

Statement
On the
Scope and Standards
of
Medical Dosimetry
Practice

Abstract

As healthcare delivery systems and technology continue to evolve, the role and responsibilities of the medical dosimetrist need to be delineated. The *Scope and Standards of Medical Dosimetry Practice* is designed to provide a statement of competence in medical dosimetry practice; define the practice of medical dosimetry; and provide a useful guide for medical dosimetrists and others in evaluating the quality, effectiveness, and appropriateness of health care services provided. In the process of developing the statement, the profession of medical dosimetry and credentialing are described; and a decision-making model to guide medical dosimetrists in determining scope of practice is provided.

Keywords: Dosimetry, Standards, Scope, Practice.

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Introduction

This statement, describing the scope of practice and standards of practice for medical dosimetrists, is a living document designed to provide a broad, organized framework that best protects the health and safety of the public. It also facilitates, rather than impedes the changing healthcare needs of the public, the technological changes in the healthcare industry and the ever expanding sophistication, knowledge and capabilities of current and future health care providers.¹ This *Statement on the Scope and Standards of Medical Dosimetry Practice* is also designed to (i) provide a statement of competence in medical dosimetry practice, (ii) define the practice of medical dosimetry, and (iii) provide a useful guide for medical dosimetrists and others in evaluating the quality, effectiveness, and appropriateness of health care services.² This document will require periodic review as the profession continues to advance, develop, and mature.³

Professionals who use this document must be aware of state and federal laws affecting their practice as well as institutional policies. The intent is not to supersede these laws or affect the interpretation or implementation of such laws. It may serve, however, as a model for the development or modification of licensure laws.

Medical Dosimetrists are educated to perform duties and complete responsibilities under the supervision of qualified medical physicists and radiation oncologists. All references in this document to decisions, actions taken, and communications assume that appropriate supervision is present and utilized by the medical dosimetrist. In addition, many tasks performed by medical dosimetrists include participation by additional members of the radiation oncology team such as radiation therapists and nurses. At different institutions, the relative levels of responsibility vary among different members of the team to accomplish a given task.

Gratitude is expressed to those individuals and organizations who have spent considerable time reviewing this document to ensure that the information provided is accurate, particularly Janice Manolis, CMD, James Naves, CMD, and Michael Mitchum, CMD for their contributions.

Background

In December 1996, the Medical Dosimetrist Scope of Practice Research Committee was formed to draft the Scope of Practice for Medical Dosimetrists. However, since neither the scope nor the standards of practice were yet defined, both projects were undertaken. The secondary objective was to develop both the scope and standards of practice that would meet the needs of medical dosimetrists as well as assist in determining the eligibility criteria for the medical dosimetrist certification examination. The committee was comprised of content experts in the disciplines of medical dosimetry, medical physics, and radiation oncology. The project was funded by the Medical Dosimetrist Certification Board (MDCB).

Data collection began in 1997 and the first committee meeting was held in April of 2000. An extensive review of the literature was influential in determining the format of this statement. The committee chose to utilize the format described in the nursing literature. This model was also utilized by the American Society of Radiologic Technologists (ASRT) in the “Practice Standards for Medical Imaging and Radiation Therapy”. By August of 2000, the document was made available to the Medical Dosimetrist Certification Board (MDCB), the American Association of Medical Dosimetrists (AAMD), the American College of Radiology (ACR), the American Society of Radiologic Technologists (ASRT), the American College of Medical Physics (ACMP), the American Association of Physicists in Medicine (AAPM), and the American Society for Therapeutic Radiology and Oncology (ASTRO) for comment. The committee reconvened in February of 2001 to revise the draft based on the recommendations received. The final document was adopted by the MDCB on March 13, 2001.

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General Description of the Profession

The medical dosimetrist is a member of the radiation oncology team who has knowledge of the overall characteristics and clinical relevance of radiation oncology treatment and planning equipment, is cognizant of procedures commonly used in brachytherapy and has the education and expertise necessary to generate radiation dose distributions and dose calculations.⁴ Communication among team members is vital to effective patient care. Toward this end, it is imperative that medical dosimetrists actively and openly communicate with radiation oncologists, medical physicists, radiation therapists, and nurses, among other members of the team, to enable and ensure that appropriate transfer of information occurs. Medical dosimetrists frequently are liaisons between medical physicists and other members of the radiation oncology team.

Radiation therapy often involves daily treatment extending over several weeks. This treatment method uses highly sophisticated equipment and requires a great deal of initial planning as well as constant patient care and monitoring. The medical dosimetrist must maintain a commitment to a high degree of accuracy, thoroughness and safety.¹

The medical dosimetrist must demonstrate an understanding of topics including, but not limited to, cancer, radiation biology, radiation therapy techniques, radiation oncology physics, equipment technology, radiation safety and protection, anatomy, physiology, mathematics, and the psychosocial aspects of cancer. He or she uses professional judgement and critical thinking when performing treatment planning, recognizing and resolving equipment problems and treatment discrepancies, and recommending when treatment should be withheld until a physician can be consulted.¹

Certification/Credential

The *Statement on the Scope and Standards of Medical Dosimetry Practice* is applicable to the entire profession; however, it is recommended that the medical dosimetrist be certified by the Medical Dosimetrist Certification Board (MDCB).^{5,6} Furthermore, this document can assist healthcare facilities and physicians to employ qualified medical dosimetrists and define their role as members of the health care team.³

Upon fulfillment of the eligibility criteria established by the MDCB, an individual may apply to take the certification examination. The MDCB is the recognized certifying agency for medical dosimetry in the United States and administers the examination one time per year. Medical dosimetrists from various countries outside of the United States have elected to become certified by the MDCB. The candidate who successfully completes the certification examination may utilize the credential Certified Medical Dosimetrist (CMD).

To maintain MDCB certification, a level of expertise and awareness of changes and advances in practice must be acquired. The CMD must obtain 50 continuing education credits every five (5) years, as defined by the MDCB.⁷ Further information may be obtained at the MDCB website: <http://www.mdcb.org>.

Scope of Practice for the Medical Dosimetrist

Preamble

The purpose of this statement is to define the scope of practice of medical dosimetrists in order to:

- a. delineate areas of technical service;
- b. educate professionals in the fields of health care, education, and other communities of interest regarding the expectations of medical dosimetrists;
- c. assist medical dosimetrists in their efforts to provide appropriate and high quality services to those in need of radiation therapy;
- d. establish a reference for curriculum review of educational programs in medical dosimetry.⁸

The scope of practice defined here and the domains set forth are part of an effort to describe the broad range of services and expectations of the profession and are not intended to be exhaustive; however, the activities described reflect current practice within the profession. It is also recognized that the level of experience, skill, and proficiency with respect to identified activities vary among the individual providers. It may not be possible for a medical dosimetrist to practice in all areas of the field. Individuals are expected to practice only in designated areas where they are competent based on their education, training, and experience. It is desirable for medical dosimetrists to pursue additional education or training to expand their personal scope of practice.⁸

Medical dosimetrists primarily contribute to patient care in the clinical environment. Non-clinical environments that allow medical dosimetrists to share their knowledge and expertise include, but are not limited to, corporate applications and sales, education, management, administration, supervision, consultation, and research.

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Scope of Practice

The Medical Dosimetrist will:

1. Obtain and synthesize pertinent clinical data to facilitate the radiation oncology process.
2. Participate in the development of optimal treatment strategies. This includes, but is not limited to, the generation of radiation dose distributions and the performance of dose calculations.
3. Document treatment parameters associated with the radiation therapy process.
4. Participate in implementation of prescribed treatment courses.
5. Evaluate, critique, and recommend changes to the radiation therapy process as necessary.
6. Provide patient and public education and promote principles of good health.
7. Adhere to the established Standards of Medical Dosimetrist Practice and Code of Ethics.⁹

Decision Making

In addition to the *Statement on the Scope and Standards of Medical Dosimetry Practice*, each medical dosimetrist must exercise professional and prudent judgement in determining whether the performance of a given act is within the scope of practice for which the medical dosimetrist is clinically competent to perform.¹⁰ The decision making model, subsequently described, provides rational and logical guidance to medical dosimetrists. When these guidelines are used to analyze whether a medical dosimetrist may perform a task, the conclusion is reached that this act is or is not within the scope of practice. (Figure 1.)¹⁰

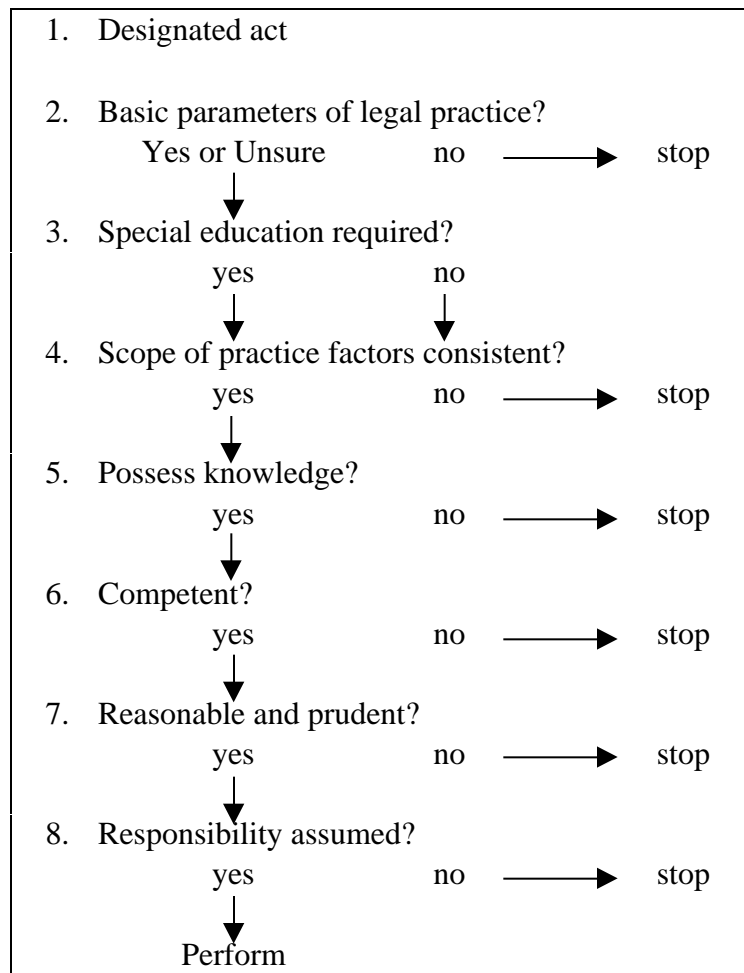
A Decision Making Model for Determining Medical Dosimetrist Scope of Practice¹¹

1. Describe the act being performed.
2. Does the act follow the basic parameters of legal practice? (e.g. regulations regarding the handling of radioactive materials) (If you answered NO to the question, the act is **not** within your scope of practice.) (If the answer is YES or you are UNSURE, continue to the next step.)
3. Does the act require you to have specialized medical dosimetry knowledge and skill? (If you answered NO to the question, the act may be within your scope of practice, continue to the next step.) (If the answer is YES, continue to the next step.)
4. Is the act consistent with the scope of practice based upon at least one of the following factors?
 - a. *Statement on the Scope and Standards of Medical Dosimetry Practice.*
 - b. Positive and conclusive data in the medical dosimetry, medical physics, or radiation oncology literature.
 - c. Appropriately established policy and procedure of the employing facility.(If you answered NO to the question, the act is **not** within your scope of practice.) (If the answer is YES, continue to the next step.)
5. Do you personally possess the depth and breadth of knowledge to perform the act safely and effectively as demonstrated by knowledge acquired in an educational or continuing education program? (If you answer NO, the act is **not** within your scope of practice.) (If you answered YES, maintain documented evidence and continue.)
6. Do you personally possess current clinical competence to perform the act safely? (If you answer NO, the act is **not** within your scope of practice unless competence is achieved.) (If you answer YES, continue.)
7. Is the performance of the act within the accepted “standard of care” which would be provided in similar circumstances by reasonable and prudent medical dosimetrists who have similar training and experience? (If you answer NO, the act is **not** within your scope of practice. Performance of the act may place both medical dosimetrist and patient at risk.) (If you answer YES, continue.)
8. Are you prepared to accept the consequences of your action? (If you answer NO, the act is **not** within your scope of practice.) (If you answer YES, then:

- a. Perform the act - based upon valid order when necessary, and in accordance with appropriately established policies and procedures.
- b. Assume responsibility for your action(s).

Figure 1.

Summary of Decision Making Model



Acknowledgements: Original model developed by the Kentucky State Board of Nursing.
Used with permission.

Standards of Practice for the Medical Dosimetrist

Introduction

The complex nature of the cancer disease process involves multiple treatment modalities with surgery, medical oncology and radiation oncology among the most common. Depending on the location, pathology and stage of disease, these methods may be used individually, concurrently or sequentially. Radiation Oncology employs ionizing radiation to not only destroy cancerous tumors while sparing surrounding tissue, but is also utilized to treat specific benign conditions. An interdisciplinary team of radiation oncologists, radiation oncology medical physicists, medical dosimetrists, radiation therapists, nurses, and support staff plan and deliver the course of treatment. While each team member plays a critical role in the delivery of health services, it is the medical dosimetrist who performs, assists, or directs the treatment planning process as designated by the radiation oncologist and medical physicist.^{1,6}

Standards of Practice

Standards of Practice are authoritative statements enunciated and promulgated by the profession for defining the practice and establishing general criteria to judge the quality of practice, service, and education. They include desired and achievable levels of performance against which actual performance can be measured and define the basic standard of medical dosimetry practice as it exists wherever medical dosimetry is practiced. They are not meant to be standards of excellence; they do not define an ideal quality of practice nor do they define the expert medical dosimetrist.¹²

Professional practice is continuously evolving and actual practice varies from state to state and country to country. Recognizing this, the profession has adopted standards that are general in nature and this document is intended to be a dynamic statement. This general format was favored over a more prescriptive approach that would be difficult to maintain in a changing environment. Listing specific areas within these standards does not necessarily exclude other, new, or emerging areas.^{8,13}

The standards focus on the dynamic nature of the health care delivery system in that the standards are adaptable not only to the area of practice but also the

locality of practice and institutional needs. While a minimum standard of acceptable performance is appropriate and should be followed by all practitioners in a specific area, it is inappropriate to assume that professional practice is the same in all regions of the United States and abroad. In the United States, state statute or regulation or, internationally, national statute or regulation may dictate practice parameters. To conduct an appropriate review of the standards, one must look to the professional standard as well as local, state or national laws that may impact the nature and scope of practice.^{1,8,13}

Professionals who use this document must be aware of state and federal laws affecting their practice as well as institutional policies and guidelines. The intent is not to supersede these laws or affect the interpretation or implementation of such laws. It may serve, however, as a model for the development or modification of licensure laws.

Format

The standards are divided into three sections: clinical performance, quality performance and professional performance.

Clinical Performance Standards. The clinical performance standards define the activities of the practitioner in the care of patients and delivery of therapeutic treatment planning by incorporating patient assessment and management with procedural analysis, performance, and evaluation.

Quality Performance Standards. The quality performance standards define the activities of the practitioner in the technical areas of performance including equipment and material assessment, safety standards, and total quality management.

Professional Performance Standards. The professional performance standards define the activities of the practitioner in the areas of education, interpersonal relationships, personal and professional self-assessment, and ethical behavior.

Each section of the standards is subdivided into individual standards. These follow a sequence of events required during the course of performing that entire section being described. The standards are numbered followed by a term or set of terms that identify the standards. The next statement is the expected performance of the practitioner when performing the procedure or treatment. A rationale

statement follows and explains why a practitioner should adhere to the particular performance standard.

Criteria. Criteria are used in evaluating a practitioner's performance. Each set of criteria is divided into two parts, the general criteria and the specific criteria. Both the measurement and specific criteria should be used when evaluating performance.

General Criteria. General criteria are written in a general style that could apply to other areas of medical imaging and radiation oncology besides medical dosimetry and should be used in the appropriate area of practice.

Specific Criteria. The specific criteria are drafted to identify specific areas that may be available to medical dosimetrists.

A profession's standards of practice serve as a guide for appropriate practice. Standards provide role definition for practitioners that can be used by individual facilities to develop job descriptions and practice parameters. Those outside the medical dosimetry community can use the standards as an overview of the role and responsibilities of the practitioner as defined by the profession.¹

Standards of Practice for the Medical Dosimetrist

Preamble

The medical dosimetry profession is committed to providing an optimal level of service delivery and to striving for excellence in practice. These Standards are the profession's statement of conditions and performances that are essential for provision of high quality medical dosimetry. The Standards provide a foundation for assessment of medical dosimetry practice.¹⁴

MEDICAL DOSIMETRY CLINICAL PERFORMANCE STANDARDS

Standard One - Assessment

The practitioner collects pertinent data concerning the patient and the procedure.

Rationale

Information related to the patient's health status is essential in providing appropriate imaging and therapeutic services.

General Criteria

The practitioner:

1. Uses consistent and appropriate techniques to gather relevant information from the medical record, significant others, and health care providers. The collection of information is determined by the patient's needs or condition.
2. Reconfirms patient identification and verifies the procedure requested or prescribed.
3. Determines whether the patient has been appropriately prepared for the procedure.
4. Assesses factors that may contraindicate the procedure, such as medications, insufficient patient preparation, or artifacts.

Specific Criteria

The practitioner:

1. Researches and analyzes the patient's previous radiation treatment history.
2. Assesses the patient's need for information, reassurance, and privacy.
3. Reviews the patient's risk for allergic reaction to contrast material prior to administration for simulation.
4. Monitors doses to normal tissues.
5. Recognizes indications of an emergency.

6. Recognizes the patient's need for assessment by other care providers.

Standard Two - Analysis/Determination

The practitioner participates in analyzing the information obtained during the assessment phase and develops an action plan for completing the procedure.

Rationale

Determining the most appropriate action plan enhances patient safety and comfort, optimizes therapeutic quality, and improves cost effectiveness.

General Criteria

The practitioner:

1. Recommends to the radiation oncologist the most appropriate and cost-effective action plan after reviewing all pertinent data and assessing the patient's abilities and condition.
2. Uses his or her professional judgment to recommend changes to imaging and therapeutic procedures to improve therapeutic outcome.
3. Consults appropriate medical personnel when necessary to determine a modified action plan.
4. Recommends the need for accessory equipment.

Specific Criteria

The practitioner:

1. Recommends appropriate immobilization and positioning aids for simulation and treatment.
2. Participates in decisions regarding appropriate simulation techniques and treatment positions.
3. Participates in the reviewing patient treatment and dose records to ensure that treatment does not exceed the prescribed dose or normal tissue tolerance.
4. Recognizes when to contact the physician regarding patient side effects or questions.
5. Recognizes a patient emergency and activates established emergency procedures.
6. Recommends when to withhold treatment until a physician is notified.
7. Gathers pertinent data relevant to the treatment planning and delivery process.

Standard Three - Patient Education

The practitioner provides information about the procedure to the patient, significant others, and health care providers.

Rationale

Communication and education are necessary to establish a positive relationship with the patient, significant others, and health care providers.

General Criteria

The practitioner:

1. Verifies that written consent has been obtained when appropriate.
2. Provides accurate explanations and instructions at an appropriate time and at a level that the patient can understand. Addresses patient questions and concerns regarding the procedure, when appropriate.
3. Refers questions about diagnosis, treatment, or prognosis to the patient's physician.
4. Provides appropriate information to the appropriate individual(s) involved in the patient's care with due consideration of patient confidentiality.

Specific Criteria

The practitioner:

1. Provides information regarding radiation, when appropriate.
2. Instructs patient in the maintenance of treatment field markings.
3. Provides information and instruction on self-care procedures.
4. Anticipates a patient's need for information and provides it, as necessary.

Standard Four - Implementation

The practitioner implements the action plan.

Rationale

Quality patient services are provided through the safe and accurate implementation of a deliberate plan of action.

General Criteria

The practitioner:

1. Participates in the implementation of an action plan that falls within established protocols, guidelines, and physician directives.
2. Elicits the cooperation of the patient to carry out the action plan.
3. Uses an integrated team approach, as needed.
4. Recommends modification to the action plan according to changes in the

clinical situation.

5. Activates established emergency policies.
6. Uses accessory equipment when appropriate.

Specific Criteria

The practitioner:

1. Designs and fabricates individualized immobilization, custom blocks, and other beam modifying devices, as prescribed.
2. Assists the radiation oncologist in determining the optimum field arrangement(s) to cover the volume of interest.
3. Prepares and positions the patient for simulation and treatment using appropriate positioning aids and immobilization devices.
4. Creates, processes, and identifies simulation radiographs/images appropriately.
5. Ensures the radiation oncologist approves the simulation radiographs/images.
6. Simulates, plans, and implements the treatment as directed and prescribed by the radiation oncologist.
7. Calculates the treatment unit settings and doses to various points of interest evaluating all variables.
8. Reviews portal films and recommends change, as necessary.
9. Monitors the patient visually and aurally, as needed.
10. Derives a manual or computer generated brachytherapy treatment plan per physician written directive.
11. Prepares, transports, loads, and removes radioisotopes as directed by appropriate personnel.
12. Determines decay factors and calculates the treatment time to deliver the prescribed dose.
14. Monitors the treatment console during treatment, as needed.
15. Demonstrates knowledge of biological effects of ionizing radiation on tissue and minimizes radiation dose to normal tissues.

Standard Five - Evaluation

The practitioner assesses whether the goals of the action plan have been achieved.

Rationale

Careful examination of the procedure is important to determine that all goals have been met.

General Criteria

The practitioner:

1. Evaluates the patient and procedure to identify variances that may affect patient wellbeing. The evaluation process should be timely, accurate, and comprehensive.
2. Measures the procedure against established protocols, guidelines, and physician directives.
3. Identifies any exceptions to the expected outcome.
4. Documents any exceptions clearly and completely.
5. Recommends and develops a revised action plan to achieve the intended outcome, as necessary.
6. Disseminates reasons for revisions to all team members.

Specific Criteria

The practitioner:

1. Checks the treatment calculations.
2. Verifies the accuracy of the patient setup prior to treatment delivery as necessary.
3. Verifies treatment console readouts and settings prior to initiating treatment and upon termination of treatment, as needed.
4. Evaluates the patient for any untoward effects, reactions, and therapeutic responses as directed by the quality assurance program, physician, or medical physicist.

Standard Six - Implementation of Revised Action Plan

The practitioner implements the revised action plan.

Rationale

It may be necessary to make changes to the action plan to achieve the intended outcome.

General Criteria

The practitioner:

1. Develops the revised plan to achieve the intended outcome per physician directive.
2. Recommends action based on patient and procedural variances.
3. Notifies the appropriate radiation oncology team member(s) of changes in procedures and patient condition.

Specific Criteria

The practitioner:

1. Reports deviations from the standard or planned treatment to appropriate persons.
2. Monitors changes in treatment parameters and recommends modifications, as needed.
3. Develops additional treatment plans when necessary to achieve an optimal dose distribution, as prescribed.
4. Adapts procedures to equipment limitations and patient needs.
5. Collaborates with radiation oncologists, medical physicists, and radiation therapists to compensate for treatment inaccuracies.

Standard Seven - Outcomes Measurement

The practitioner reviews and evaluates the outcome of the procedure.

Rationale

To evaluate the quality of care, the practitioner compares the actual outcome with the intended outcome.

General Criteria

The practitioner:

1. Reviews the appropriate therapeutic process data for completeness and accuracy.
2. Determines whether the actual outcome is within established criteria.
3. Evaluates the process and recognizes opportunities for future changes.

Specific Criteria

The practitioner:

1. Monitors the appropriate therapeutic data throughout the therapy process.
2. Recommends appropriate policy and procedural changes based on outcome measurements.

Standard Eight - Documentation

The practitioner documents information about patient care, the procedure(s), and outcomes.

Rationale

Clear and precise documentation is essential for continuity of care, accuracy of care, and quality assurance.

General Criteria

The practitioner:

1. Documents data for the therapeutic process in the appropriate record.
Documentation must be timely, accurate, concise, and complete.
2. Documents any exceptions from the established criteria or procedures.

Specific Criteria

None added.

MEDICAL DOSIMETRY QUALITY PERFORMANCE STANDARDS

Standard One - Development

The practitioner participates in the development of a quality management program.

Rationale

The development of a quality management program is necessary to ensure safe and effective radiation oncology services.

General Criteria

The practitioner:

1. Participates in the development of a departmental quality management program.
2. Participates in the review and update of the departmental quality management program according to established protocols.

Specific Criteria

The practitioner:

1. Participates in the development of a chart check protocol for reviewing treatment delivery.
2. Reviews and updates the policy and procedure manuals according to established protocols.
3. Participates in the development of safety guidelines for the facility.

Standard Two - Assessment

The practitioner collects pertinent information regarding equipment, the procedures, and the work environment.

Rationale

The planning and provision of safe and effective medical services relies on the collection of pertinent information about equipment, procedures, and the work environment within guidelines established by a medical physicist.

General Criteria

The practitioner:

1. Follows established safety procedures.
2. Confirms with the medical physicist that equipment maintenance and operation comply with established guidelines.
3. Assesses equipment to determine acceptable performance based on established guidelines by the medical physicist.
4. Participates in the review and revision of protocol and procedure manuals to include recommended criteria.

Specific Criteria

The practitioner:

1. Reviews the accuracy and completeness of written radiation treatment prescription.
2. Examines charts for correct documentation of treatment.
3. Observes the environment for any potential radiation hazards and/or defective accessory devices and reports any unsafe conditions according to the accepted quality management procedure.
4. Recognizes emergency situations and activates an appropriate response.
5. Participates in patient dose calculation and radiation therapy chart reviews.

Standard Three - Analysis/Determination

The practitioner analyzes information collected during the assessment phase and determines whether changes need to be made to equipment, procedures, or the work environment under the guidelines established by the radiation oncologist and medical physicist.

Rationale

Determination of acceptable performance is necessary for the provision of safe and effective services.

General Criteria

The practitioner:

1. Assesses whether services, procedures, and environment meet or exceed established guidelines.
2. Evaluates equipment to determine if it meets or exceeds established standards.
3. Analyzes information collected during the assessment phase to determine whether optimal services are being provided.

Specific Criteria

The practitioner:

1. Verifies the mathematical accuracy of the prescription and the daily treatment summary.
2. Verifies proper functioning of radiation monitors.
3. Identifies potential radiation hazards.
4. Ensures that treatment charts have been checked and calculations verified before treatment delivery.
5. Participates in the review of treatment and prescription deviations.

Standard Four - Education

The practitioner informs the patient, public, and other health care providers regarding procedures, equipment and facilities.

Rationale

Open communication promotes safe practices.

General Criteria

The practitioner:

1. Elicits confidence and cooperation from the patient, the public, and other health care providers by providing timely communication and effective instruction.
2. Presents explanations and instructions at the learner's level of understanding and learning style.

Specific Criteria

The practitioner:

1. Informs the patient and their significant others about appropriate and essential uses of radiation and corrects misconceptions.
2. Participates in instructing other health care providers about radiation protection procedures.

3. Provides technical mentorship to other medical dosimetrists in treatment planning processes and procedures.
4. Instructs personnel on the use of thermoluminescent dosimeters (TLDs), diodes, or other systems to verify patient dose by measurement using procedures established by a medical physicist.
5. Participates in the proper training of users of the treatment planning system.

Standard Five - Performance

The practitioner performs quality assurance activities or acquires information on equipment and materials following guidelines established by a medical physicist.

Rationale

Quality assurance activities provide valid and reliable information regarding the performance of materials and equipment.

General Criteria

The practitioner:

1. Performs quality assurance activities based on established protocols.
2. Provides evidence of ongoing quality assurance activities.

Specific Criteria

The practitioner:

1. Adheres to radiation safety rules and standards at all times.
2. Performs quality assurance testing on equipment, as directed.
3. Verifies accuracy of beam modification devices, as directed.
4. Reports any treatment deviations, according to established procedures.
5. Determines the need to withhold a patient's treatment until the appropriate personnel is/are notified.
6. Verifies the accuracy of patient parameters used in the treatment planning process.
7. Uses radiation detecting equipment appropriately.
8. Demonstrates safe handling and storing of brachytherapy sources.
9. Reviews treatment planning data.
10. Verifies treatment plan implementation.
11. Performs quality assurance on the treatment planning system, as directed.
12. Performs special dosimetry on a patient at the physician's request.
13. Verifies that informed consent has been obtained.
14. Verifies calculations of monitor unit or timer settings by an independent method.

15. Performs quality assurance on radioactive materials, as directed.
16. Accepts appointment as Radiation Safety Officer or Chairperson of the Radiation Safety Committee in accordance with regulatory agencies and institutional policy.
17. Performs and documents area surveys during and after brachytherapy procedures according to guidelines established by a medical physicist.

Standard Six - Evaluation

The practitioner evaluates quality assurance results and establishes an appropriate action plan based on established guidelines.

Rationale

Materials, equipment, and procedure safety depend on ongoing quality assurance activities that evaluate performance based on established guidelines.

General Criteria

The practitioner:

1. Compares quality assurance results to established acceptable values.
2. Verifies quality assurance testing conditions and results.
3. Formulates an action plan following review of test results.

Specific Criteria

The practitioner:

1. Assesses the chart review procedure according to established protocols.
2. Assesses patient immobilization procedures.
3. Critiques beam shaping and beam modification device manufacturing procedures.
4. Evaluates the treatment planning process.
5. Participates in evaluation processes for other areas within the department/facility.

Standard Seven - Implementation

The practitioner implements the quality management action plan according to established guidelines.

Rationale

Implementation of a quality management action plan is imperative for quality diagnostic and therapeutic procedures and patient care.

General Criteria

The practitioner:

1. Obtains assistance from appropriate personnel to implement the quality management action plan.
2. Implements appropriate aspects of the quality management action plan.

Specific Criteria

The practitioner:

1. Recommends or takes appropriate action in response to the results of quality management procedures.
2. Implements and/or supervises the appropriate aspects of the quality management program.

Standard Eight - Outcomes Measurement

The practitioner assesses the outcome of the quality management action plan in accordance with established guidelines.

Rationale

Outcomes assessment is an integral part of the ongoing quality management plan to enhance diagnostic and therapeutic services.

General Criteria

The practitioner:

1. Reviews the quality management plan for reliability and validity.
2. Reviews safety issues related to equipment and materials performance under established guidelines of a medical physicist.
3. Participates in implementation of a modified action plan when testing results are not in compliance with guidelines.

Specific Criteria

The practitioner:

1. Participates in the evaluation of quality assurance tools and instruments periodically for effectiveness.
2. Recommends or takes appropriate action in response to the results of quality procedures.

Standard Nine - Documentation

The practitioner documents quality management activities and results.

Rationale

Documentation provides evidence of quality management activities designed to enhance the safety of patients, the public, and health care providers during diagnostic and therapeutic services.

General Criteria

The practitioner:

1. Maintains documentation of quality management activities, procedures, and results in accordance with established guidelines.
2. Provides timely, concise, accurate, and complete documentation.
3. Provides documentation that adheres to current protocol, policy, and procedures.

Specific Criteria

The practitioner:

1. Documents outcomes and reports results to appropriate personnel.
2. Reports equipment malfunctions or abnormal quality assurance readings.
3. Maintains records of clinical data and treatment technique for statistical analyses.
4. Maintains logs related to radioactive sources.
5. Administers (distributes, collects, and documents) the personnel radiation monitoring program under the supervision of a medical physicist.
6. Performs and documents area surveys during and after brachytherapy procedures, as directed.
7. Documents changes in the prescribed course of treatment, as appropriate.

MEDICAL DOSIMETRY PROFESSIONAL PERFORMANCE STANDARDS

Standard One - Quality

The practitioner strives to provide optimal care to all patients.

Rationale

All patients expect and deserve optimal care during the radiation oncology process.

General Criteria

The practitioner:

1. Works with others to evaluate the quality of care.
2. Participates in quality management programs.
3. Adheres to the accepted standards, policies, and procedures adopted by the profession and regulated by law.
4. Evaluates the prescribed objective and develops plan(s) for therapeutic treatment, applying professional judgment and discretion.

Specific Criteria

None added.

Standard Two - Self-Assessment

The practitioner evaluates personal performance, knowledge, and skills.

Rationale

Self-assessment is an important tool in professional growth and development.

General Criteria

The practitioner:

1. Monitors personal work ethics, behaviors, and attitudes.
2. Monitors and evaluates facility orientation guidelines and recommends improvements or changes, as needed.
3. Evaluates performance and recognizes opportunities for improvement.
4. Recognizes his or her strengths and uses them to benefit patients, coworkers, and the profession.
5. Performs procedures only after receiving appropriate education and training.
6. Recognizes and takes advantage of opportunities for educational growth and improvement in technical and problem-solving skills.
7. Actively participates in professional societies and organizations.

Specific Criteria

None added.

Standard Three - Education

The practitioner acquires and maintains current knowledge in clinical practice.

Rationale

Advancements in medical science require enhancement of knowledge and skills through education.

General Criteria

The practitioner:

1. Demonstrates completion of the appropriate education related to clinical practice.
2. Seeks appropriate credentials and certification related to clinical practice.
3. Participates in continuing educational activities to enhance knowledge, skills, and performance.
4. Shares knowledge and expertise with others.

Specific Criteria

None added.

Standard Four - Collaboration and Collegiality

The practitioner promotes a positive, collaborative practice atmosphere with the other members of the health care team.

Rationale

To provide quality patient care, all members of the health care team must communicate effectively and work together efficiently.

General Criteria

The practitioner:

1. Shares knowledge and expertise with colleagues, peers, students, and all members of the health care team.
2. Develops collaborative partnerships with other health care providers in the interest of therapeutic quality, cost effectiveness, and safety.

Specific Criteria

The practitioner:

1. Integrates with other members of the radiation oncology team.
2. Develops relationships with other disciplines for integrated cancer management.

Standard Five - Ethics

The practitioner adheres to the profession's accepted Code of Ethics.

Rationale

All decisions and actions made on behalf of the patient are based on a sound ethical foundation.

General Criteria

The practitioner:

1. Provides health care services with respect for the patient's dignity and age specific needs.
2. Acts as a patient advocate supporting patient's rights.
3. Takes responsibility for professional decisions.
4. Delivers patient care and service without bias based on personal attributes, nature of the disease, disability, race, color, religion, creed, age, gender, national origin, ancestry, or any other protected classification under state or federal law.
5. Respects the patient's rights to privacy and confidentiality.
6. Adheres to the established practice standards of the profession.

Specific Criteria

None added.

Standard Six - Exploration and Investigation

The practitioner participates in the acquisition, dissemination, and advancement of the professional knowledge base.

Rationale

Scholarly activities such as research, scientific investigation, presentation, and publication advance the profession and thereby improve the quality and efficiency of patient services.

General Criteria

The practitioner:

1. Reads and critically evaluates research in diagnostic and therapeutic services.
2. Investigates new, innovative methods, and applies them in practice.
3. Participates in data collection and clinical research compliance.
4. Shares information with colleagues through publication, presentation, and collaboration.
5. Pursues lifelong learning.

Specific Criteria

None added.

Medical Dosimetry Glossary

Accountability – “The readiness or preparedness to give an explanation or justification to relevant others (stakeholders) for one's judgments, intentions, acts and omissions when appropriately called upon to do so.”¹⁵

Action Plan – “A documented strategy for solving a problem.”¹⁶

Artifacts - Markings on a radiograph/image that are foreign to the image.

Beam Modifier - Anything that is placed in the path of a radiation beam whose purpose is to alter the beam. The term, as used in this document, includes devices such as blocks, compensators, wedges, multileaf collimators, beam degraders and bolus.

Blocks - Devices used to shape radiation treatment fields. Frequently made of lead or alloys, blocks shield normal tissues or structures from being irradiated.

Brachytherapy - Radiation therapy treatment using radioactive sources inserted directly in or on the tumor site.

Cancer - A group of diseases characterized by abnormal cellular proliferation with the ability to metastasize.

Clinical - Pertaining to or founded on actual observation and treatment of patients.

Competency - Having the ability to perform a specific task.

Contrast material (media) - High or low atomic number substances used to radiographically visualize internal structures or anatomy, such as barium or air.

Disease - A disorder or abnormal condition having a characteristic train of symptoms that may affect the whole body or any of its parts. Its etiology, pathology, and prognosis may be known or unknown.

Dose rate - A measure of the quantity of radiation delivered during a period of time.

Evaluate - Quality assessment of the preliminary data collection.

Guidelines - Established mandatory or recommended standards or principles of care published by agencies and professional organizations.

Medical Dosimetrist - Member of the radiation oncology team responsible for participating in the development and implementation of treatment plans and calculating radiation doses to the tumor and surrounding normal tissues.

Outcome – The result of the performance (or nonperformance) of a function(s) or process(es).¹⁷

Portal films - Radiographic documentation of the treatment area made using the treatment unit; can be film or electronic format.

Practitioner - Any individual practicing in a specific area or discipline. The profession believes that any individual practicing in this discipline should be held to a minimum standard of performance to protect the patients who receive professional services.

Quality assurance – Also “quality assessment” - All those planned or systematic actions necessary to provide confidence that a product or service will satisfy given requirements for quality.¹⁸

Quality management - Activities to determine the quality of care, to develop and maintain programs to keep it at an acceptable level of quality, to institute improvements when the opportunity arises or the care does not meet the desired standard of care, and to provide evidence that the desired level of quality is being maintained.¹⁷

Radiation oncology - The field of cancer medicine which deals with the management and treatment of cancer patients, primarily with ionizing radiation.

Radiation protection - Procedures followed to prevent inappropriate or accidental irradiation of patient, public, and health care professionals.

Radiation therapist - see Practice Standards for Medical Imaging and Radiation Therapy, ASRT 1998.¹

Radiation therapy – The treatment of disease by ionizing radiation.

Radiation therapy process - The development of a radiation treatment plan by the radiation oncology team which involves clinical evaluation, simulation, treatment dose planning, patient evaluation during treatment, and follow up of the patient that is receiving ionizing radiation therapy.

Simulation - An initial procedure in planning a course of radiation therapy. It is performed to obtain patient anatomical information through imaging methods; this information is utilized to determine the optimum treatment parameters. It also may involve the radiographic documentation of the treatment fields.

Treatment course - A patient's planned program of radiation treatment from simulation to the final treatment.

Treatment field (port, portal) - Volume exposed to radiation from a single radiation beam.

Treatment planning process - Encompasses procedures involved in planning a course of radiation treatment; includes simulation through the completion of the treatment summary.

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