



**Book of Abstract of presentations at the International Day of Medical Physics (IDMP) 2020,
The International Organisation for Medical Physics (IOMP); 7 November 2020.**

Status of Medical Physics in Africa

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Introduction

Information on facilities and clinical programmes in Africa:

- 54 countries in Africa
- 1.2 billion population
- 50% of countries with RT facilities
- 20 countries with NM facilities
- ~ 1,000 MPs in region
- 10 countries with MP academic programmes
- 6 countries with MP clinical programmes



Medical Physics (MP) Workforce

The summary of the Africa's Medical Physics workforce is given as follows:

Country	No. of MPs	Country	No. of MPs
Algeria	129	Nigeria	100
Angola	4	Senegal	3
Benin	3	Sierra Leone	1
Botswana	4	South Africa	136
Burkina Faso	2	Sudan	28
Cameroon	2	Tanzania	4
Congo DR	1	Tunisia	37
Cote d'Ivoire	2	Uganda	10
Egypt	374	Zambia	6
Eritrea	2	Zimbabwe	9
Ethiopia	4	Total	1,041
Gabon	4		



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A comprehensive status report may be found in the following publication:

MEDICAL PHYSICS INTERNATIONAL Journal, Special Issue, History of Medical Physics 3, 2020

MEDICAL PHYSICS DEVELOPMENT IN AFRICA – STATUS, EDUCATION, CHALLENGES, FUTURE

T.A. Ige¹, F. Hasford², S. Tabakov³, C.J. Trauernicht⁴, A. Rule⁵, G. Azangwe^{6,7}, D. Ndlovu⁷, T. Thatha⁸, L. Mhathiwa⁹, E. Mhukayesango⁹, M.A. Aweda¹⁰, M. A. Adewole¹, S. Inkoom², A.K. Kyere², C. Schandorf², J.H. Amuasi², H. Saikouk^{11,12}, I. Ou-Saada¹², F. Bentayeb¹², S. Boutayeb¹³, K. Eddaoui¹⁴, M. Besbes¹⁵, L. Bensalem¹⁵, C. Nasr¹⁵, N.A. Deiab¹⁶, E.M. Attalla¹⁶, K.M. Elshahat¹⁷, A.I. Seddik¹⁸, G. Lazarus¹⁹, O. Samba²⁰

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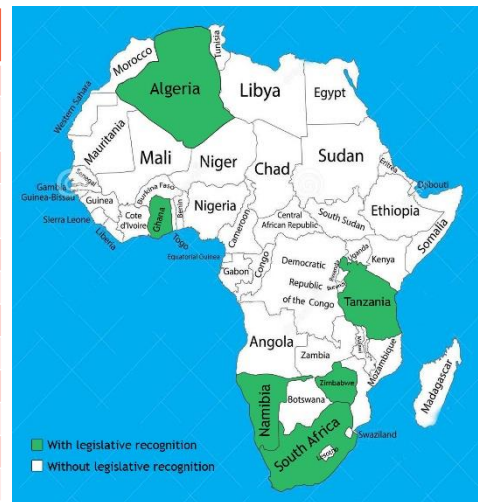
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Legislative Recognition of MPs as Health Professionals

Recognition status all over the continent is given as follows:

Countries With recognition	Countries without recognition			
Algeria	Angola	Cote d’Ivoire	Lesotho	Rwanda
Ghana	Benin	Djibouti	Liberia	Sao Tome & Principe
Namibia	Botswana	Egypt	Libya	Senegal
South Africa	Burkina Faso	Equatorial Guinea	Madagascar	Seychelles
Tanzania	Burundi	Eritrea	Malawi	Sierra Leone
Zimbabwe	Cabo Verde	Eswatini	Mali	Somalia
	Cameroon	Ethiopia	Mauritania	South Sudan
	Central Africa Republic	Gabon	Mauritius	Sudan
	Chad	Gambia	Morocco	Togo
	Comoros	Guinea	Mozambique	Tunisia
	Congo DR	Guinea Bissau	Niger	Uganda
	Congo Republic	Kenya	Nigeria	Zambia



Conclusions

Quite a lot of progress has been made but we need to work harder to improve Medical Physics profession in the entire continent.

Keywords: Medical Physics; health professional; Africa.



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Status of Medical Physics in Africa: Algeria

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Introduction

The countries background information is given as follows:

- Population: 43.82 millions (ONS 2020)
- Equipment numbers:

RTH	NM	DIR
<ul style="list-style-type: none"> • 54 Linac, • 3 Tomotherapy • 24 CT-sim, • 14 BT 	<ul style="list-style-type: none"> • 24 SPECT • 11 SPECT-CT • 3 PET-CT • 2 Cyclotrons 	<ul style="list-style-type: none"> • > 574 CT , • > 120 fluoroscopy, • 50 interventional (including cardio vascular), • > 281 mammography • > 3000 RX machines

- Number of medical physicists in the country: 144 (Based on a survey conducted in 2020. This number includes MPs in clinical environment and in R&D institutions)

RTH	NM	DIR
121	14	9



Medical Physics Recognition

1. We Is there a regulatory framework that governs the use of ionizing radiation? Yes
 - a. Regulatory framework that governs the use of ionizing radiation
 - Loi n° 19-05 Activités Nucléaires (Law, 2019)
 - Décret présidentiel n°05-117 du 11 Avril 2005_protection_ray_ionisant (presidential Decree, 2005)
 - Arrêté Interministériel du 10 novembre 2015_fixant les règles optimisation (Regulation, 2015)
 - b. This regulatory framework covers:
 - The establishment of medical exposure optimization and control including requirements for the conduct of procedures and requirements for QA and RP.
 - The general conditions for patient protection, as optimization (Patient dose management, QA/QC,.....).
 - The permanent presence of medical physicists in radiotherapy and advisable to be present in major facilities of medical imaging and nuclear medicine.
2. Is there any regulation may help to motivate for the recognition or employment of medical physicists? Yes
 - The medical physicist is recognized in Algeria since the promulgation of the statute of the medical physicist in July 2010 as health professional (Décret exécutif n°10-178).



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3. Is there a national medical physics association? If so, what is the name? Contact details? Not Yet.
4. For countries that require medical physicists to register with a health professions council or similar:
 - When was this achieved?
 - What steps had to be undertaken for this to happen?
 - Who were the relevant role players?

It is important to note the following:

- i. There are no registry mechanisms for PMs in Algeria.
 - ii. They are recognized as health professionals by regulation
5. For countries that do not yet have this recognition:
 - What activities are currently happening to help along this process?
 - Who are the relevant role players?
 - Can FAMPO play a role? If so, please provide details:
- NA -

2 Chaâbane 1431 14 juillet 2010	JOURNAL OFFICIEL DE LA REPUBLIQUE ALGERIENNE N° 43	7
TITRE II		
DISPOSITIONS APPLICABLES AU CORPS DES PHYSIENS MEDICAUX DE SANTE PUBLIQUE.		
<p>Art. 15. — Le corps des physiciens médicaux de santé publique comprend trois (3) grades :</p> <ul style="list-style-type: none"> — le grade de physicien médical de santé publique ; — le grade de physicien médical principal de santé publique ; — le grade de physicien médical en chef de santé publique. 		
Chapitre Ier		
Définition des tâches		
<p>Art. 16. — Les physiciens médicaux de santé publique sont chargés, notamment :</p> <ul style="list-style-type: none"> — de procéder, selon un protocole écrit et documenté, au contrôle de qualité des appareils de diagnostic et de traitement ; — de calculer la distribution de la dose d'irradiation administrée aux patients ; — de déterminer la dose à administrer aux patients à des fins de diagnostic ou de traitement en médecine nucléaire ; — de gérer les produits et déchets radioactifs ; — de participer à la détermination des caractéristiques physiques des appareils de traitement ou de diagnostic. <p>Art. 17. — Outre les tâches dévolues aux physiciens médicaux de santé publique, les physiciens médicaux principaux de santé publique sont chargés, notamment :</p> <ul style="list-style-type: none"> — d'introduire les données physiques des faisceaux cliniques et les données anatomiques dans les systèmes de planning de traitement ; — d'élaborer, de mettre en œuvre et d'assurer le suivi des protocoles de contrôle des appareils et du programme d'assurance qualité en radiothérapie, médecine nucléaire et imagerie médicale ; — de participer à la sélection, à la réception et à la calibration des instruments de mesure de doses de radioactivité et de veiller aux activités de radioprotection. <p>Art. 18. — Outre les tâches dévolues aux physiciens médicaux principaux de santé publique, les physiciens médicaux en chef de santé publique sont chargés, notamment :</p>		
<ul style="list-style-type: none"> — de préparer les cahiers des charges destinés à l'acquisition d'appareils de diagnostic, de traitement et de tous les équipements spécifiques utilisés dans les domaines de la radiothérapie, de la médecine nucléaire et de l'imagerie médicale ; — d'initier, de participer ou de réaliser des études et des travaux de recherche ; — d'élaborer le plan d'urgence radiologique ; — de participer à la formation des personnels de santé. 		
Chapitre 2		
Conditions de recrutement et de promotion		
<p>Art. 19. — Les physiciens médicaux de santé publique sont recrutés, dans la limite des postes à pourvoir, par voie de concours sur titre, parmi les candidats titulaires du diplôme d'ingénieur d'Etat en physique médicale ou d'un titre reconnu équivalent.</p> <p>Art. 20. — Sont recrutés ou promus en qualité de physicien médical principal de santé publique :</p> <ul style="list-style-type: none"> 1— par voie de concours, sur titre, les candidats titulaires d'un magistère en physique médicale ou d'un titre reconnu équivalent ; 2— par voie d'examen professionnel, dans la limite de 30% des postes à pourvoir, les physiciens médicaux de santé publique justifiant de cinq (5) années de service effectif en cette qualité ; 3 — au choix et après inscription sur une liste d'aptitude, dans la limite de 10% des postes à pourvoir, les physiciens médicaux de santé publique justifiant de dix (10) années de service effectif en cette qualité. <p>Art. 21. — Sont promus sur titre en qualité de physicien médical principal de santé publique, les physiciens médicaux de santé publique ayant obtenu, après leur recrutement, le magistère en physique médicale ou un titre reconnu équivalent.</p> <p>Art. 22. — Sont promus en qualité de physicien médical en chef de santé publique :</p> <ul style="list-style-type: none"> 1— par voie d'examen professionnel, les physiciens médicaux principaux de santé publique justifiant de cinq (5) années de service effectif en cette qualité ; 2 — au choix, et après inscription sur une liste d'aptitude, dans la limite de 20% des postes à pourvoir, les physiciens médicaux principaux de santé publique, justifiant de dix (10) années de service effectif en cette qualité. 		

Conclusion

- i. Medical physics is a discipline in full expansion in Algeria due to the increase in the number of centres against cancer and the development of medical imaging and nuclear medicine.
- ii. Since 2010, the medical physicist is recognized as a health professional by the regulations.
- iii. 7 universities provide academic programme in medical physics.
- iv. Short clinical training is given in RTH, NM and DIR during the academic programme.
- v. A huge effort is being deployed by Algeria to introduce the clinical training as an independent part in the MP training to conform with the international requirements.

Keywords: Medical Physics; RTH; NM; DIR; Algeria.



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Status of Medical Physics in Africa: Ghana

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Introduction

The country's background information is as follows:

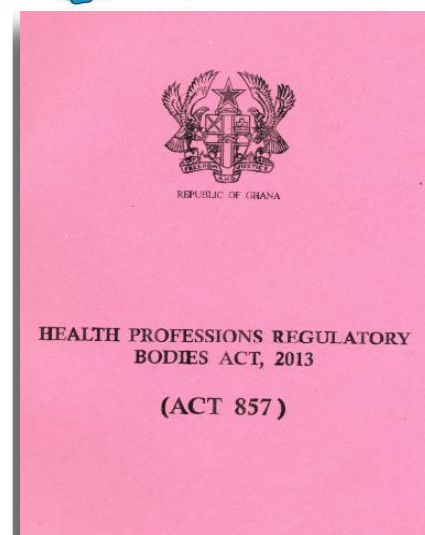
- I Population: 31,284,422 as of Saturday, October 31, 2020
- Equipment numbers:
 - i. 5 EBRT machines (3 LINACs and 2 Cobalt machines)
 - ii. 3 HDRs & 1 LDR
- Number of medical physicists in the country:
 - i. Radiotherapy: 32
 - ii. Radiology: 8
 - iii. Nuclear Medicine: 6
 - iv. Others (University, Research, etc): 12



Medical Physics Recognition

- A. National medical physics association:
GHANA SOCIETY FOR MEDICAL PHYSICS
- B. Contact:
Medical Physics Department
School of Nuclear and Allied Sciences
P.O. Box AEI, Ghana Atomic Energy Commission – Ghana
Telephone: +233 24 494 5805
Email: info@gsmphghana.org, medicalphysicsghana@yahoo.com
- C. Recognition of the program:
Medical Physics degree program is recognized by the:
 - National Council for Tertiary Education (NCTE), Ghana.
 - National Accreditation Board (NAB), Ghana.
- D. Recognition of medical physics in Ghana:

Medical Physics is recognized as medical profession in Ghana through the Health Professions Regulatory Bodies Act (ACT 857 of 2013). The profession is regulated by the Allied Health Professions Council (AHPC) of Ghana.





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- E. Legislative recognition is through the Allied Health Professionals Council
- i. When was this achieved? 2013
 - ii. What steps had to be undertaken for this to happen?
 - Formation of Ghana Society for Medical Physics in 2011.
 - Formation of the Ghana Federation of Allied Health Professions (GFAHP) in 2012
 - Formation of the Allied Health Task Force by Government in 2012.
 - Passage of ACT 857 by Parliament of Ghana in January 2013, *Medical Physics was fully captured.*
- F. Who were the relevant role players?
- Ghana Society for Medical Physics; Ghana Federation of Allied Health Professions; Ministry of Health; Allied Health Professions Council; Universities; Ghana Health Workers Union, and Teaching Hospitals

Conclusion

- Medical Physics is captured in health professions regulatory bodies act, 2013 ACT 857 – Government commitment.
- Ministry of health, posted the first set of medical physicists to the various teaching hospitals October 2020 – Health Ministry commitment.
- GSMP is collaborating with Ghana nuclear regulatory authority as primary stakeholder in placement and responsibilities of medical physicists in various hospitals.

Foreign assistance obtained:

- FAMPO: Facilitating cooperation and collaboration between medical physics associations in the African region.
- IAEA: Assistance in establishing medical physics programme in Ghana and supporting human resource development through training courses and workshops, long and short-term fellowships, expert services, etc.
- AFRA/IAEA: Collaboration in designation of Ghana as Regional Designation Centre (RDC) for the training of medical physicists from Africa.
- ICTP: Assistance with human resource development through fellowships, short-term training courses, etc.
- Norwegian Partnership Programme for Medical Physics and Radiography Education (NORPART): Support with human resource development through partnership between Ghana (University of Ghana) and Norway (Norwegian University of Science and Technology). Programme also covers annual summer school and student/staff mobility between Ghana and Norway.
- UCL PaRTner Project: Support with training of radiotherapy personnel.
- IOMP: Support with development of professional recognition within the country and throughout Africa
- MAYO CLINIC, USA: Support with training of radiotherapy personnel and donation of equipment
- GLOBAL ACCESS TO CANCER CARE FOUNDATION, USA: Filling all gaps in radiotherapy. Support with training of radiotherapy personnel, facility development and donation of equipment.

Keywords: Medical Physics, Ghana, Allied Health Task Force.



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Status of Medical Physics in Africa: Namibia

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Introduction

The country's background information is given as:

- a. Population (2.5 million)
- b. Equipment numbers (medical): 2 Cancer centre (1 Cobalt, 1 Linac)
 - 4 interventional radiology centres (Cathlabs)
 - 16 CT scans
 - 13 Mammo
 - 16 Fluoroscopy units
 - 72 Conventional radiology units
 - 120 dental units
- c. Medical physicists in the country
 - 3 Radiotherapy
 - 2 Nuclear medicines
 - 2 Academia
 - 2 Regulatory Authority



Medical Physics Recognition

Regulatory framework that governs the use of ionizing radiation:

- The government has promulgated Atomic Energy and Radiation Act, Act 5 of 2005 that established the National Radiation Protection Authority (NRPA).
- Operationalise Radiation protection and Waste Disposal Regulation in 2012.
- The Regulations require the availability of Medical Physicists in Diagnostic and Radiotherapy practices.
- MP in hospital require to be registered with the HPCNA under the Medical and Dental Act.
- No national medical physics association yet.
- Regulations for registration of MP was promulgated February 2020.
- REGULATIONS RELATING TO MINIMUM REQUIREMENTS OF STUDY OF A MEDICAL PHYSICIST, REGISTRATION OF INTERNS, RESTORATION OF A NAME TO A REGISTER AND SCOPE OF PRACTICE OF MEDICAL PHYSICIST, MEDICAL AND DENTAL ACT, 2004.
- Drafting of the Regulations commenced in 2014.



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- Role players were the MP in the country lead by MP in the RA.
- Constant/persistent follow up with the drafters at the HPCNA



**GOVERNMENT GAZETTE
OF THE
REPUBLIC OF NAMIBIA**

N\$7.80 WINDHOEK - 24 February 2020 No. 7128

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GOVERNMENT NOTICE

No. 52 Regulations relating to minimum requirements of study of medical physicist, registration of interns, restoration of name to register and scope of practice of medical physicist: Medical and Dental Act, 2004 1

Government Notice

MINISTRY OF HEALTH AND SOCIAL SERVICES

No. 52 2020

REGULATIONS RELATING TO MINIMUM REQUIREMENTS OF STUDY OF MEDICAL PHYSICIST, REGISTRATION OF INTERNS, RESTORATION OF NAME TO REGISTER AND SCOPE OF PRACTICE OF MEDICAL PHYSICIST: MEDICAL AND DENTAL ACT, 2004

Under section 59 of the Medical and Dental Act, 2004 (Act No. 10 of 2004), read with section 18(1) and on the recommendation of the Medical and Dental Council of Namibia, I have made the regulations set out in the Schedule.

DR. K. SHANGULA
MINISTER OF HEALTH AND SOCIAL SERVICES

Windhoek, 7 February 2020

SCHEDULE

ARRANGEMENT OF REGULATIONS

1. Definitions
2. Minimum qualification required for registration as medical physicist
3. Application for registration as medical physicist
4. Registration and internship training of medical physicist

Conclusion

Constant/persistent follow up with the drafters at the HPCNA is recommended.

Keywords: Medical Physics; Namibia; Regulations.



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Status of Medical Physics in Africa: South Africa

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Introduction

The country's background information is given as follows:

Population: 59.6 million



SERVICE AREA	STATE (12 CENTRES)		PRIVATE (41 CENTRES)	
	EQUIPMENT	MEDICAL PHYSICISTS (57)	SERVICE AREA	MEDICAL PHYSICISTS (77)
THERAPY	LINACS	32	47 LINACS 1 GAMMAKNIFE 6 HDR	51
	Co-60	2		
	HDR	11	NMED	4
	CT	14	RADIOLOGY	7
NME	MR	1	METROLOGY (SSDL)	4
	SPECT/CT	16	REGULATOR	3
	SPECT/CT	10	INDUSTRY	8
RADIOLOGY	PET/CT	5		
	General X-Ray	120		
	MRI	14		
	CT	26		
	Mammography	13		
	Lodox	15		
	Interventional	28		

Regulatory Body Governing the Use of Ionising Radiation

- The Directorate of Radiation Control (DRC) receives its regulatory mandate through the Hazardous Substances Act (15 of 1973).
- The act classifies electronic generators of ionizing radiation as Group III hazardous substances, and radioactive sources as Group IV hazardous substances.
- SAHPRA (South African Health Products Regulatory Authority) assumed the roles of both the Medicines Control Council (MCC) as well as the DRC.
- SAHPRA is an independent entity that reports to the National Minister of Health through its Board.



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The Path to Recognition in South Africa

- February 1960 the SA Association of Medical Physicists was formed with nine founding members.
- In 1968 the association was expanded to include health physicists and the South African Association of Physicists in Medicine and Biology (SAAPMB) was born. www.saapmb.net
- Members of the association were successful in their pursuit of registration of Medical Physicists with a professional body - Atomic Energy Board (AEB).
- In 1972, registration was taken on by the SA Medical and Dental Council (SAMDC) – Medical Physicists were recognized as health professionals.
- Currently the Health Professions Council of South Africa (HPCSA) registers Medical Physicists for clinical practice.

Health Professions Council of South Africa

- www.hpcsa.co.za
- The Health Professions Council of South Africa is a statutory body committed to protecting the public and guiding the professions.
- A Medical Physicist nominated by the national society and appointed by the HPCSA board represents the profession in the Medical Science committee of the Medical and Dental Board of the HPCSA.
- The Council guides and regulates the health professions in the country in aspects pertaining to:
 - i. Registration (annual renewal). Failure to do so constitutes a criminal offence.
 - ii. Education and training (accreditation of training institutions and their training programmes).
 - iii. Assessment and moderation of interns' portfolios of evidence for subsequent certification.
 - iv. Continuing Professional Development (CPD).
 - v. Taking action against unprofessional conduct and/or unethical behaviour.

Keywords: SAAPMB; South Africa; HPCSA; Health Professions Council.



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Status of Medical Physics in Africa: United Republic of Tanzania

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Introduction

The country's background information is given as follows:

- Population (50 million people).
- Equipment numbers: 3 Co-60 units, 4 linacs, 4 HDR and 1 Cs-137.
- Number of medical physicists in the country: 5 registered clinically medical physicists.

Medical Physics Recognition

- Is there a regulatory framework that governs the use of ionizing radiation? Yes, In Tanzania there is regulatory body TAEC responsible for use of ionizing radiation.
- Is there any regulation may help to motivate for the recognition or employment of medical physicists? NO, MP already recognized by the ministry of health.
- Is there a national medical physics association? If so, what is the name? Contact details?
- No but, there is a plan to establish the association by 2021.
- For countries that require medical physicists to register with a health professions council or similar: (MRIPC) Medical Radiology and Imaging Professional Council.
- When was this achieved? 2013.
- What steps had to be undertaken for this to happen? Through Ministry of Health
- Who were the relevant role players? Medical Physicists, Radiographers, Radiotherapists, Radiologists, Radiation Oncologists and Nuclear Medicine Technologists and Physicians.
- For countries that do not yet have this recognition.
- What activities are currently happening to help along this process?
- Who are the relevant role players?
- Can FAMPO play a role? If so, please provide details:

Conclusion

A lot of effort was done to get the medical physicists get recognized as health professional in the past.

Keywords: Medical Radiology; Efficiency index; dose fall-off; prescription dose level.



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Status of Medical Physics in Africa: Zimbabwe

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Introduction

The country's background information are:

- 14 million inhabitants
- Govt: 2 Dual Energy Linacs, 3 Single Photon Linacs [All Varian]
- Pvt: 1 Dual Energy Linac [Elekta Synergy Platform].
- 8 Medical Physicists.

Medical Physics Recognition

- The Radiation Protection Authority of Zimbabwe (RPAZ) has been in existence since 2010.
- The RPAZ is a statutory body established by the Radiation Protection Act [Chapter 15:15] of 2004 to protect people and the environment against the harmful effects of radiation. Medical Practices Regulations (SI 99 of 2014).
- Our Association:
 - Zimbabwe Association of Physicists in Medicine (ZAPM)
 - [Officially launch: 15 August 2020 in Harare]
 - Attention: The Secretary General
 - Donald Ndlovu
 - Mpilo Radiotherapy Department
 - Mobile: +263 292 214961
 - Email: dndlovu25@gmail.com
- Registration for MPs started in the early 2000s.
- There was no MPs Association by then.
- The Medical, Dental and Allied Professions Act (Chapter 27:08). Required that all Practicing Medical Physicist be regulated under the Allied Health Professions Council

Conclusion

- For countries that do not yet have this recognition:
- What activities are currently happening to help along this process?
- Who are the relevant role players?

Keywords: Single Photon Linacs, Zimbabwe; Elekta Synergy Platform.



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Status of Medical Physics in Africa: Egypt

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Introduction

The history of medical physics science had been known at the beginning of 1950 on the hand of few physicists who are participated in the establishment of hospitals that include departments equipped with radio diagnosis, nuclear medicine, and radiotherapy machines.

Medical Physics Recognition

Table 1: Information about African countries with medical physics societies [Wikipedia, 2020]

Country	GDP per capita	No. of MPs	Population (per million)	MPs per million population
Algeria	4,229	129	43.0	3.0
Egypt	3,047	374	99.6	3.7
Ghana	2,262	58	31.1	1.9
Morocco	3,441	61	35.7	1.7
Niger	510	4	22.4	0.2
Nigeria	2,244	100	200.9	0.5
South Africa	6,331	136	58.8	2.3
Sudan	808	28	41.6	0.7
Tunisia	3,587	37	11.5	3.1
Uganda	769	5	42.8	0.1

Egypt has the biggest number of medical radiation equipment all over the African Continent.

Table 2: Radiation medicine equipment approximate distribution in Africa

Country	Radiotherapy		Diagnostic Radiology			Nuclear Medicine		
	Teletherapy (Linac, Co-60)	Brachytherapy (LDR, HDR)	CT	FL / IR	Mammo	SPECT	SPECT/CT	PET/CT
Algeria	37	12	≥57	170	280	24	11	1
Angola	3	1	0	-	-	-	-	-
Benin	0	0	5	-	6	0	0	0
Botswana	1	2	-	-	-	-	-	-
Burkina Faso	0	0	10	-	-	1	0	0
Cameroon	1	0	-	-	-	1	0	0
Congo Republic	1	0	≥10	0	≥5	0	0	0
Cote D'Ivoire	2	0	-	-	-	0	1	0
Egypt	110	23	725	622	185	92	15	52
Ethiopia	1	0	91	27	28	1	0	0
Gabon	2	0	12	5	13	0	1	0
Ghana	4	3	48	35	42	1	0	0
Kenya	11	5	-	-	-	1	1	0
Libya	6	1	-	-	-	2	3	1
Madagascar	2	0	-	-	-	-	-	-
Mali	1	0	-	-	-	0	0	0
Mauritania	2	1	1	-	1	0	1	0
Mauritius	3	1	-	-	-	-	-	-
Morocco	42	10	360	-	-	12	11	11
Mozambique	1	0	-	-	-	-	-	-
Namibia	2	1	-	-	-	-	-	0
Niger	0	0	10	3	10	0	2	0
Nigeria	10	6	150	8	50	2	1	0
Rwanda	2	0	-	-	-	-	-	-
Senegal	3	0	-	-	-	1	0	0
South Africa	97	24	-	-	-	-	-	-
Sudan	8	2	-	-	-	-	5	0
Tanzania	5	2	21	400	<21	-	-	-
Tunisia	23	4	191	66	-	11	4	4
Uganda	1	1	26	1	12	0	1	0
Zambia	3	2	2	-	-	-	-	-
Zimbabwe	7	3	-	-	-	1	0	0

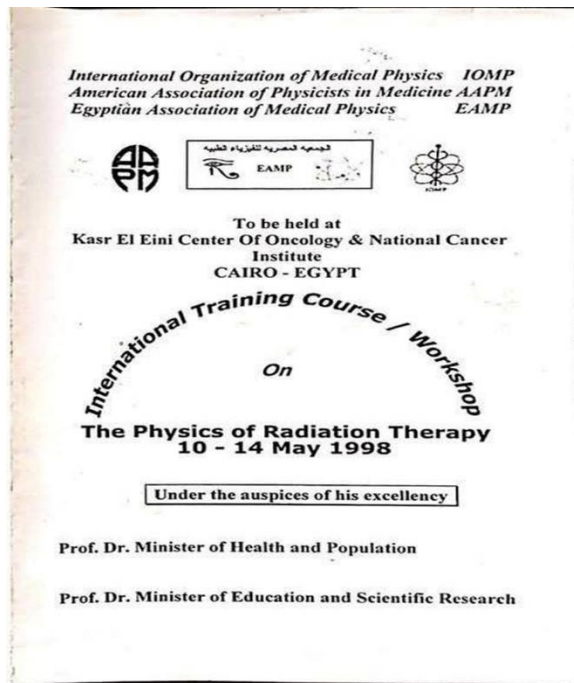
*CT – Computed Tomography; FL – Fluoroscopy; IR – Interventional Radiology; SPECT – Single Photon Computed Tomography; PET – Positron Emission Tomography; N/A – No Data Available



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- Many Egyptian universities established under and postgraduate programs for medical physics.
- On February 1998 medical physicists succeeded to initiate the Egyptian Association of Medical Physics (EAMP).
- From that date, the EAMP held a lot of national and international meetings in cooperation with IAEA, AAPM/ISEP, IOMP and EAEA.
- EAMP wrote a job description and recognition of the medical physics profession and sent to the Egyptian Syndicate of the Scientific Professions in order to submit to the Egyptian ministry of health.

International training course/ workshop on the Physics of Radiation Therapy, (10–14 May, 1998) Cairo - Egypt



International training course/workshop on the Radiological Protection and imaging Quality in the Diagnostic Radiology and Nuclear Medicine, 23-27 Feb., 2003, Cairo – Egypt.





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**Egyptian Association for Medical Physics
EAMP**

الجمعية المصرية للفيزياء الطبية
المشهرة تحت رقم 388 بتاريخ 1998/2/15

The member Board EAMP:

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2. Dr. Ali Sabry Ahmed Raya Ibrahim	(Vice President)
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Date: 5/05/2014

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Prof. Amin Elsayed Amin
EAMP Member Board



THE EGYPTIAN ASSOCIATION OF MEDICAL PHYSICS [EAMP]

Attendance Certificate

It is certified that *Mr. Sayed Mohamed Sayed Mohamed*
has attended
THE EAMP SUMMER SCIENCE CLUB - 2016
14th August 2016
Nasser Institute, Cairo, Egypt
(A Full day seminar event)

Ass. Professor. Nashaat A. Deiab
General Secretary of the EAMP

Professor. Ahmed R. Shafie
President of the EAMP





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- In August 2017, the board member of EAMP is accepted of the rearrangement
- In addition, the new board member certified and has been appointed Dr Mohamed Metwaly Mohamed as Vice President of EAMP for the External Relationships.

The third annual SSC event in August, 2017, was hold at Nasser Institute hospital, Cairo, Egypt, as:

تعلن الجمعية المصرية للفيزياء الطبية
The EAMP SUMMER SCIENCE CLUB 2
اللقاء العلمي السنوي الثاني للفيزياء الطبية

17 August 2017

Prof. Nashaat A. Deiab General Secretary of EAMP	Prof. Ahmed Reda Shafie President EAMP
Prof. Khalid El-Shahat EAMP Member Board	Dr. Kassem A. Mostafa Treasurer EAMP
Dr. Mohamed Bahaa El-Din EAMP Member Board	Prof. Amin Elsayed Amin EAMP Member Board

Prof. Ehab Atta ALLAH National Cancer Institute & SFSZ Hospital	FRIST SESSION *Principles of Diagnostics Imaging. *The Role of Medical Physicist in Nuclear Medicine. *Understanding of Medical Imaging.	Prof. Ahmed ElSersy Radiation Unit , NCI
Prof. Hossam M. Yasin King Fahad Unit , Kasr Ahsiny, Cairo University	SECOND SESSION *Physics of Targeted Radiotherapy. *X-knife Versus Gamma knife Radiotherapy & Radiosurgery. *A Paperless Dosimetry QA System in Radiotherapy. *In-Vivo Radiotherapy Dosimetry. *Dosimetric Verification of Different Radiotherapy Planning Techniques for Nasopharyngeal Carcinoma.	Prof. Hassan Fathy Physics Dep., Faculty Of science ,Cairo University
Prof. Magdy Khalil Biomedical Dept., Faculty of science, Helwan University	*Patient Dose in Imaging Modalities. *Importance of Radiation Calibration for Radiotherapy & Radio-diagnostic Applications. *Monte Carlo Simulation in Medical Imaging.	Prof. Hanan Mohamed Delab NSRA
Dr. Mohamed Saber Meady Milarity Hospital	THIRD SESSION *Radiation Protection in Petroleum and Oil Industries. *Experience in Establishing DRL in Diagnostic Radiology. *Ten advices to the Egyptian Medical Physicist.	Dr. Mohamed Bahaa El-Din Mina Oncology Center
Dr. Ahmed Mosa Mohamed Nasser Institute Oncology Center		Dr. Rania M. Mahmoud King Fahad Unit , Kasr Ahsiny , Cairo University
Dr. Walaa Soliman National Cancer Institute		Dr. Eslam Kamal MMROCK, Cairo University

Assessors Rehab Samir, Radiation Diploma Student, Mansoura University Esmat Abd El Monezy, Radiation Diploma, Mansoura University Hudaib Hany, Master Degree Student, Misr El-Hayat, Misra University Salwa Osama, Fourth year student Bio-Physics, Mansoura University Mervat M. Mousa, Third year student Bio-Physics, Mansoura University Amrany Farah Mohamed, Third year student Bio-Physics, Mansoura University	Co-ordinators Dr. Sahrir Abdel Khalil Dr. Ahmed Mosa Mohamed MP, Ali Abdel Aziz MP, Mohamed Abdel Majeed Co-ordinators Dr. Rehab Omar MP, Salwa Ishty MP, Ahmed Mohamed Morbada	Honorary Director Dr. Mohamed Metwaly Head of Chemistry and Medical Imaging, Radiotherapy Physics, United Linedoctors hospitals NED Trust, UK Conference Director Prof. Nashaat Ahmed Deiab EAMP General Secretary, National Cancer Institute, Cairo University
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Dr. Nashaat Ahmed Deiab Khalifa	(Vice President)
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Dr. Amin Elsayed Ahmed Amin	(Member)
Dr. Khalid Mohamed El-Shahat	(Member)
Dr. Momen Mohamed Omran Mostafa	(Member)
Dr. Ismail Hassan Soliman Aboderaa	(Member)
Dr. Ali Sabry Ahmed Raya Ibrahim	(Member)



The EAMP SUMMER SCIENCE CLUB III

Medical Physics as vital Profession

Nasser Institute Hospitals, Cairo, 13th August 2018





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- As medical physicists in Egypt, we had struggled for more than five decades to make medical physics a recognized profession. Since 1970.
- Many of our colleagues who were pioneers in medical physics not only in Egypt but in Africa and the middle east region tired of asking the Egyptian government, represented by the Egyptian Ministry of Health, to define the medical physics profession.

Conclusion

EAMP looking forward for the help from FAMPO and IOMP to arrange meetings with the Egyptian Ministry of Health through the official channels such as the national office of IAEA in Egypt which is the EAEA and WHO, to draw the Egyptian government's attention to the importance of introducing the medical physics profession.

Keywords: IOMP; Medical Physics; Egyptian Ministry of Health; EAMP.



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Status of Medical Physics in Africa: Morocco

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Introduction

The country's background information:

- Population: 36Million
- Equipment numbers: 58 linear accelerators
- Number of medical physicists in the country: 86 Medical Physicists with more than 90% in radiation therapy field
- In radiation therapy field we have 11 public oncology center and 24 privates.

Medical Physics Recognition

Is there a regulatory framework that governs the use of ionizing radiation?

- Law n°005 – 71 (20 October 1971): the Main Headlines of Radiation Protection.
- With Regulatory Authority: National Center for Radiation Protection, Ministry of Health, from 1971 to October 2016 –
- Implementing Decree n° 2-97-132 (28 October 1997): introduce separately ionizing radiation for medical or dental purposes.
- Law n° 142-12 (august 2014) creation of Radiological and Nuclear Safety and Security Moroccan Agency (august 2014): The Agency take place in October 2016.
- Several regulatory texts are being drawn up in different fields using ionizing radiation including medical and dental purposes one of these regulatory texts will be the recognition of Medical Physics profession as well as the obligation of clinical training.
- For the moment there is no official recognition of Medical Physics profession but:
 - i. Radiological and Nuclear Safety and Security Moroccan Agency (AMSSNuR) work on this with close collaboration with professional and Ministry of Health.
 - ii. Several regulatory texts are being drawn up.

Conclusion

- The legislator created the agency (AMSSNuR) and gave them the responsibility to ensure safety and security during the use of ionizing radiation in our country.
- Since the agency began operations, things have accelerated in our country.
- Regulation of the profession of medical physics can ensure the safe use of ionizing radiation in medicine.

Keywords: Ionizing radiation; Morocco; Nuclear Safety and Security Moroccan Agency; Linear accelerators.



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Status of Medical Physics in Africa: Nigeria

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Introduction

The country's background information is as follows:

- Population: current population estimated at 210 million.
- Equipment numbers: There are 10 teletherapy machines in the country (LINAC and Co-60), over 3000 X-ray and 150 CT.
- Number of medical physicists in the country: 100 with half in the clinics and the other in academic institutions.

Medical Physics Recognition

- Nigeria has a regulatory framework that governs the safe use of ionizing radiation for all purposes. The regulatory body is named Nigerian nuclear regulatory authority (NNRA).
- The roles of RSO and RSA as required by NNRA is not exclusive for medical Physicists.
- There is no extant law or guidelines geared towards motivating and encouraging medical Physicists.
- The existence and employment of medical physicists in Nigeria is not yet recognized in the country, the professional body is only registered with the corporate affairs commission while the process for the passage of the MP bill is currently in progress.
- There is a medical physics professional body named Nigerian Association of Medical Physicists (NAMPA). the headquarter office is currently located at the Medical Physics Department of National Hospital, Abuja.
- Most medical Physicists working in government-owned clinics in Nigeria are often nomenclated as scientific officers.
- This has also failed to address the peculiar needs of medical Physics in terms of recognition, training and remuneration.

Conclusions

- Medical Physics as a profession is not yet recognized in the country; we currently have eight (8) universities where postgraduate medical physics academic programmes are run.
- The country has in place a medical physics residency training programme which commenced in 2012 according to IAEA TCS-37 guidelines. the first set are just about to complete the program albeit this has further been impacted by the COVID-19 pandemic.
- The professional body regularly holds annual conferences and workshops during which the international day of medical physics is celebrated. Usually, foreign medical physics experts are invited for workshops during the programme.
- Most Physicists gained proficiency by learning on the job after the completion of their academic degrees. plans are underway to get this group certified by IMPCB.
- Plans are underway to encourage practicing physicists to be certified by IMPCB.

Keywords: Medical Physics; Nigeria; Nigerian Association of Medical Physicists; TCS-37 guidelines.



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Status of Medical Physics in Africa: Zambia

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Introduction

The country's background information is:

- Population: 18 million people
- Equipment numbers:
 - i. Linear Accelerator (1)
 - ii. Cobalt 60 (2)
 - iii. HDR Brachytherapy (2)
 - iv. CT Simulator (1)
 - v. Treatment Planning System
 - vi. Dosimetry
- Number of medical physicists in the country: 4



Medical Physics Recognition

- a. Current all medical use of ionisation is regulated under the 2011 Ionisation Radiation Protection Act of Zambia with its associated regulations.
 - The act was largely based on the older IAEA BSS (1996??)
 - Not explicit on the functions of MP or need for
- b. MPs are just registered with the Health Professions Council of Zambia a health worker by virtue of working in the hospital.
- c. No regulation has been drafted
- d. Currently no national medical physics association



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- However, affiliation to other associations: examples are Radiological Association of Zambia, Amano Society of Pure and Applied Physics
- e. MPs have been registering since 2006 which coincided with the establishment of the 1st radiotherapy facility
- f. Not much thought was put into making a formal process. The process followed was as laid out by the HPCZ.
- g. Major influence was by the IAEA who insisted that MPs must be employed as Health workers and remunerated as such bearing in mind the high skills they possess.
- h. Current effort MP recognition:
 - To establish MP recognition through legal channel (to ride on Nuclear Policy that is yet to be enacted)
 - Develop policy to recognize MPs (Ministry of Health engaged to train MPs and create appropriate positions with a career path)
- i. What role FAMPO can play:
 - Seek audience at high level (AU, regional organisations)
 - Write to the Health Councils on the importance of these key players
- j. Remind our Radiation Protection Regulators that they need to support the requirements to have MPs.

Conclusion

- Ministry of Health to establish appropriate MP positions
- Formalise clinical training of MPs
- HPCZ to create an appropriate register.
- Engage Regulatory authority to 'impose' MP in relevant institutions.

Keywords: Ministry of Health; Zambia; FAMPO; regional organisations.