Nigerian Association of Medical Physicists - NAMP -

Competency for Medical-Scientific Expert Domain
Radiation Oncology Medical Physics Speciality

This document is to provide information about the areas that are considered when assessing Competency for the Medical-Scientific Expert Domain, for applications for NAMP Certification an experienced Medical Physicist.

Competency for Medical Scientific Expert Domain

Demonstration of competence in relevant key clinical activities in the following areas is assessed using the following criteria:

i. Scientific knowledge in a medical context
ii. Practical skills in a medical context
iii. Application of relevant theory to novel situations
iv. Scientific judgment and responsibility
v. Provision of high-quality and safe care

Application requirements including evidence of expertise

Please fill in as much detail as possible against each subtopic area specified in the sections of the learning management system (ALEX). Inclusion of evidence to support statements of knowledge and experience is critical for candidates not holding overseas registrations/certifications as outlined in clause 5.2 of the NAMP registration policy. Providing comprehensive information will greatly assist and expedite the assessment of your application.

Separate attachments of reports, presentations, certificates, published papers, or other documents should be included. Evidence must only be from the past 10 years, with more recent experience and evidence given higher weighting on assessment.

Competency for Radiation Oncology Medical Physics Speciality

Demonstration of competence in relevant key clinical activities in the following areas is assessed:

(i) Radiation Safety and Protection
(ii) Dosimetry
(iii) External Beam-Based Treatment
(iv) MV External Beam Treatment Planning
(v) Imaging for Radiation Oncology
(vi) Brachytherapy

For each specified topic there are three possible outcomes:

Acceptable (A)	Candidate meets the knowledge and skills expected of a minimally competent person based on the portfolio assessment.
Not Acceptable (N)	Candidate does not demonstrate the knowledge and skills expected of a minimally competent person.
Revise and resubmit (R)	Candidate has not provided enough evidence for a determination. Ask to revise portfolio in specific areas and resubmit for further consideration. Only a single opportunity to revise and resubmit is available, after the revised material is received a final decision is made, based on the latest submission, about the suitability to proceed to the next phase.

Possible overall outcomes

- Suitable to proceed to Safe to Practice interview.
- Revise and resubmit with more evidence (NB: only one resubmission allowed).
- Refusal (prescribed work – one chance only); Portfolio reassessed following submission of prescribed work.
- Reject (TEAP suggested, with recognition of prior experience as appropriate).
- Dismiss.

Detailed Topic Areas Assessment Criteria

Radiation Safety and Protection

Radiation Oncology <u>Essential</u> Scientific criteria

Practice and advise on radiation protection	
Knowledge	• The principal requirements of radiation protection management • Evaluating compliance processes in radiation protection • Assessing radiation protection risks in relation to medical, occupational, and public exposure to ionizing radiation • Comparing risk information from ethics committees, clinical trial dose and risk assessments for patients undergoing radiation therapy in radiation oncology vs nuclear medicine therapy patients
Perform radiation surveys and compare to design calculations	
Knowledge	• Selection of appropriate radiation protection instrumentation (e.g. survey meter and dosimeters) • Evaluating survey results and providing recommendations
Describe and practice key actions and considerations for radiation incidents and accidents	
Knowledge	• Identifying unsafe situations • The required communication with those involved incidents, including relevant authorities • Determining any dose estimations • Long-term action requirements

Dosimetry

Radiation Oncology Essential Scientific criteria

Describe and practice commissioning or QA for detectors	
Knowledge	• Commissioning or QA for an ion chamber • Commissioning or QA for a dosimeter other than an ion chamber
Describe and practice commissioning or QA for dosimetry systems	
Knowledge	• Commissioning or QA for water tank dosimetry systems • Commissioning or QA for other phantoms or ancillary components
Describe and practice absorbed dose measurement under reference conditions	
Knowledge	• The radiation quality for MV photons and electrons • The cross calibration of ion chambers • Reference dosimetry under reference conditions
Clinically apply measurements in conditions of disequilibrium	
Knowledge	• Perform measurements in conditions of disequilibrium

Radiation Oncology <u>Desirable</u> Scientific criteria

***Note: If clinical experience cannot be shown in this area, then the applicant must provide a brief (1 page) report for each criteria, indicating their understanding of the key components of the topic.*

Describe and practice in-vivo dosimetry for the department**	
Knowledge	• Principles of in-vivo dosimetry and physical properties of suitable in-vivo detectors • The methods for performing in-vivo dosimetry measurements for the department • Interpreting and making clinical recommendations based on in-vivo dosimetry measurements in the department

External Beam-Based Treatment

Radiation Oncology <u>Essential</u> Scientific criteria

Perform and evaluate measurements used for linac acceptance, commissioning, and routine QA	
Knowledge	• Procedures that are used for acceptance, commissioning, and ongoing QA for a linear accelerator • Understanding linac parameters that influence tests used for acceptance, commissioning, ongoing QA and/or patient specific QAE • The dosimetric features of photon and electron beams and the physical principles and metrics for how they are assessed • Measurement equipment requirements, uncertainties and confounding variables for tests used for acceptance, commissioning, ongoing QA and/or patient specific QAE • Connecting the observed measurement deviations for tests used with how they impact the choice of tolerances • Comparing the differing roles of acceptance testing, commissioning and ongoing routine QA and their interrelationships
Manage a linear accelerator for clinical use	
Knowledge	• Recommending requirements for commissioning, ongoing QA programs and testing after fault repair • Evaluating the role and function of quality systems in the linac context including periodic review, incident reporting and feedback

Perform quality assurance procedures for patient positioning, IGRT and motion management techniques and technologies	
Knowledge	• Acceptance, commissioning, and clinical implementation of patient positioning, IGRT and motion management devices • QA tests for patient positioning, IGRT and monitoring systems and recognising the testing required after fault repair
Clinically apply patient positioning, IGRT and motion management strategies	
Knowledge	• Evaluating differences between systematic vs random errors for patient positioning and their relative effect on treatment delivery accuracy • Connecting measurement deviations for QA tests with the tolerances used for patient position and monitoring systems • Connecting IGRT and motion management strategies to the determination of clinical margins

Radiation Oncology <u>Desirable</u> Scientific criteria

***Note: If clinical experience cannot be shown in this area, then the applicant must provide a brief (1 page) report for each criteria, indicating their understanding of the key components of the topic.*

Explain the fundamental principles of kV external beam therapy**	
Knowledge	• The physical principles and dosimetric features of kV treatment beams • Procedures that are used for acceptance, commissioning and ongoing QA for a kV treatment unit • The effects of energy, field size, field shape, beam modifiers, source to surface distance, penumbra, and normalisation on kV dose distributions, including their impact on beam profile, depth dose and skin dose • Suitable materials and their thicknesses for patient shielding The decision making influencing the choice of kV photon treatment techniques over other modalities for achieving desired dose distributions

MV External Beam Treatment Planning

Radiation Oncology <u>Essential</u> Scientific criteria

Practice acceptance, commissioning, and QA for an external beam radiation therapy treatment planning system	
Knowledge	• Commissioning measurements for planning reference data • Acceptance, commissioning, clinical implementation, and QA on an external beam radiation therapy treatment planning system
Practice treatment planning checks	
Knowledge	• Quality control checks of individual treatment plans • Dose/MU/time accuracy with an independent dosimetry calculation system • Dosimetric measurements to verify the accuracy of treatment plans for individual patients - patient specific QA
Manage the quality of treatment plans	
Knowledge	• Determining recommendations for clinical application of external beam radiation therapy treatment planning systems for safe patient treatment • Evaluating parameters that influence common problems that arise in development of a treatment plan and providing solutions for these

Imaging for Radiation Oncology

Radiation Oncology <u>Essential</u> Scientific criteria

Describe and practice acceptance, commissioning, or QA for a CT scanner	
Knowledge	• The goals of acceptance and commissioning, general order of tests and the relevance of each major step in the procedure • Performing tests and measurements listed in a best practice protocol and identifying limitations and tolerances • The relationship between acceptance, commissioning, and ongoing QA tests • The implications of differences between CT parameters and clinical use of the equipment • Evaluating faults in major components of a CT and recognising the tests required to return the unit to service

Brachytherapy

Radiation Oncology Essential Scientific criteria

Participate in acceptance, commissioning, or QA for a HDR brachytherapy afterloader and ancillary equipment	
Knowledge	• Performing tests and measurements listed in a best practice protocol and identifying limitations and tolerances • The relationship between acceptance, commissioning, and ongoing QA tests • The implications of differences between manufacturer parameters and clinical use of the equipment • Evaluating faults in major components of a HDR system and recognising the tests required to return the unit to service
Participate in calibration of HDR brachytherapy sources according to established protocols	
Knowledge	• Performing tests and measurements to determine RAKR • The implications of differences between manufacturer parameters and clinical use of the equipment • Prepares source data for treatment planning • Derives benchmark values for routine QA
Participate in HDR brachytherapy treatment planning and delivery	
Knowledge	• Understand HDR treatment regimes • Describe operational process for developing, optimising and checking a treatment plan for HDR brachytherapy • Describe treatment preparation, delivery and QA processes and regulatory requirements

Radiation Oncology <u>Desirable</u> Scientific criteria

***Note: If clinical experience cannot be shown in this area, then the applicant must provide a brief (1 page) report for each criteria, indicating their understanding of the key components of the topic.*

Explain the fundamental principles of LDR Brachytherapy**	
Knowledge	• The physics principles of LDR brachytherapy sources • LDR treatment regimes • Principles of LDR brachytherapy treatment planning • Principles of ultrasound imaging and its use in LDR brachytherapy • The principles and practices of LDR brachytherapy source handling • The principles and practices of LDR source calibration and quality management

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Professional
Communicator
Scholar
Collaborator
Health Advocate
Leader