Accelerating the Future:
Designing a Robust and Affordable Radiation Therapy Treatment System for Challenging Environments

Addressing the Need for Medical Physics Education

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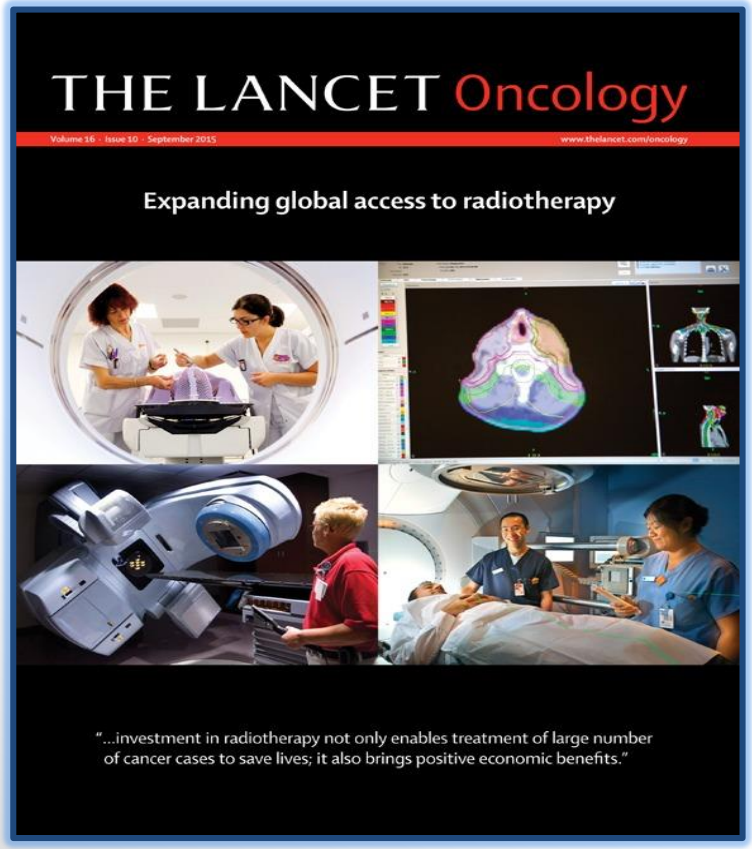
The Need Globally



Union for International Cancer Control (UICC)

- Global Task Force on Radiotherapy for Cancer Control (GTFRCC)
- What will it cost to close the gap between what exists today and reasonable access to radiotherapy globally by 2035?
- Lancet Oncology Commission report
- 18 authors
- Atun *et al*, Lancet Oncol, 16: 1153-1186; 2015.

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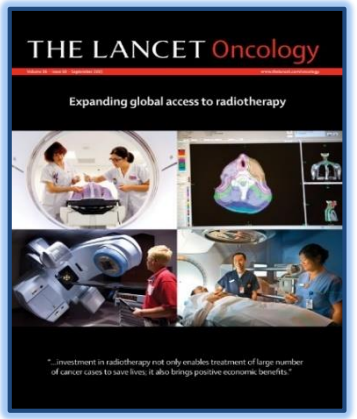
What is the "Gap"?

- GTFRCC determined
  - Cancer incidence by clinical site by country
    - Number patients needing RT
    - Number of fractions by country
  - Number of departments, machines, personnel by country income level (LIC, LMIC, UMIC, HIC)



Atun *et al*, Lancet Oncol Sept 2015

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The “Gap”?

Atun *et al*, Lancet Oncol 16: 1153-1186; 2015

- 2013 … Existing
  - ~ 4,200 MV machines in LMICs
- 2035 … Need … Additional
  - ~ 13,000 linacs in LMICs
  - ~ 6,500 CT scanners
  - ~ 30,000 Rad’n Oncologists in LMICs
  - ~ 22,000 Medical Physicists in LMICs
  - ~ 78,000 RTTs in LMICs
- GTFRCC … Action 3: human resources for radiotherapy
  - Target: 7500 radiation oncologists, 20,000 radiation technologists and 6000 medical physicists to be trained by 2025

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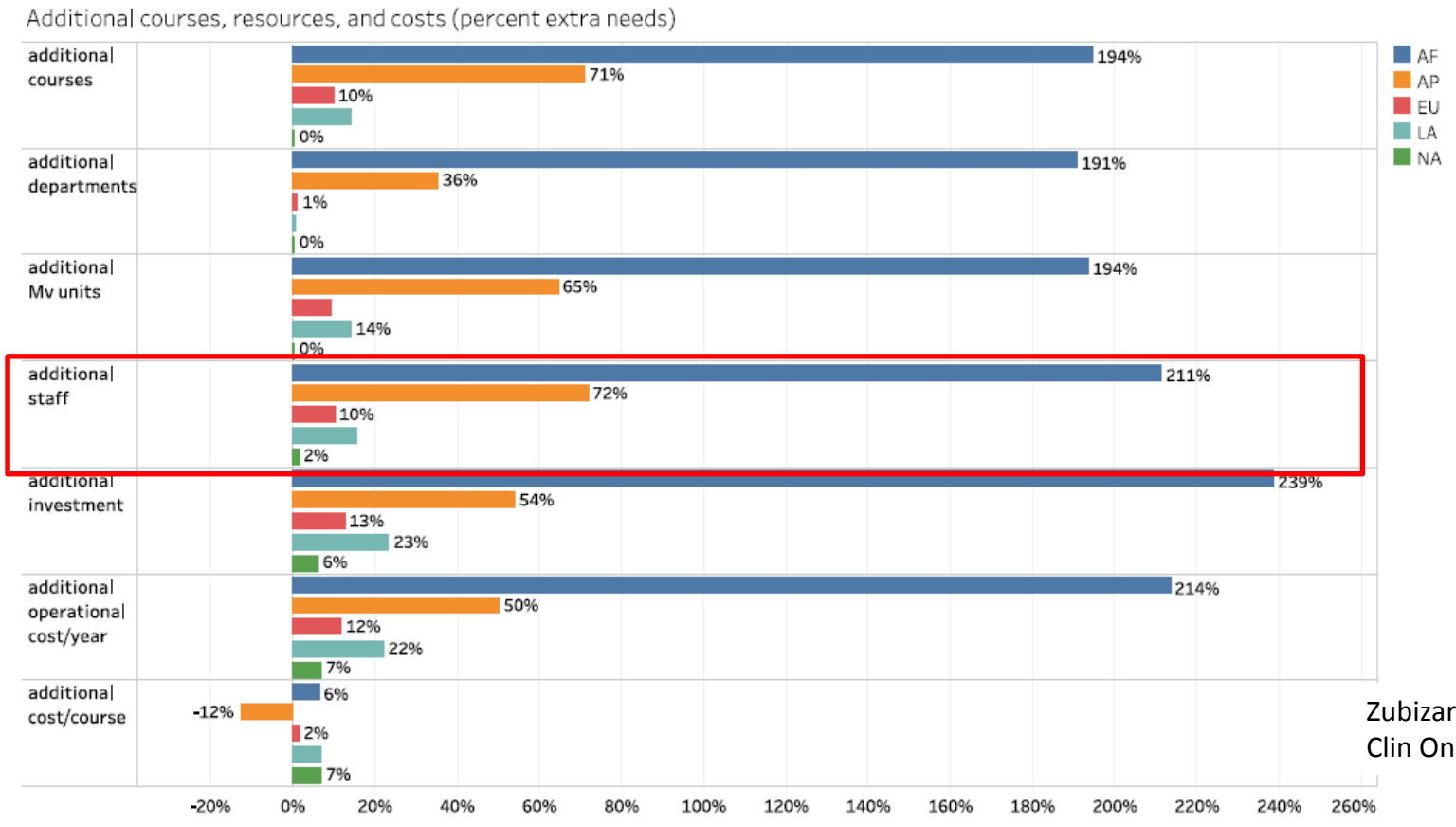
Additional Needs by Region



Zubizarreta, Van Dyk, Lievens.
Clin Oncol 29: 84-92; 2017

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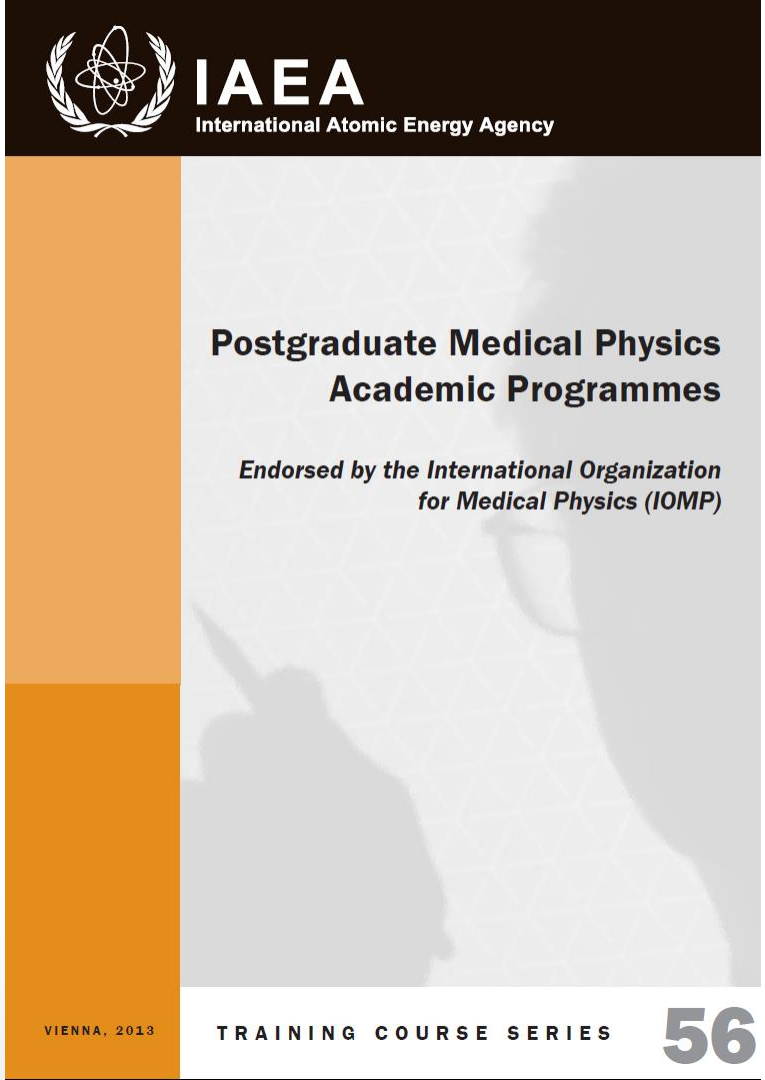
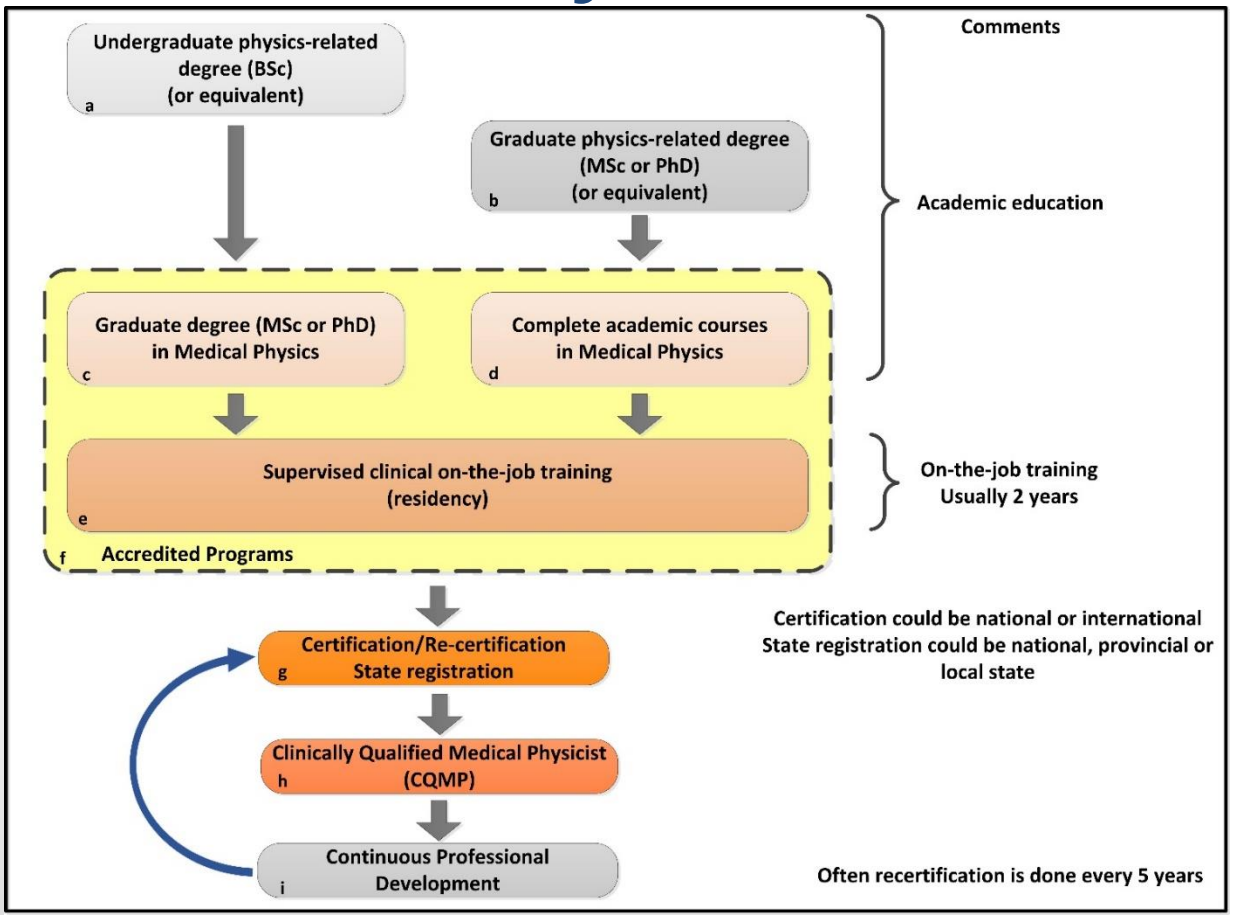

IAEA
International Atomic Energy Agency
Postgraduate Medical Physics Academic Programmes
Endorsed by the International Organization for Medical Physics (IOMP)
VIENNA, 2013
TRAINING COURSE SERIES
56

Medical Physics Education/Training



Adapted from Fig. 1, IAEA TCS 56

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Faculty … Academic

- “The academic faculty should include at least one instructor holding a PhD in the medical physics field.”
- “The structure should therefore include a formal link with a clinical medical physics department in a hospital setting with a teaching mandate.”

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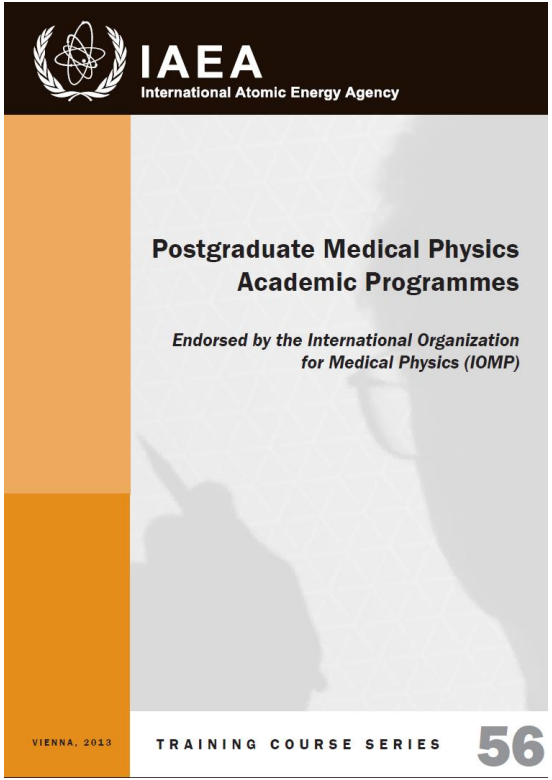
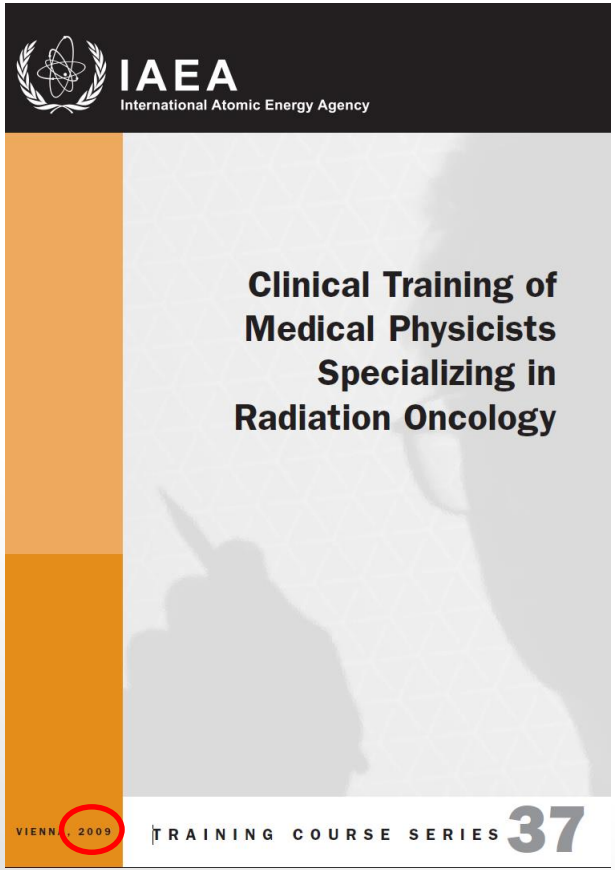
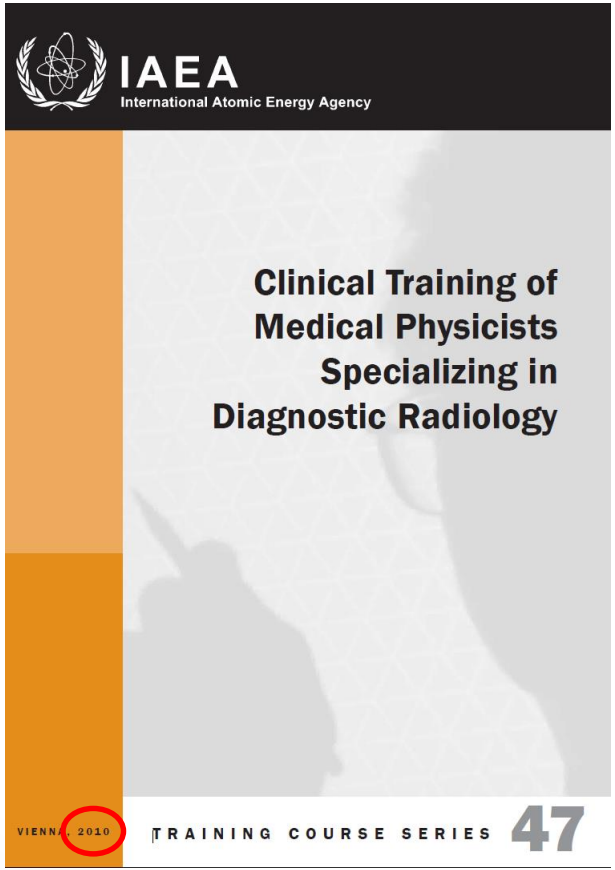
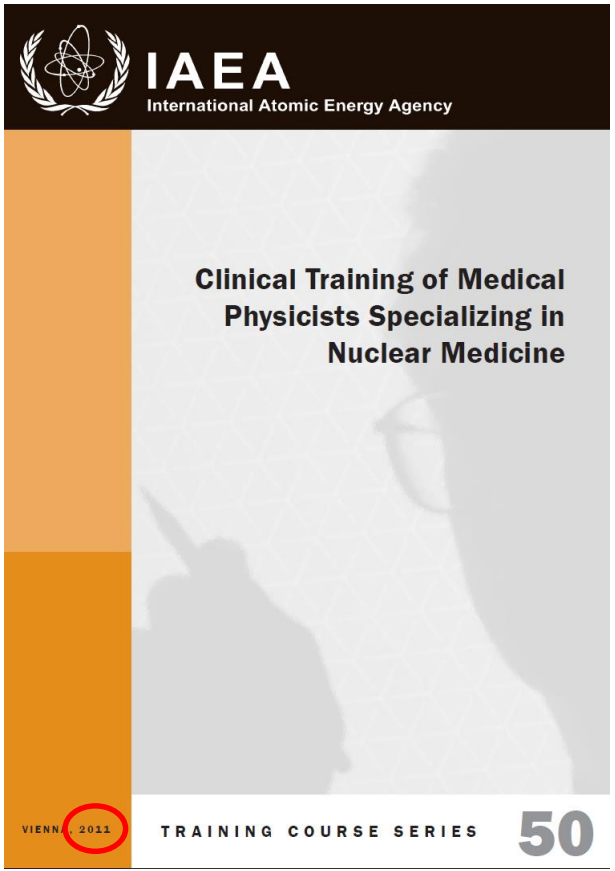
Academic … syllabus

- Anatomy and physiology
- Radiobiology
- Radiation Physics
- Radiation Protection
- Professional and Scientific Development
- Research Project
- Medical Imaging Fundamentals
- Radiation Dosimetry
- Physics of Radiation Oncology
- Physics of Nuclear Medicine
- Physics of Diagnostic and Interventional Radiology




IAEA
International Atomic Energy Agency
Clinical Training of Medical Physicists Specializing in Radiation Oncology
VIENNA, 2009
TRAINING COURSE SERIES 37


IAEA
International Atomic Energy Agency
Clinical Training of Medical Physicists Specializing in Diagnostic Radiology
VIENNA, 2010
TRAINING COURSE SERIES 47


IAEA
International Atomic Energy Agency
Clinical Training of Medical Physicists Specializing in Nuclear Medicine
VIENNA, 2011
TRAINING COURSE SERIES 50

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AFRA

RAF/6/044

STRENGTHENING MEDICAL PHYSICS IN SUPPORT OF CANCER MANAGEMENT - PHASE II

A REGIONAL CLINICAL TRAINING PROGRAMME FOR RADIOTHERAPY MEDICAL PHYSICS

REPORT OF A TASK FORCE MEETING

2013

Recommendations for Medical Physics Education in AFRA Member States

This document is endorsed by the Federation of African Medical Physics Organizations

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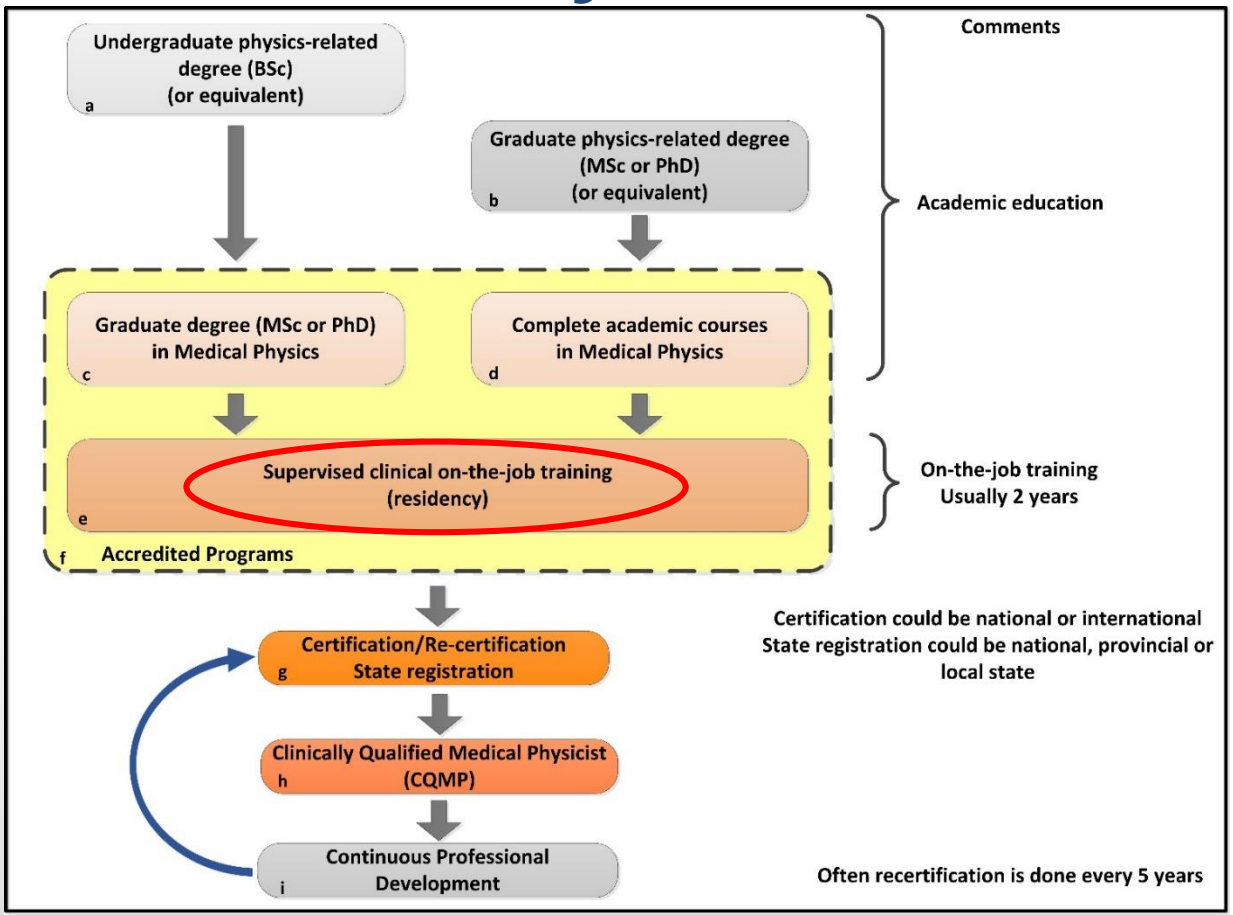
Medical Physics Education/Training



Adapted from Fig. 1, IAEA TCS 56

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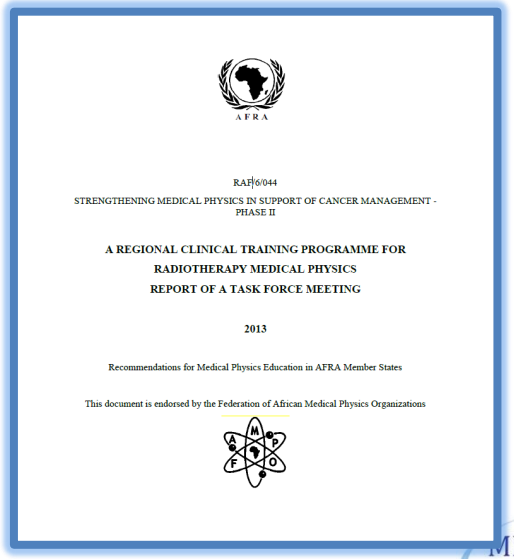
Supervision … Clinical

A practising CQMP with at least 5 years' experience in hospital-based independent practice should supervise the programme. The maximum ratio of residents (interns or trainees) to CQMP staff should be 2:1 taking into account the workload of the facility and additional numbers of practising CQMPs.

CQMP= Clinically Qualified Medical Physicist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Clinical … syllabus

From: TABLE 1: CLINICAL TRAINING PROGRAMME FOR RADIOTHERAPY MEDICAL PHYSICS RESIDENTS

- Clinical environment in radiotherapy
- EBRT Reference dosimetry including instrumentation and calibration
- EBRT Relative dosimetry (ATP, commissioning and ongoing QC)
- Imaging equipment
- EBRT
- Brachytherapy
- Radiation protection and safety
- Equipment specification and acquisition
- Quality management
- Professional ethics

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AFRA … Duration of Clinical Training Program

- Radiotherapy physics … 1 year
- Diagnostic/interventional radiology … 6 months
- Nuclear medicine … 6 months

General Observations

- MP Training Requirements
  - Supporting infrastructure
    - Government/academic/clinical
  - Instructors knowledgeable in Medical Physics
    - With appropriate time for training
  - Equipment for treatment/training
  - Students with appropriate backgrounds

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Possible Sources of Support

- Government
- IAEA
- Partnering with enriching organizations (NGOs)
- Partnering with clinical/academic organizations
- Example: Kenya has requested MPWB to help with recruitment of 2 visiting professors for the first couple of years of a new MP MSc program

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