapy Treatment Planning
Classical Radiation Treatment Planning

Classical radiation treatment planning uses patient data acquired from external patient body contours, measurements of patient thickness, and single plane radiographic images. The treatment plans and calculations are usually generated by hand using isodose curves or treatment planning systems, where the patient information is digitized or scanned into the TPS.

Modern Radiation Treatment Planning

The main distinction between modern radiation therapy treatment planning and classical radiation therapy treatment planning is modern radiation therapy treatment planning requires the availability of 3D and 4D anatomic information and a treatment planning system that can calculate 3D and 4D dose distributions and dose-volume statics for contoured structures. The anatomic information is usually obtained in the form of closely spaced transverse images, which can be processed to reconstruct anatomy in any plane, or in three or four dimensions. Visible tumor, critical structures, and other relevant landmarks are outlined slice by slice by the treatment planner. The QMD is an active participant in modern radiation treatment planning.
The Role of the QMD in Modern Radiation Treatment Planning

Currently 3D CRT, IMRT, VMAT, and 4D treatment planning techniques represent the latest in modern radiation treatment planning. As the field of radiation oncology evolves the QMD will continue to be an active participant in modern radiation treatment planning.

The QMD participation includes, but is not limited to the following activities, which are performed in collaboration with the QMD and the RO, in accordance to each department/institution’s policies and procedures.

Quality Improvement

A Quality Improvement (QI) Program is recommended for every radiation oncology facility. A Quality Improvement Program’s goal includes, but is not limited to, the following: identifying problems, creating action plans, verifying action plans were performed, and evaluating the effectiveness of the action plans.

The QMP should participate in the departmental QI program per departmental policies. The following duties fall into the scope of practice for the QMD, although the QMD may require some additional training to become proficient in these safety techniques:
- Participation in incident learning systems.
- Participation in root cause analysis.
- Assistance in formulation of department-specific corrective and quality improvement actions.

How have you participated in QI in your section, department, etc.?
Panel Discussion Members

Daniel Bailey, PhD, DABR – AAPM liaison to AAMD, task group member
Paula A. Berner, BS, CMD, FAAMD - task group chair
Jason Bryan, BS, CMD – task group member at large
Allison Paige Dalton, BS, RT(T), CMD – AAMD representative to MDCB
Lee Hales, CMD – AAMD president
Naomi Schechter, MD – ASTRO, co-presenter