

**Final review by the ACMP Standards Committee, and incorporation of comments  
received from the Board of Chancellors**

*Feb 2002*

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**AMERICAN COLLEGE OF MEDICAL PHYSICS**

**SCOPE OF PRACTICE OF MEDICAL PHYSICS**

**ORGANIZATIONAL AND LEGAL STATEMENT**

The American College of Medical Physics (ACMP) is a non-profit organization of medical physicists whose purpose is to enhance the quality of medical physics practice and promote its continued competence. To this purpose, the ACMP periodically will define new standards for medical physics practice in order to improve the quality of patient care. These standards recognize that the safe and effective practice of medical physics requires specific training, skills, and techniques as described in each standard.

Each standard, as a policy statement by the ACMP, has undergone a thorough consensus process in which it has been subjected to extensive review, requiring the approval of the Standards Committee, the Commission on Professional Practice, and the ACMP Board of Chancellors. Existing standards will be updated and modified, as appropriate, no later than on the fifth anniversary of their publication.

Standards generated by the ACMP are practice guiding principles for the Qualified Medical Physicist. They are designed to support the Qualified Medical Physicist in the achievement of quality patient care. Standards may be exceeded by a Qualified Medical Physicist in a particular practice situation or for an individual patient, depending on patient need and available resources. These standards should not be deemed inclusive of all proper methods of care or exclusive of other methods of care reasonably directed toward obtaining the same results. The ultimate judgment regarding the propriety of any specific procedure or course of conduct must be made by the Qualified Medical Physicist in light of all circumstances presented by the individual situation. Adherence to standards will not necessarily assure a successful outcome in every situation. It is prudent, however, to document the rationale for any deviation from applicable standards in the facility's policies and procedures manual or in the patient's medical record.

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individual or entity other than the ACMP is not authorized, without the expressed permission of the ACMP.

## INTRODUCTION

The Scope of Practice of Medical Physics has not been specifically addressed as a standard previously. This may allow for possible misinterpretation of proper medical physics practice or the inappropriate approval of improper medical physics practice by regulatory or advisory organizations. Since the practice of medical physics by unqualified individuals could represent a threat to public welfare, this Standard is promulgated.

## STATEMENT OF BASIC RESPONSIBILITY

The essential responsibility of the Qualified Medical Physicist's clinical practice is to assure the optimum use of radiation to produce a stated diagnostic or therapeutic outcome. This responsibility includes: protection of the patient and others from potentially harmful or excessive radiation; establishment of adequate protocols to ensure accurate patient dosimetry; the measurement and characterization of radiation; the specification of dose delivered; development and direction of quality assurance programs; and assistance to the practitioner in optimizing the balance between the beneficial and deleterious effects of radiation.

## DEFINITIONS AND EXPLANATIONS

The term Medical Physics means that branch of physics that is associated with the practice of medicine. The term Medical Physics, as it is used here, includes radiological physics, therapeutic radiological physics, diagnostic imaging physics, medical nuclear physics and medical health physics.

Radiation includes both ionizing and non-ionizing radiation such as electromagnetic radiation, particulate radiation, and sonic radiation. These modalities, used for diagnostic or therapeutic purposes when prescribed by a properly qualified practitioner, are herein described as radiological procedures.

The Practice of Medical Physics means the use of principles and accepted protocols of physics to assure the correct quality, quantity, and placement of radiation during the performance of a radiological procedure. The term practice includes: radiation beam calibration and characterization; equipment quality assurance and radiological operations quality management; instrument and device specification; acceptance testing and commissioning; image quality assessment and optimization of imaging systems and processes; shielding design and protection analysis on radiation-emitting equipment and radiopharmaceuticals; determination of dose delivered to patients and others exposed to radiation; consultation and treatment planning with practitioners to

determine dose to be delivered; consultation with practitioners to assure accurate radiation dose to a specific patient; and consultation intended to provide patient, staff, and /or general public radiation safety. Proper medical physics practice may include the actual performance of the activities or their establishment and supervision under appropriate circumstances.

Practitioner means a doctor of medicine, osteopathy, podiatry, dentistry, or chiropractic who is licensed to practice their medical specialty and who either prescribes or utilizes radiological procedures for other persons.

Quality Assurance consists of activities designed to assure adequate quality, precision and accuracy in the uses of radiation and reproducibility of the procedures and systems used. Quality Assurance may be especially important in retrospective dose determinations for workers and patients or fetal dose determinations and hence must be properly viewed as part of the practice of medical physics.

## PROFESSIONAL QUALIFICATIONS

The primary qualification for the practice of Medical Physics is certification in the appropriate sub-field by the American Board of Medical Physics, the American Board of Radiology, the Canadian College of Physicists in Medicine or the American Board of Science in Nuclear Medicine. In the case of Mammography physics, while lesser qualifications are acceptable under Federal Law [1020 CFR 900.12(a)(3)], certification in the appropriate medical physics sub-field, and state licensure, in those states in which licensure exists, is the appropriate qualification for the designation of a Qualified Medical Physicist (adopted July 17, 1986; revised May 1, 1993, revised November 29, 1999). Certification by the American Board of Health Physics is an acceptable qualification for the practice of Medical Health Physics.

Other professionals, such as service engineers or State or Federal inspectors, may perform some of the assessments often accomplished by medical physicists. Their activity, however, should not be considered to be the same as the practice of a qualified medical physicist and in particular, the results of their measurements should not be interpreted to mean that the equipment is radiologically safe, effective or suitable for use on human beings.

## SPECIFICS OF PRACTICE

This document summarizes the tasks for which medical physicists are uniquely qualified. Particular duties and specifications describing the scope of medical physics practice are described in greater detail in specific published standards (e.g. ACMP ,ACR, ACRO, etc.). A scope of practice consistent with the

aforementioned standards for the different sub-specialties of medical physics is offered in the following.

#### For Diagnostic Medical Physics

- Development of specifications for imaging equipment and diagnostic radiation detectors
- Development of procedures for the initial and continuing evaluation of imaging equipment and diagnostic radiation detectors
- Provision of evidence of compliance of imaging equipment with regulatory and accreditation agency rules and recommendations
- Imaging and other associated equipment acceptance testing
- Measurement and characterization of medical radiation from imaging equipment prior to clinical utilization
- Performance of acceptance testing and evaluation of imaging computer systems, their algorithms, data, and output
- Evaluation of radiological imaging procedures prior to clinical use
- Development and/or evaluation of policies and procedures related to the appropriate clinical use of radiation for imaging purposes
- Review of diagnostic imaging dosimetry information noted in patient records
- Development and management of a comprehensive Quality Management Program that monitors and evaluates critical imaging equipment and processes and strives to optimize them
- Development and/or evaluation of a comprehensive clinical radiation safety program in diagnostic imaging
- Provision of consultation on patient or personnel radiation dose and associated risks
- Provision of diagnostic imaging physics training
- Provision of consultation to assure an optimized balance between image quality and patient dose

#### For Medical Nuclear Physics

- Development of nuclear imaging and radioactivity measurement equipment specifications
- Development of procedures for the initial and continuing evaluation of nuclear imaging and radioactivity measurement equipment
- Development and/or evaluation of nuclear imaging techniques, algorithms, and methods for data analysis
- Provision of evidence of compliance of nuclear imaging and radioactivity measurement equipment with regulatory and accreditation agency rules and recommendations
- Nuclear imaging and radioactivity measurement equipment acceptance testing

- Measurement and characterization of medical radiation from radiopharmaceuticals prior to clinical utilization
- Performance of acceptance testing and evaluation of nuclear imaging computer systems, their algorithms, data, and output
- Evaluation of nuclear imaging and radioactivity measurement procedures prior to clinical use
- Development and/or evaluation of policies and procedures related to the appropriate clinical use of radiation for nuclear imaging and/or radioactivity measurement purposes
- Review of radiopharmaceutical dosimetry information noted in patient records
- Development and management of a comprehensive Quality Management Program that monitors and evaluates critical nuclear imaging and radioactivity measurement equipment and processes and strives to optimize them
- Development and/or evaluation of a comprehensive clinical radiation safety program in nuclear medicine
- Provision of consultation on patient or personnel radiation dose and associated risks
- Provision of medical nuclear physics training
- Provision of consultation to assure an optimized balance between image quality and patient dose

#### For Therapeutic Radiological Physics

- Development of equipment specifications for radiation therapy treatment, brachytherapy, simulation, and therapeutic radiation detection
- Development of procedures for the initial and continuing evaluation of radiation therapy treatment, brachytherapy, simulation, and therapeutic radiation detection equipment
- Provision of evidence of compliance of equipment for radiation therapy treatment, brachytherapy, simulation, and therapeutic radiation detection, with regulatory and accreditation agency rules and recommendations
- Acceptance testing of radiation therapy treatment, brachytherapy, simulation, and therapeutic radiation detection equipment
- Measurement and characterization of medical radiation from radiation therapy treatment, brachytherapy, and simulation equipment prior to clinical utilization
- Performance of acceptance testing and evaluation of radiation oncology computer systems, their algorithms, data, and output
- Evaluation of radiation oncology technical procedures prior to clinical use
- Development and/or evaluation, in conjunction with the practitioner, of policies and procedures related to the appropriate therapeutic use of radiation
- Review of radiation oncology dosimetry information noted in patient records
- Development and management of a comprehensive Quality Management Program that monitors and evaluates critical radiation oncology equipment and processes and strives to optimize them

- Development and/or evaluation of a comprehensive clinical radiation safety program in radiation oncology
- Provision of consultation on patient or personnel radiation dose and associated risks
- Provision of radiation oncology physics and dosimetry training
- Provision of consultation to assure accurate radiation dose delivery

#### For Medical Health Physics

- Planning and specification of thickness, material, and placement of shielding needed to protect workers, patients, and the general public from radiation produced incident to diagnosis or treatment of humans
- Initial assessment and evaluation of installed shielding designed to protect workers, patients, and the general public from radiation produced incident to diagnosis or treatment of humans
- Development of radiation protection equipment specifications
- Development of procedures for the initial and continuing evaluation of radiation protection equipment and procedures
- Provision of evidence of compliance of radiation protection devices, facilities, policies and procedures with regulatory and accreditation agency rules and recommendations
- Acceptance testing of radiation protection equipment, devices and facilities
- Performance of acceptance testing and evaluation of radiation protection computer systems, their algorithms, data, and output
- Evaluation of radiation safety procedures prior to use
- Development and/or evaluation of policies and procedures related to the safe use of radiation
- Development and/or evaluation of an applicable radiation safety program
- Consultation to determine presence and extent of any radiological hazard resulting from the use of ionizing radiation or radioactivity in treatment or diagnosis of human beings including provision and interpretation of surveys required, and evaluation of compliance with appropriate regulatory and accreditation bodies
- Consultation consisting of the evaluation or assessment of the radiation safety aspects of an institution's policies or procedures, when such evaluation or assessment provides recommendations regarding dose equivalent assessment, the overall radiation safety afforded to individuals, or the compliance of the policies or procedures with either state or federal regulations.