GHANA SOCIETY FOR MEDICAL PHYSICS

[G S M P]

Promoting the Application of Physics to Medicine and Biology

SCOPE OF PRACTICE FOR MEDICAL PHYSICISTS

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Statement of Basic Responsibility

This Scope of Practice is designed by Ghana Society for Medical Physics (GSMP) to support the Qualified Medical Physicist in the achievement of quality patient care. Guidelines 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 guidelines 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.

The essential responsibility of the Qualified Medical Physicist's clinical practice is to assure the safe and effective delivery of radiation to achieve a diagnostic or therapeutic result as prescribed in patient care. The medical physicist performs or supervises the pertinent procedures necessary to achieve this objective. The responsibilities of the medical physicist include: 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 determination of delivered dose; advancement of procedures necessary to ensure image quality; development and direction of quality assurance programs; and assistance to other health care professionals in optimizing the balance between the beneficial and deleterious effects of radiation.

DEFINITIONS AND EXPLANATIONS

Medical Physics is 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.

Medical 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.

Qualified Medical Physicist is an individual who is competent to practice independently in one or more of the subfields of medical physics.

Medical Dosimetrist is a member of the radiation oncology team who has knowledge of the overall characteristics and clinical relevance of radiation oncology treatment machines and equipment, is cognizant of procedures commonly used in brachytherapy and has the education and expertise necessary to generate radiation dose distributions and dose calculations in collaboration with the medical physicist and radiation oncologist.

Nuclear Medicine Physician is a medical specialist that uses tracers, usually radiopharmaceuticals, for diagnosis and therapy.

Biomedical Engineer is one with knowledge in the application of engineering principles and design concepts to medicine and biology for healthcare purposes (e.g. diagnostic or therapeutic).

Radiation oncologist is a specialist physician who uses ionizing radiation (such as megavoltage X-rays or radionuclides) in the treatment of cancer. Radiation oncology is one of the three primary specialties, the other two being surgical and medical oncology, involved in the treatment of cancer.

Radiologists are medical doctors or doctors of osteopathic medicine who specialize in diagnosing and treating diseases and injuries using medical imaging techniques, such as x-rays, computed tomography, magnetic resonance imaging, nuclear medicine, positron emission tomography and ultrasound.

Radiographer is an important member of the diagnostic health care team. They are responsible for producing high quality medical images that assist medical specialists and doctors to diagnose or monitor a patient's injury or illness.

PROFESSIONAL QUALIFICATIONS

The primary qualification for the practice of Medical Physics is certification in the appropriate sub-field by the GSMP.

Other professionals, such as service engineers or inspectors from the Nuclear Regulatory Authority of Ghana, Radiation Protection Institute, and Radiological and Medical Sciences Research Institute of Ghana Atomic Energy Commission, may perform some of the assessments often accomplished by medical physicists. Their activity, however, should not be considered to be a substitute for the activities provided by 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. Additionally, medical physicists participate in many procedures in the clinic not listed here, depending on the specifics of clinic operation. A scope of practice consistent with the aforementioned practice guidelines for the different sub-specialties of medical physics is outlined in the following. In every case, the medical physicist is an essential member of the patient care team that includes Radiologists, Nuclear Medicine Physicians, Radiation Oncologists, Physicians, Nurses, Radiologic Technologists, Radiographers, Medical Dosimetrists, Biomedical Engineers and QA personnel. In every case, the medical physicist subscribes to ethical guidelines outlined by the professional society GSMP.

Further, the qualified medical physicist as defined above may serve in the capacity of the Institutional Radiation Safety Officer as appropriate.

For Diagnostic Radiology 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.
- Measurement and characterization of medical radiation from imaging equipment prior to clinical utilization.
- Acceptance testing, evaluation and commissioning of imaging equipment and/or their associated computer systems, algorithms, data, and output.
- 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, evaluates, and optimizes imaging processes.
- 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 for medical practitioners and other health-care providers.
- Provision of consultation to assure an optimized balance between image quality and patient dose.
- Provision of institutional consultation on program development in diagnostic imaging.
- Planning and specification of thickness, material, and placement of shielding needed to protect patients, workers, the general public and the environment from radiation produced incident to diagnosis or treatment of humans.

- Assessment and evaluation of installed shielding designed to protect patients, workers, the general public and the environment from radiation produced incident to diagnosis or treatment of humans.
- Involvement in informatics development and direction.
- Other medical applications of physics as appropriate to safely carry out diagnostic radiologic procedures
- Medical Health Physics procedures associated with the practice of Diagnostic Radiology.

For Nuclear Medicine 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.
- Provision of evidence of compliance of nuclear imaging and radioactivity measurement equipment with regulatory, professional and accreditation agency rules and recommendations.
- Measurement and characterization of medical radiation from radiopharmaceuticals prior to clinical utilization.
- Acceptance testing, evaluation and commissioning of nuclear imaging and radioactivity measurement equipment and their associated computer systems, 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, radiopharmaceutical therapy 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, evaluates, and optimizes nuclear imaging, radiopharmaceutical therapy and radioactivity measurement processes.
- 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 institutional consultation on program development in medical nuclear imaging and radiopharmaceutical therapy.
- Provision of medical nuclear physics training for medical practitioners and other health-care providers.
- Provision of consultation to assure an optimized balance between image quality and patient dose.
- Planning and specification of thickness, material, and placement of shielding needed to protect patients, workers, the general public and the environment from radiation produced incident to diagnosis or treatment of humans.
- Assessment and evaluation of installed shielding designed to protect patients, workers, and the general public from radiation produced incident to diagnosis or treatment of humans.
- Involvement in informatics development and direction.
- Other medical applications of physics as appropriate to safely carry out nuclear medicine procedures.
- Medical Health Physics procedures associated with the practice of nuclear medicine.

For Radiotherapy Physics

- Development of equipment specifications for radiation therapy treatment, brachytherapy, simulation, and radiation detection.
- Development of procedures for the initial and continuing evaluation of radiation therapy treatment, brachytherapy, simulation, and radiation detection equipment.
- Provision of evidence of compliance of equipment for radiation therapy treatment, brachytherapy, simulation, and radiation detection, with regulatory and accreditation agency rules and recommendations.
- Measurement and characterization of medical radiation from radiation therapy treatment, brachytherapy, and simulation equipment prior to clinical utilization.
- Acceptance testing, evaluation and commissioning of equipment used for external beam therapy, brachytherapy, simulation, treatment-planning, and radiation detection; acceptance testing and evaluation of their associated computer systems, algorithms, data, and output.
- Evaluation of radiation oncology technical procedures prior to clinical use.
- Development and/or evaluation, in conjunction with the medical practitioner, of policies and procedures related to the appropriate therapeutic use of radiation.
- Development and/or evaluation, with the medical practitioner, of the dosimetric component of patients' treatment plans.
- Review of radiation oncology dosimetry information noted in patient records.
- Development and management of a comprehensive Quality Management Program that monitors, evaluates, and optimizes radiation oncology processes.
- Development and/or evaluation of a comprehensive clinical radiation safety program in radiation oncology.
- Direction of the Radiation Oncology Physics program to include the technical direction of staff responsible for treatment planning, machine maintenance and repair and other physics support staff.
- Provision of consultation on patient or personnel radiation dose and associated risks.
- Provision of radiation oncology physics and radiation dosimetry training for medical practitioners and other health-care providers.
- Provision of consultation to assure accurate radiation dose delivery.
- Provision of institutional consultation on program development in radiation oncology.
- Planning and specification of thickness, material, and placement of shielding needed to protect patients, workers, the general public and the environment from radiation produced incident to diagnosis or treatment of humans.
- Assessment and evaluation of installed shielding designed to protect patients, workers, and the general public from radiation produced incident to diagnosis or treatment of humans.
- Use of imaging procedures as they pertain to the simulation, treatment planning and treatment delivery in therapeutic radiologic procedures.
- Involvement in informatics development and direction.
- Other medical applications of physics as appropriate to safely carry out therapeutic radiologic procedures.
- Medical Health Physics procedures associated with the practice of Therapeutic Radiology.

For Medical Health Physics

- Planning and specification of thickness, material, and placement of shielding needed to protect patients, workers, the general public and the environment from radiation produced incident to diagnosis or treatment of humans.
- Assessment and evaluation of installed shielding designed to protect patients, workers, 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 and commissioning 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.
- Provision of radiation-protection training for medical practitioners, and other health care providers.
- 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 national regulations.