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Medical Physics Education and Training Capacity in Zimbabwe: Institutional Structures, Geographic Distribution, and Workforce Alignment

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Zimbabwe produces medical physics graduates through recognized academic pathways, but conversion into supervised training, registration, employment, and retention remains limited. In this work, we assess Zimbabwe's education-to-workforce pipeline and identify bottlenecks affecting clinical medical physics workforce development.

ABSTRACT

A national descriptive pipeline assessment evaluated Zimbabwe's medical physics education-to-workforce pathway. Data sources included MSc Medical Physics graduate-output records from AHPCZ-accredited universities; Google Forms registration-profile responses from participating medical physicists linked to Zimbabwe (n = 24); site-reported clinical training and workforce-absorption data from all local radiotherapy sites; and alumni tracer Google Forms responses from participating graduates (n = 22).

Accredited MSc Medical Physics pathways included integrated 6–12-month clinical attachments. NUST produced 52 MSc graduates from 2017–2025. Across all local radiotherapy sites, six clinical medical physicists (CMPs) were identified: two at PGH, two at Mpilo, and two at Oncocare. Internship supervision was public-sector concentrated, with ~2 interns per cycle at PGH and Mpilo, and none at Oncocare. Registration progression remained incomplete: only 10/24 (42%) completed AHPCZ-recognized internship training, 16/24 (67%) were actively practicing, and practice location was split between Zimbabwe (13/24; 54%) and abroad (11/24; 46%). Alumni outcomes showed pathway leakage: only 6/22 (27%) remained in medical physics-related work, while others worked outside medical physics, pursued further studies, or were unemployed.

Improving post-graduation conversion requires expanded internship intake, protected supervisor time, reliable clinical equipment, structured CPD, more CMP posts with competitive remuneration, and clearer implementation of AHPCZ-recognized progression pathways in radiation oncology (RO), diagnostic radiology (DR), and nuclear medicine (NM) physics, with particular attention to strengthening diagnostic radiology posts and recognition.

ABBREVIATIONS

- **AHPCZ**: Allied Health Practitioners Council of Zimbabwe
- **CMP**: Clinical medical physicist
- **CPD**: Continuing professional development
- **DR**: Diagnostic radiology
- **MSU**: Midlands State University
- **NM**: Nuclear medicine
- **NUST**: National Univ. of Science & Technology
- **PGH**: Parirenyatwa Group of Hospitals
- **RO**: Radiation oncology
- **RT**: Radiotherapy
- **UZ**: University of Zimbabwe

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INTRODUCTION

- Sustainable medical physics workforce development requires academic training, supervised clinical training, registration/certification, CPD, and retention.
- Zimbabwe has established academic training routes through NUST and UZ, and professional registration through AHPCZ.
- The key question is whether academic output converts into supervised internship, full registration, clinical employment, specialty development, and retention.
- This poster evaluates Zimbabwe's medical physics education-to-workforce alignment.

METHODS AND MATERIALS

Design: National descriptive pipeline assessment of Zimbabwe's medical physics education-to-workforce pathway.

Academic data: MSc Medical Physics graduate-output data from AHPCZ-accredited universities, primarily NUST; UZ and MSU included where data were available.

Registration profile: Google Forms responses from participating medical physicists linked to Zimbabwe, including those on/previously on the AHPCZ public register and legacy MPs who practiced before AHPCZ registration structures.

Alumni tracer: Google Forms responses from participating graduates on employment status, retention, career diversion, migration, and workforce-entry barriers.

Clinical training sites: Site-reported qualified CMPs, interns, and workforce-absorption data from all radiotherapy sites: PGH and Mpilo, public; Oncocare, private.

Analysis domains: Academic output, clinical internship, AHPCZ registration progression, workforce absorption, specialty alignment, migration, and retention barriers.

DISCUSSION

Zimbabwe has academic programmes and an AHPCZ registration pathway, but conversion after graduation remains weak. Graduate output is not consistently matched by supervised internship capacity, local CMP posts, specialty-specific employment, CPD access, or retention structures. Key bottlenecks across the education-to-employment pathway are summarized in Fig. 3. Although AHPCZ guidelines recognize progression pathways in RO, DR, and NM physics, employment remains concentrated in RO. Limited recognition and availability of DR/NM posts restrict specialty diversification, despite reported expertise. The recent creation of DR medical physicist posts in selected public hospitals is a positive step, but broader implementation is still needed.

CONCLUSIONS

Zimbabwe produces medical physics graduates through recognized academic pathways, but conversion into supervised training, registration, employment, and retention remains limited. Strengthening the pathway requires expanded internship intake, protected supervisor time, functioning clinical training sites, competency-based progression to full AHPCZ registration, structured CPD, and expanded posts across RO, DR, and NM.

RESULTS

- **Academic output/training:** NUST produced 52 MSc graduates from 2017–2025. MSc pathways included integrated clinical attachments: 12 months at NUST and 6 months at UZ.
- **Training-site capacity:** CMP coverage existed across all radiotherapy sites, but active internship supervision was concentrated at public-sector sites (Table 1).
- **Progression to clinical practice:** Formal AHPCZ-recognized internship completion lagged behind active practice, suggesting mixed local, abroad, and legacy practice pathways.
- **Registration retention:** Registration was not a stable endpoint; half of respondents were not currently registered, including inactive and never-registered participants.
- **Practice location:** Geographic leakage was evident, with a substantial proportion of respondents practicing outside Zimbabwe, mainly in the UK, Australia, and USA (Fig 1).
- **Specialty alignment:** Employment was concentrated in RO. Although AHPCZ guidelines recognize RO, DR, and NM pathways, DR/NM employment remains limited, despite reported expertise (Fig 2).
- **Alumni outcomes:** Alumni responses showed limited retention in medical physics-related work, with many graduates working outside medical physics, pursuing further study/training, or unemployed/seeking work (Fig 3).
- **Overall pattern:** Pipeline indicators suggest that academic output does not consistently convert into supervised internship, full registration, local clinical practice, specialty-specific employment, and retention (Table 2).

Table 1. CMP and internship capacity at RT sites in Zimbabwe.

Facility	Sector	No. of CMPs	Current Interns
PGH	Public	2	2
Mpilo	Public	2	2
Oncocare	Private	2	0

Table 2. Key bottlenecks and their workforce implications

Bottleneck	Workforce implication
Limited internship capacity	Graduate output may exceed supervised training slots
Small supervisor pool	Few CMPs carry both clinical and training duties
Equipment downtime	Reduced hands-on exposure
Incomplete registration retention	Registration is not a stable endpoint
Abroad/legacy practice	Active practice does not always equal local workforce capacity
RO-concentrated employment	Few DR/NM roles despite reported expertise
Limited CPD/career progression	Weak retention after training

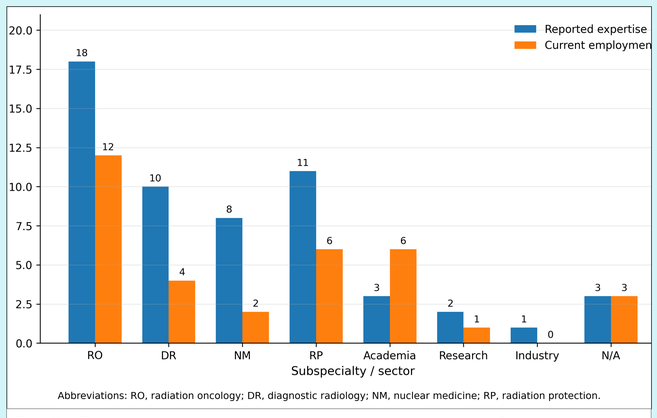

Fig 2. Reported areas of expertise vs. sector of employment across different medical physics subspecialties.

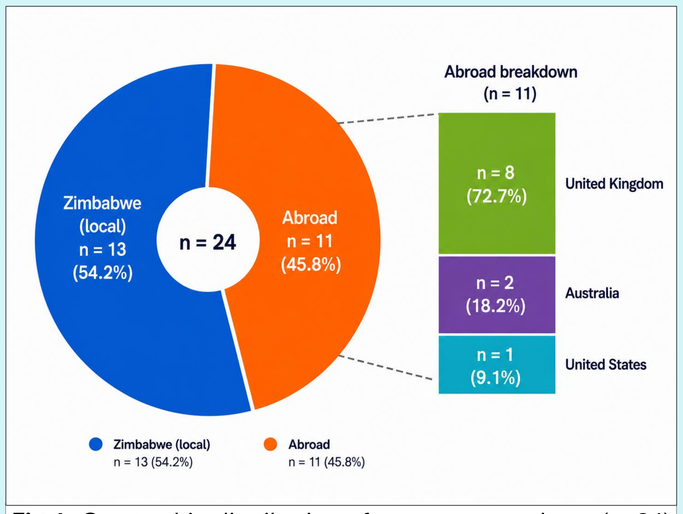

Fig 1. Geographic distribution of survey respondents (n=24) practicing locally in Zimbabwe versus those working abroad, including a breakdown of destination countries.

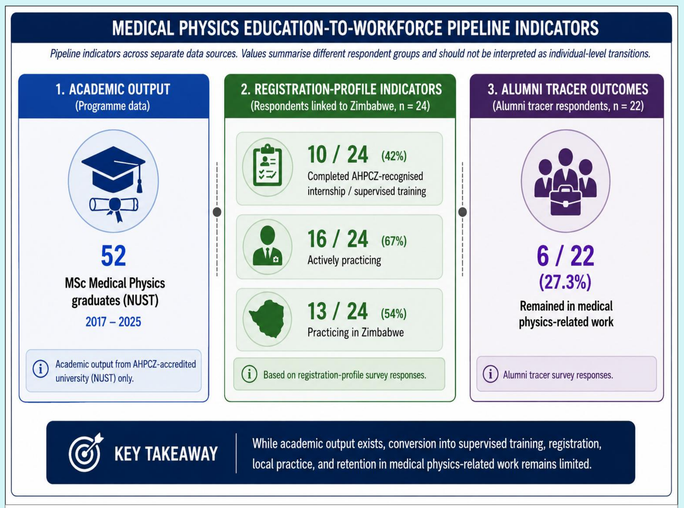

Fig 3. Medical Physics education-to-employment pipeline indicators for Zimbabwean workforce.

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