Cancer Care for All: Expanding Access to Life-Saving Cancer Treatment in Africa: IAEA perspective

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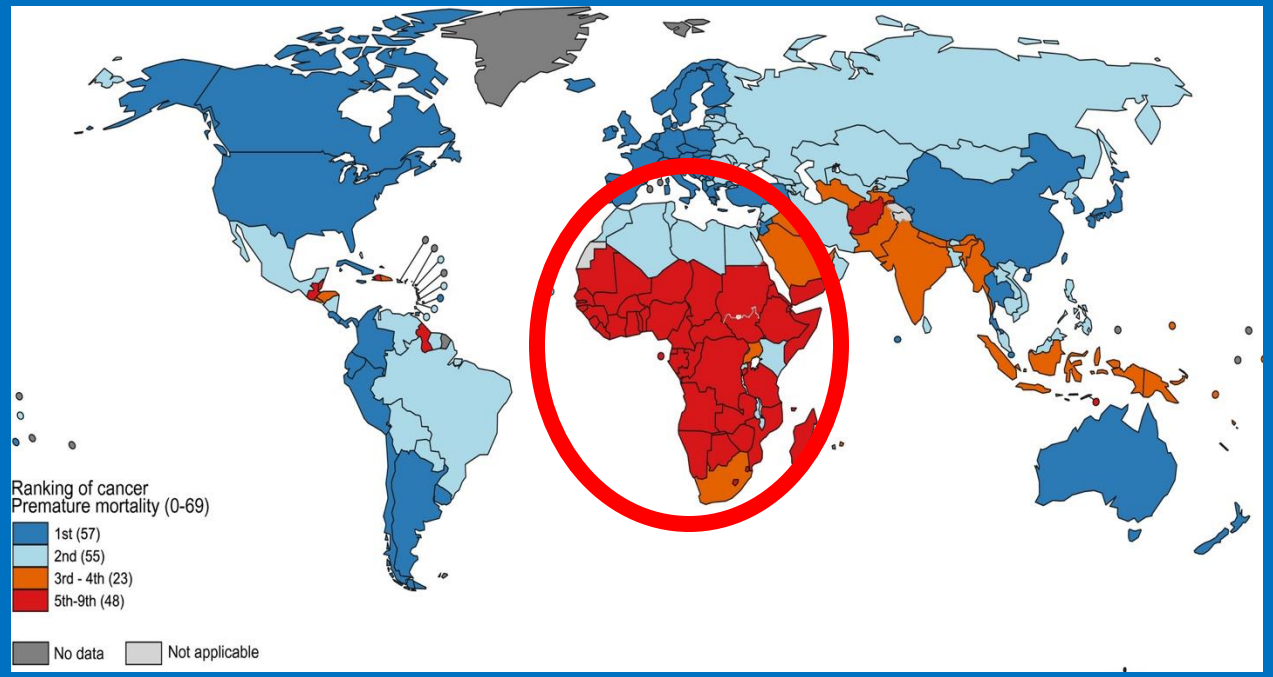
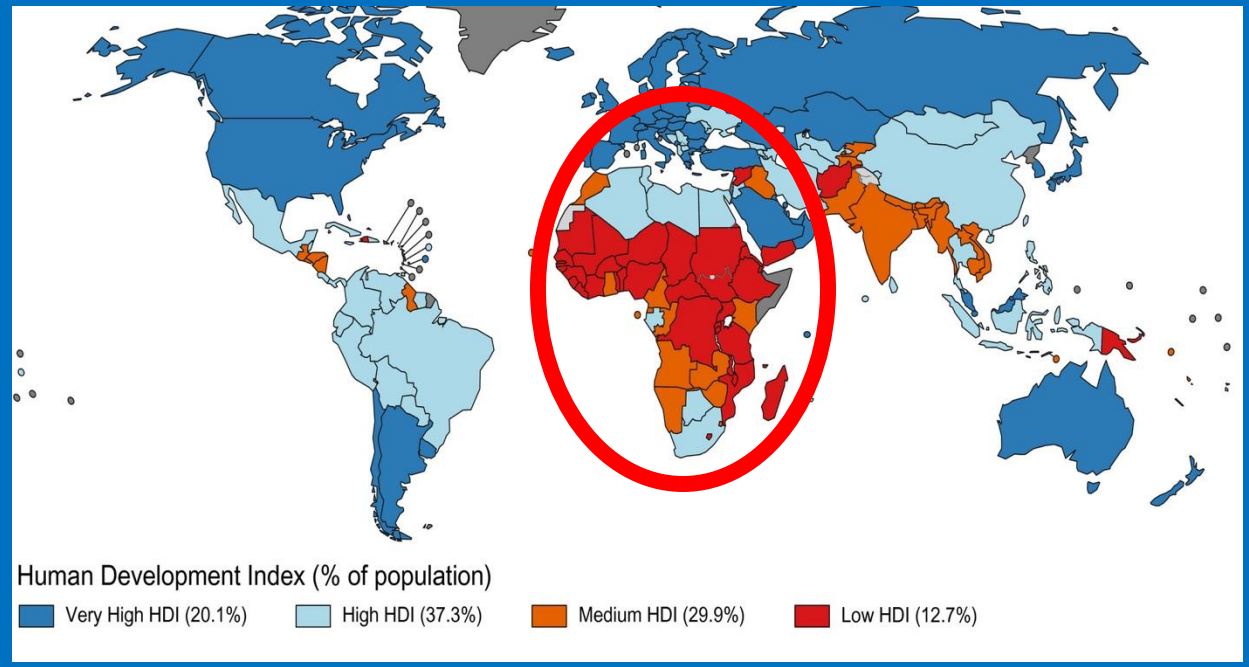
Director, Division of Human Health
Department of Nuclear Sciences and Applications,
International Atomic Energy Agency

Vienna Center for Disarmament and Non-Proliferation (VCDNP) 18 March 13:00 to 14:30

Mortality of Cancer and HDI





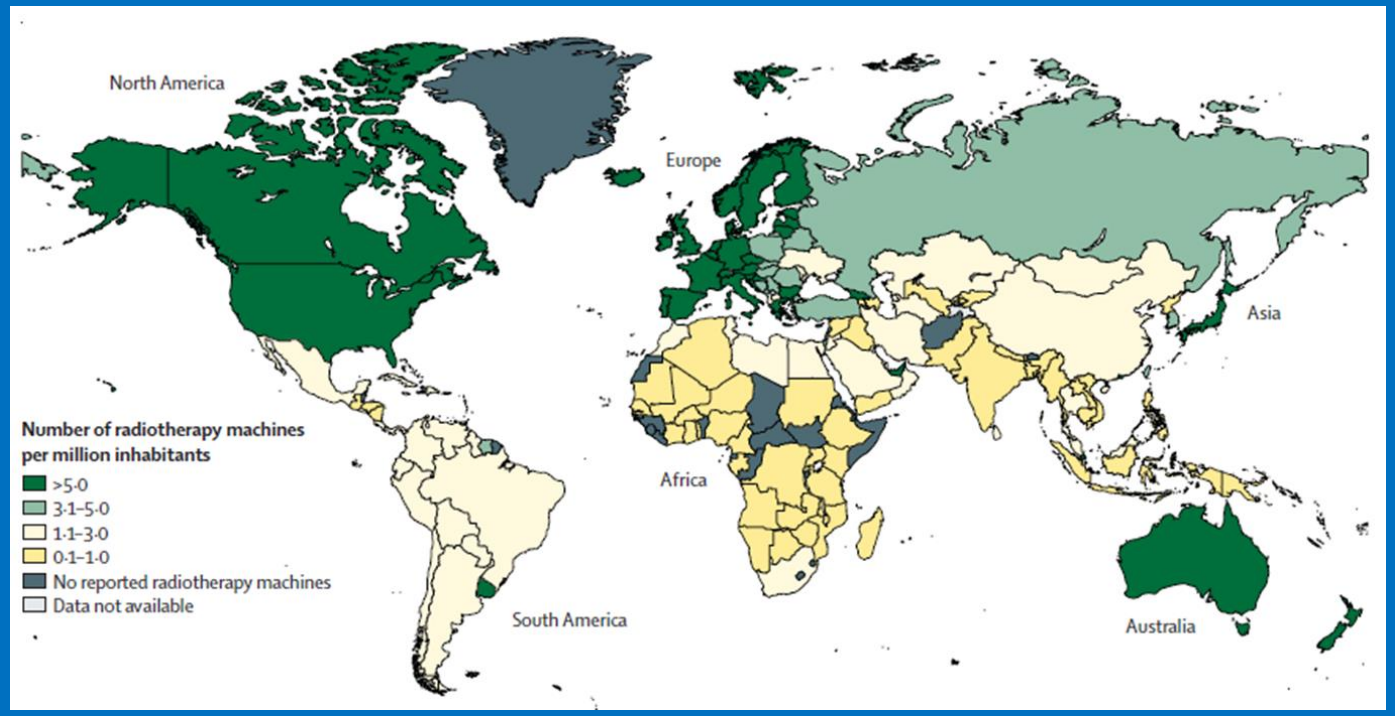
Sung et al: *CA A Cancer J Clinicians 2021;* 71(3): 209-249

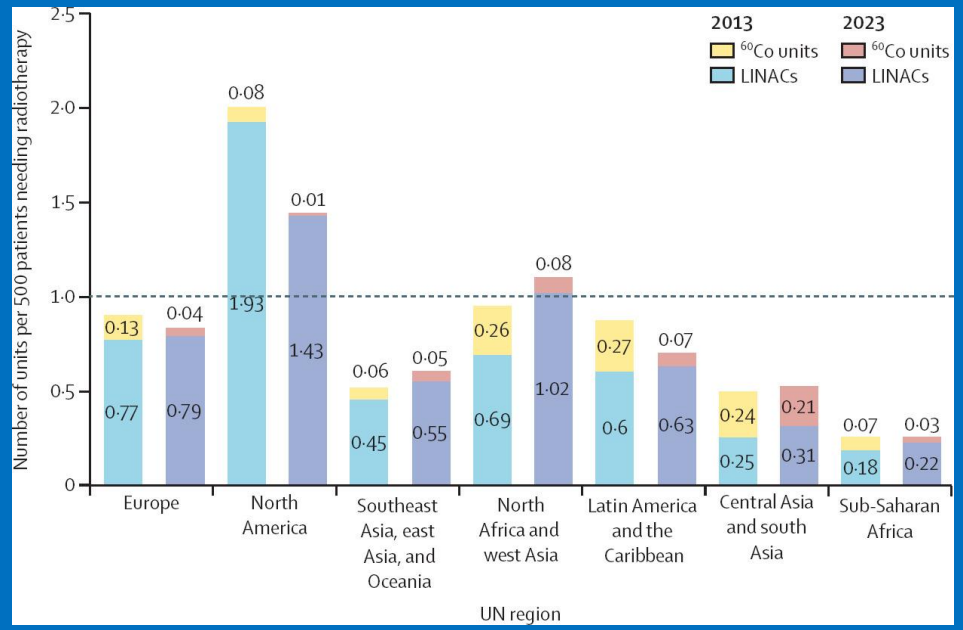
Interconnected components of the Health System

- Healthcare Infrastructure
- Quality Assurance measures
- Workforce Capacity
- Financing Mechanisms
- Referral Systems

World Health Organization. *Essential Public Health Functions, Health Systems and Health Security: Developing Conceptual Clarity and a WHO Roadmap for Action*; World Health Organization: Geneva, Switzerland, 2018.

2024 Lancet Oncology Commission

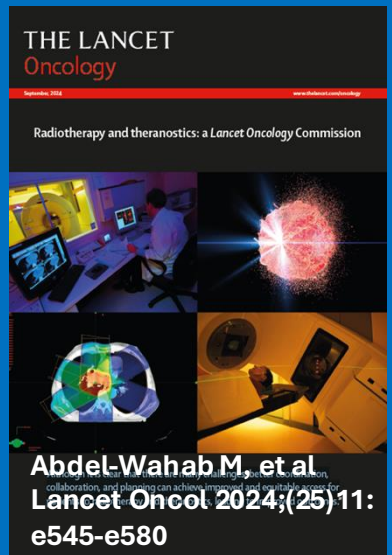




Despite progress, equipment availability and suitably professionals continue to be challenging

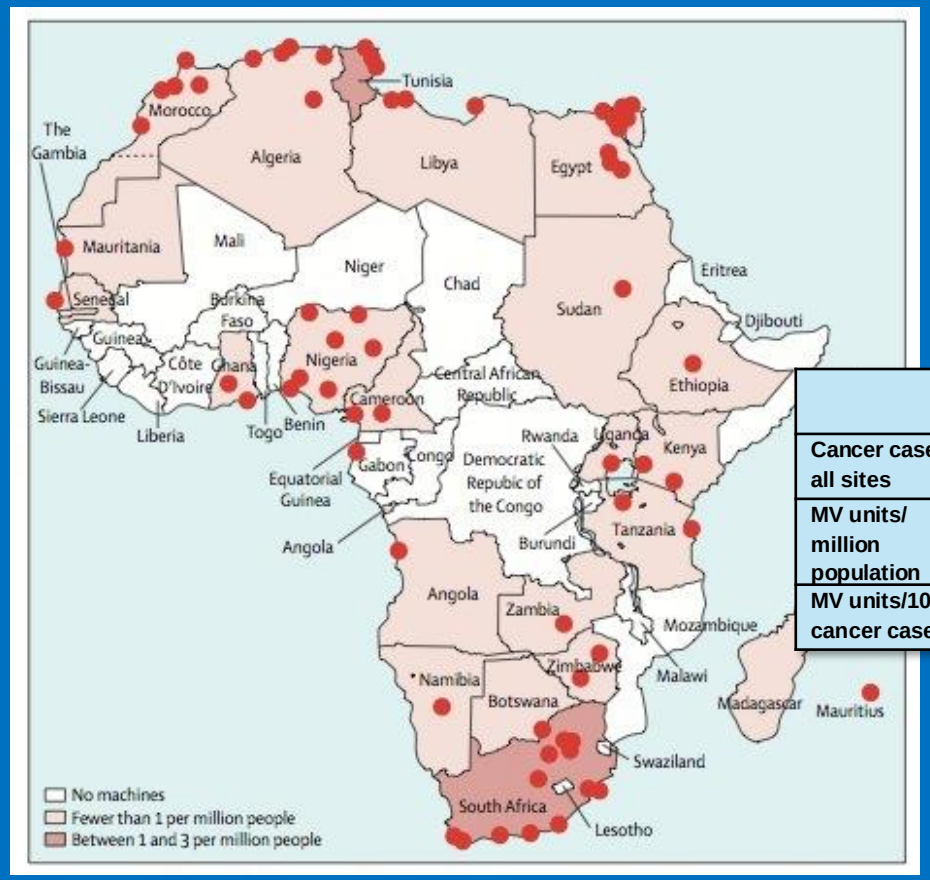
Low-income countries need 8 times the number of available machines for every 1 machine to serve 500 patients

The 2022 workforce has to expand by 60+% just to meet the cancer burden in 2050

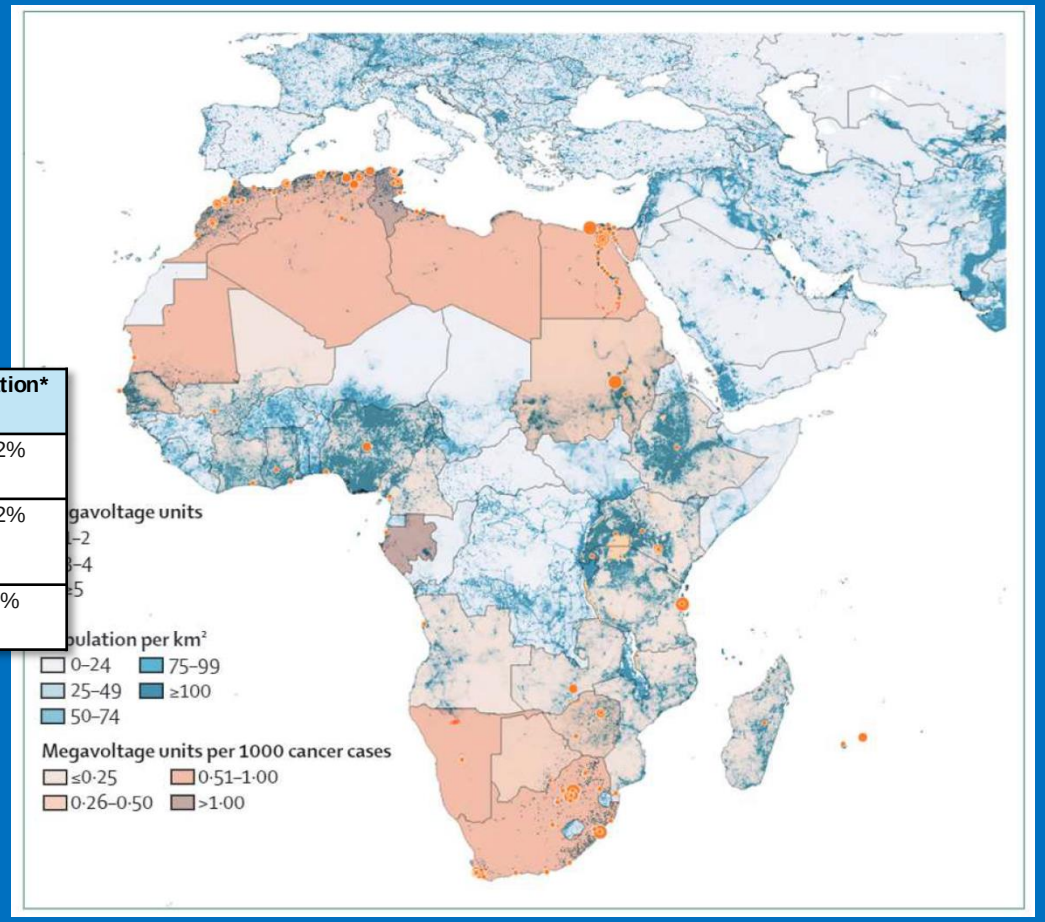


Abdel-Wahab M, et al
Lancet Oncol 2024;(25)11: e545-e580

Improvements over 10 years in Africa outpaced by cancer cases



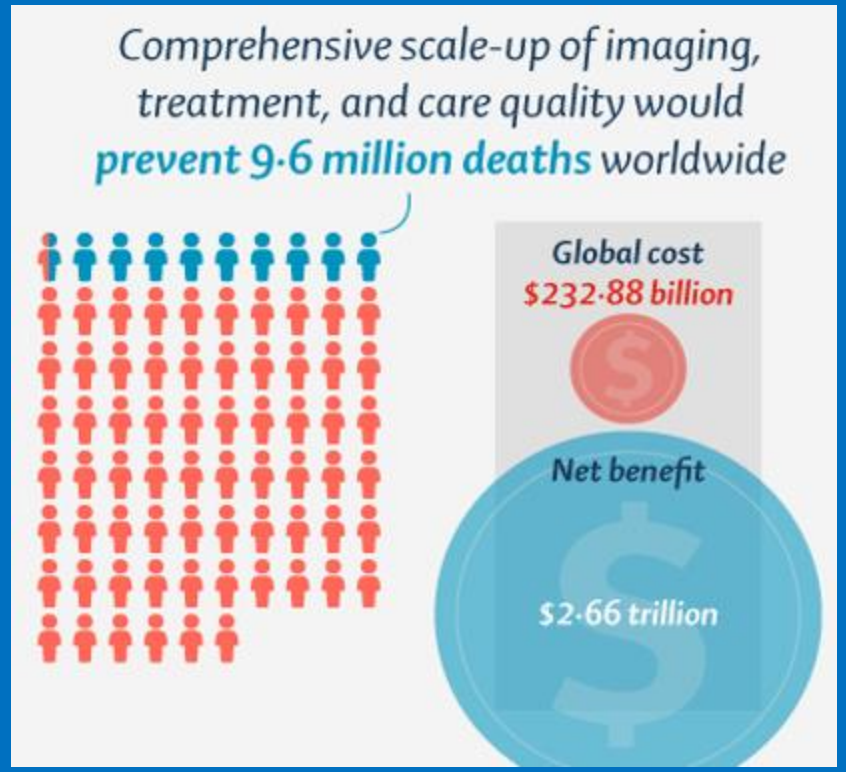
	2012	2018	2020	Variation*
Cancer cases, all sites	844279	1055172	1122495	+32%
MV units/ million population	0.26	0.28	NA	+12%
MV units/1000 cancer cases	0.34	0.32	0.35	+3%



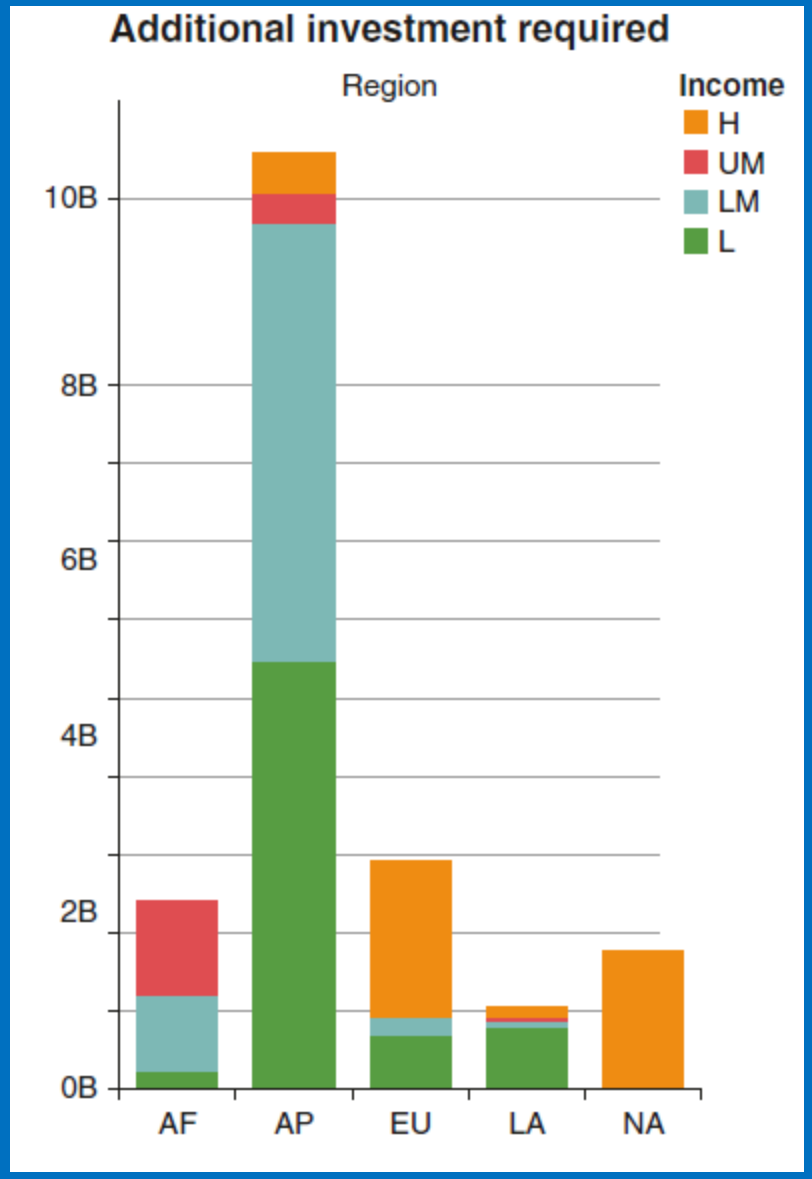
Abdel-Wahab et al Lancet Oncol 2013;14:168-75

Elmore et al Lancet Oncol 2021

Investment in Equipment and Other factors



Hricak, Atun, Abdel-Wahab et al: Medical Imaging & Nuc medicine LOC Lancet Oncol 2021; 22 (4): e136-e172.



Radiotherapy in global health" Abdel-Wahab M et al in "Radiology in Global Health: Strategies, Implementation, and Applications, 2e"Springer 2018

Main challenges in 26 African countries

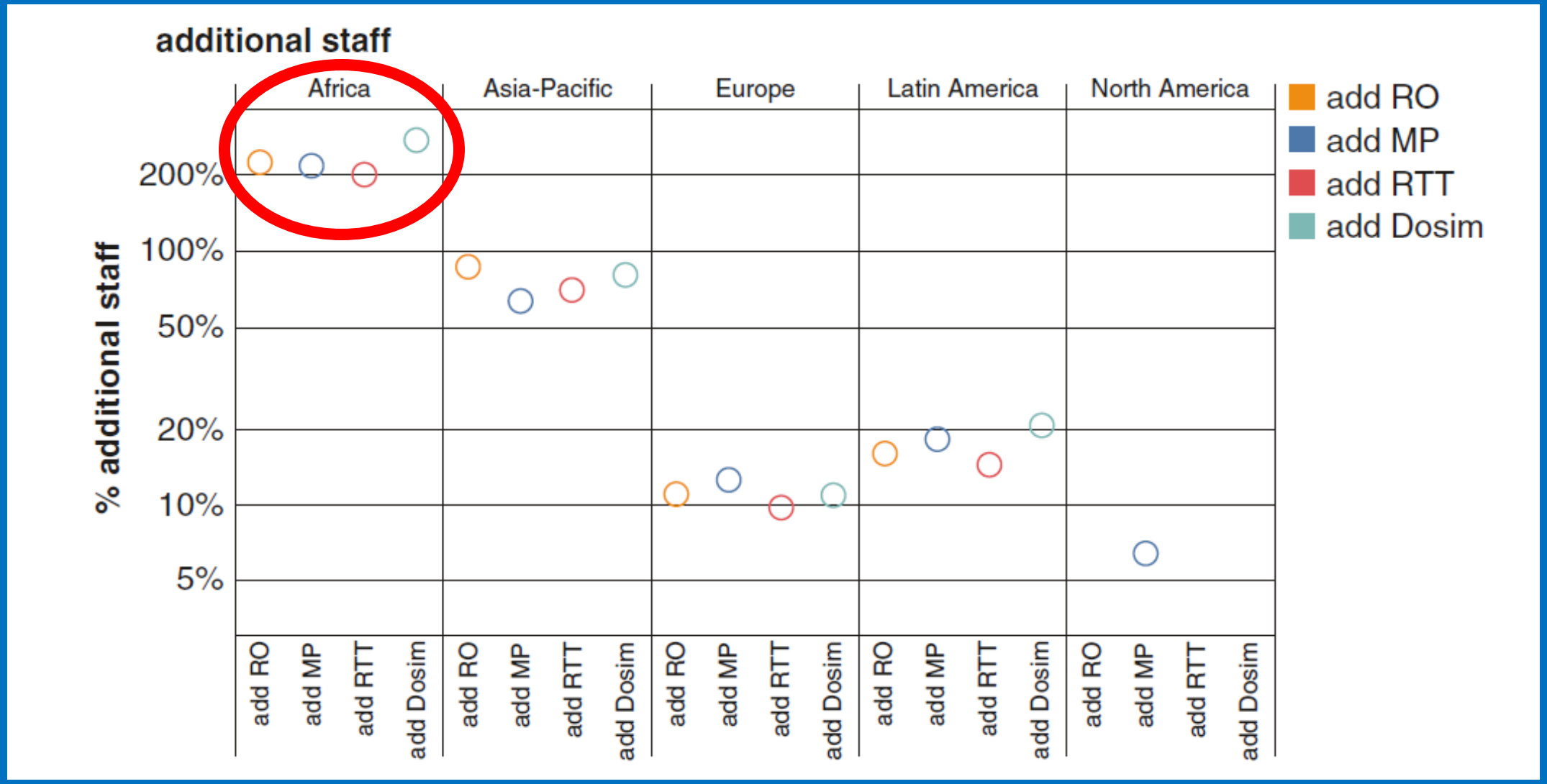
- Lack of Radiotherapy facilities
- Lack of Maintenance/ spare parts/ High cost of maintenance
- Limited training opportunities
- Lack of specialty recognition

Individual perspectives of the main challenges faced by radiotherapy centres.

	Lack of sufficient radiotherapy treatment facilities for population	Insufficient staffing/ human resources	Lack of sufficient maintenance/ poor availability of spare parts/ frequent machine breakdown	Limited training opportunities	High cost of equipment and maintenance	Lack of recognition of specialty
Algeria	✓			✓		
Angola			✓	✓		
Botswana	✓	✓	✓			
Cameroon	✓	✓	✓	✓	✓	✓
Egypt		✓		✓	✓	
Ethiopia	✓	✓	✓	✓		✓
Ghana		✓	✓			✓
Kenya					✓	
Libya		✓		✓		
Madagascar	✓					
Mali	✓		✓			
Mauritania	✓					
Mauritius		✓		✓		
Morocco				✓	✓	✓
Mozambique	✓			✓		✓
Namibia	✓		✓		✓	
Nigeria	✓	✓	✓			
Rwanda	✓	✓				
Senegal		✓		✓		
South Africa		✓	✓			
Sudan	✓	✓	✓	✓	✓	
Tanzania	✓				✓	✓
Tunisia	✓					✓
Uganda	✓	✓				
Zambia	✓		✓			
Zimbabwe			✓		✓	

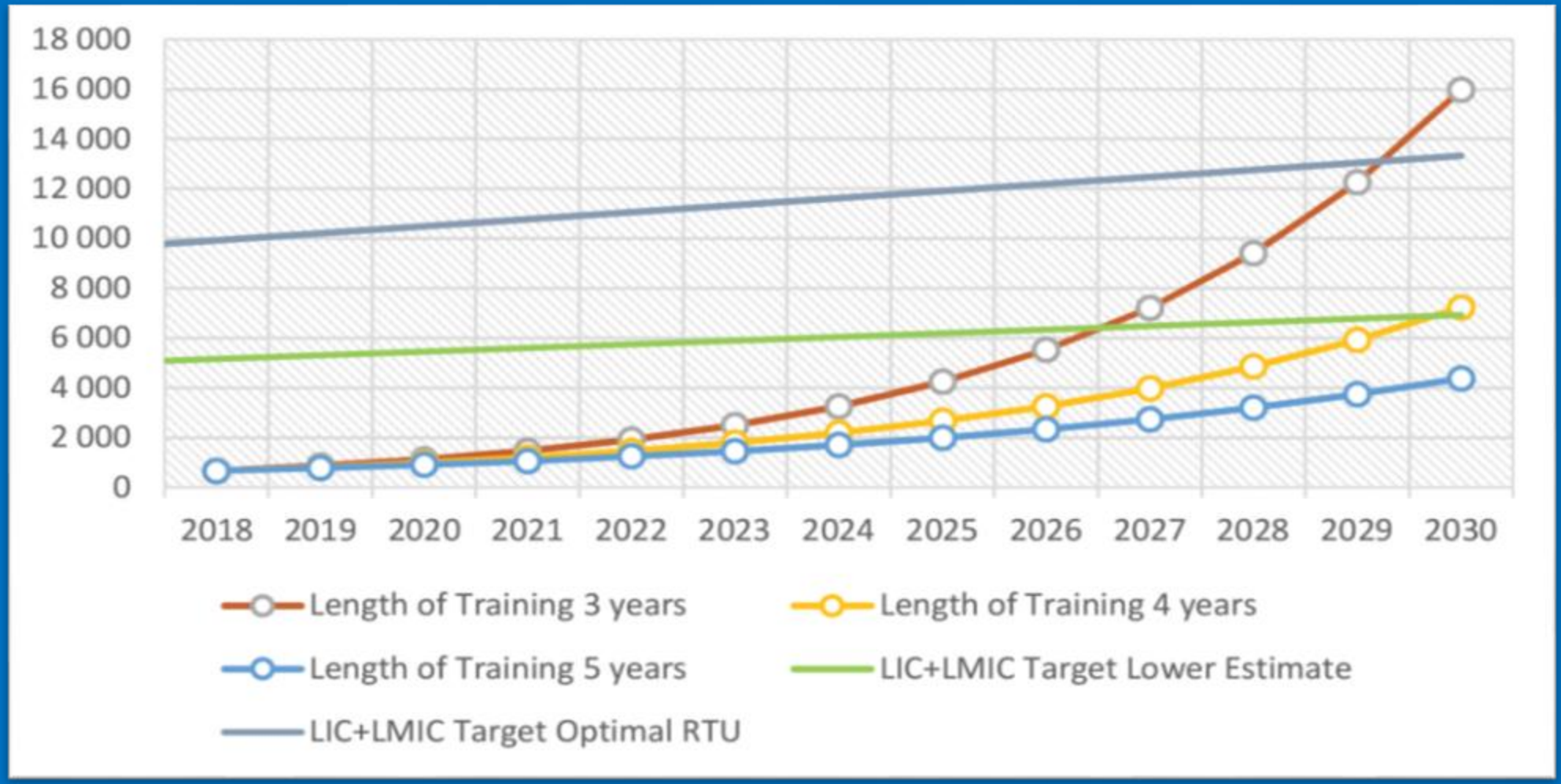
Ige et al J Cancer Policy 2023;35:100372

Additional Staff needed by Region



Radiotherapy in global health" Abdel-Wahab M et al in "Radiology in Global Health: Strategies, Implementation, and Applications, 2e"Springer 2018

Effect of Length of Training on RO Supply



The impact of different durations of training (on projected growth in the supply of radiation oncologists.

Elmore et al Appl Radiat Oncol 2019: 10-16

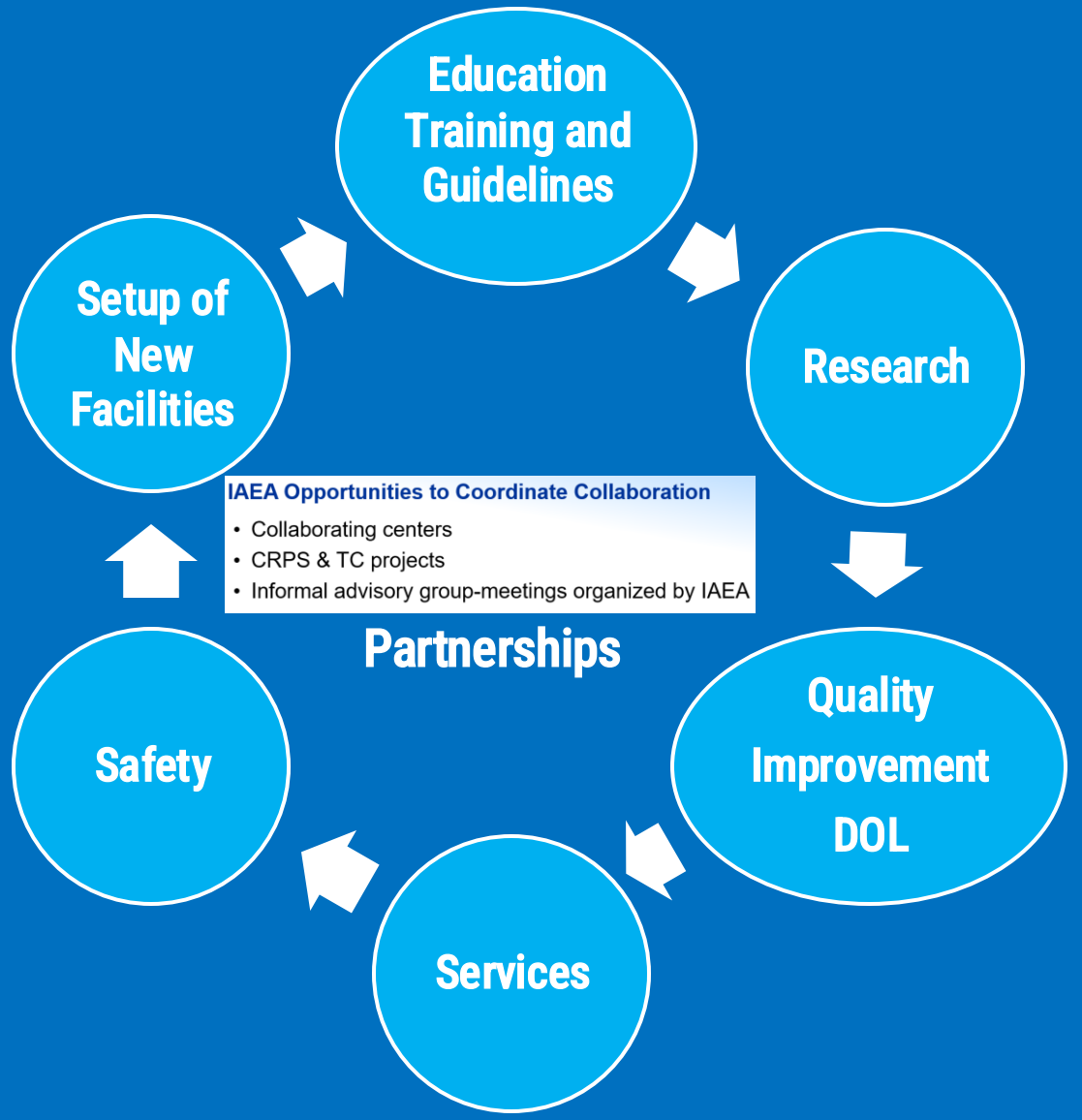
Areas of Support

Division of Human Health

To strengthen the capabilities of MS to address the needs related to the prevention, diagnosis and treatment of health problems

through the application of nuclear and related techniques

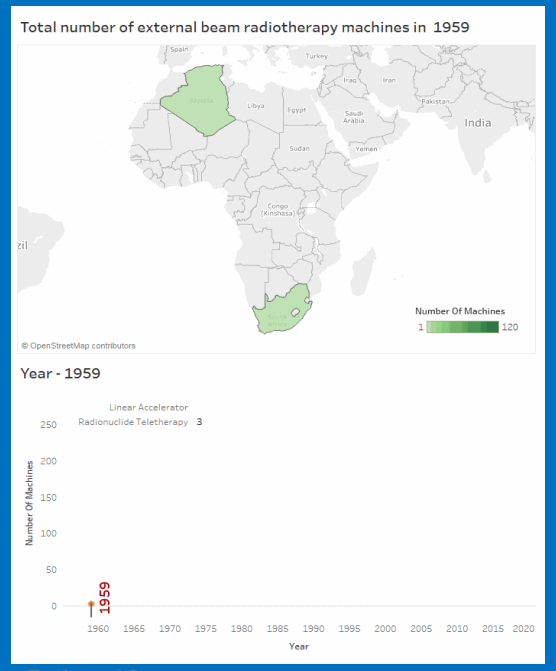
- Nutritional and Health-Related Environmental Studies Section
- Nuclear Medicine and Diagnostic Imaging Section
- Applied Radiation Biology and Radiotherapy Section
- Dosimetry and Medical Radiation Physics Section

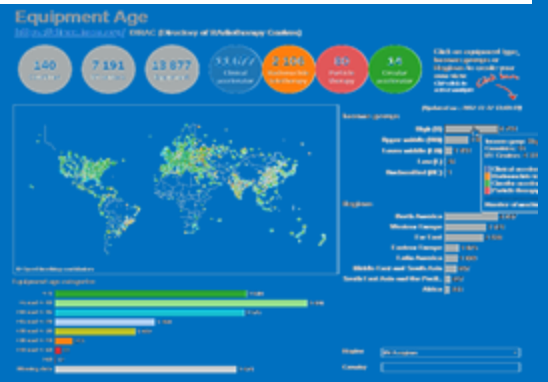


Addressing Global Challenges

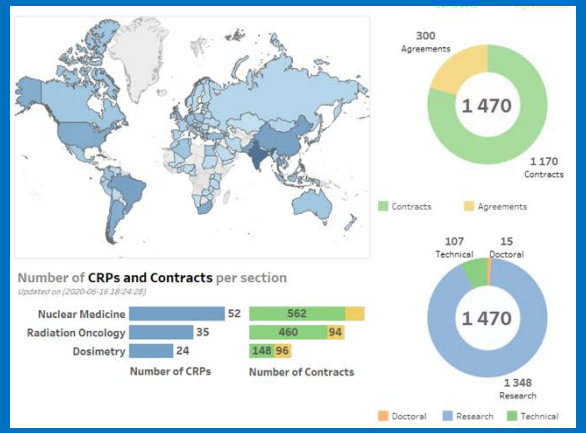
Communication

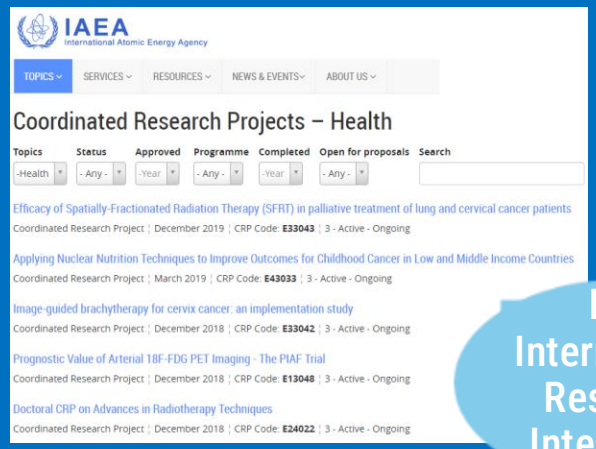
Needs





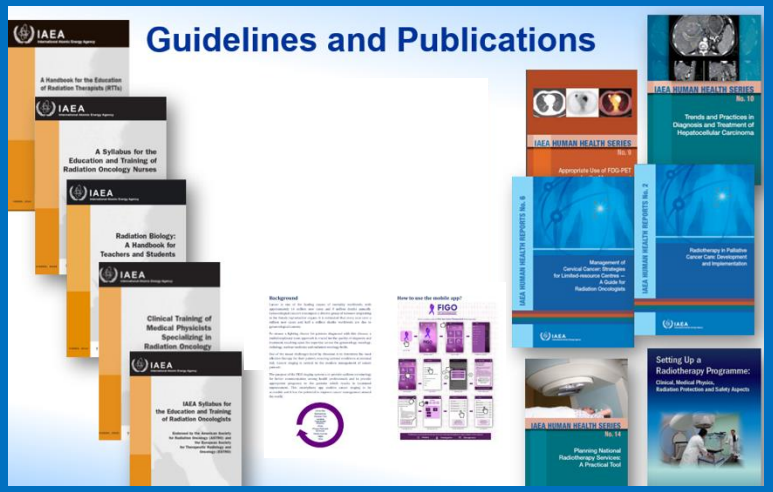
Research Opportunities

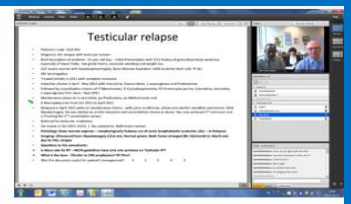




IRIS International Research Integration

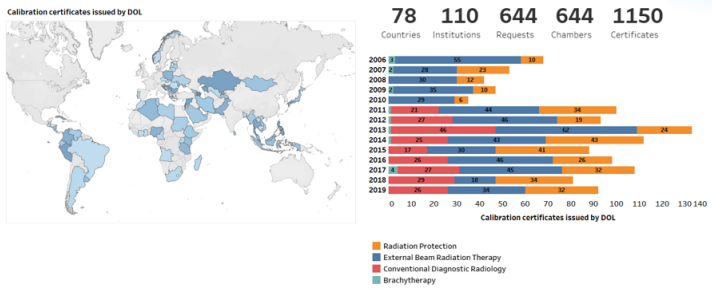
Education & Training





Quality

Quality: Dosimetry calibrations for SSDLs

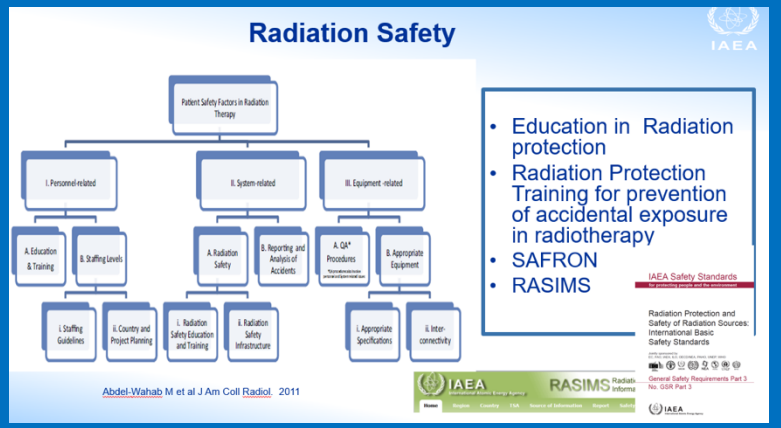


https://ssdl.iaea.org/

IAEA DOL is central laboratory for the SSDL Network 86 Labs,72 Countries

Radiation Safety

Radiation Safety



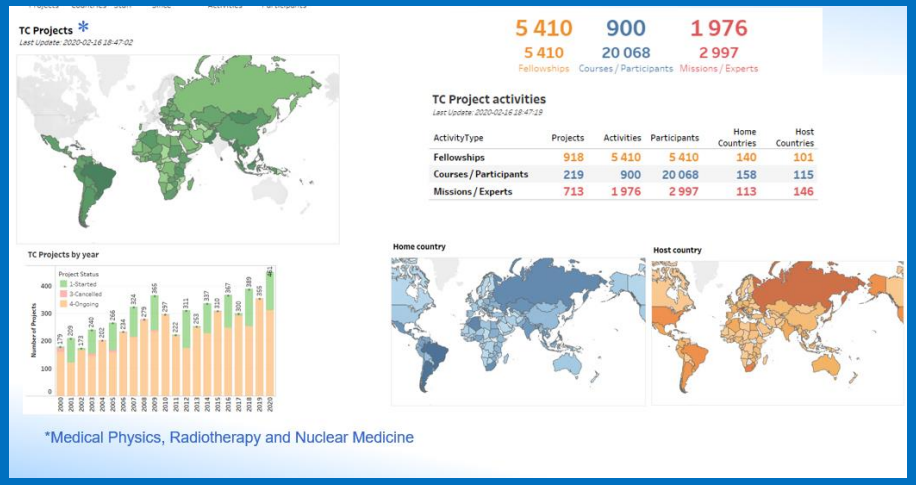
Abdel-Wahab M et al J Am Coll Radiol. 2011

Quality Assurance Team for Radiation Oncology

- Radiation oncologist
- Medical physicist
- RTT
- Safety specialist (local)

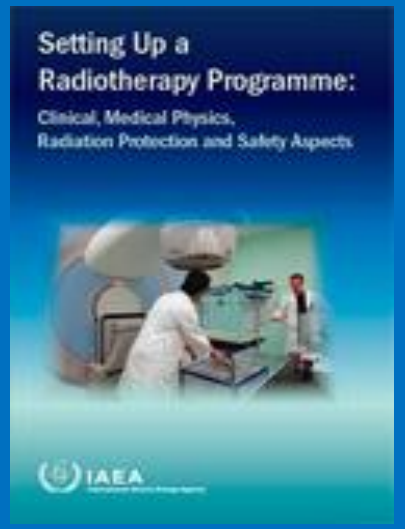
IAEA dosimetry travel kit used for QUATRO missions

Access

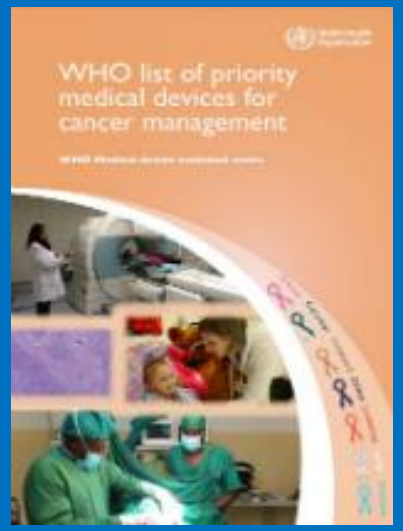


*Medical Physics, Radiotherapy and Nuclear Medicine

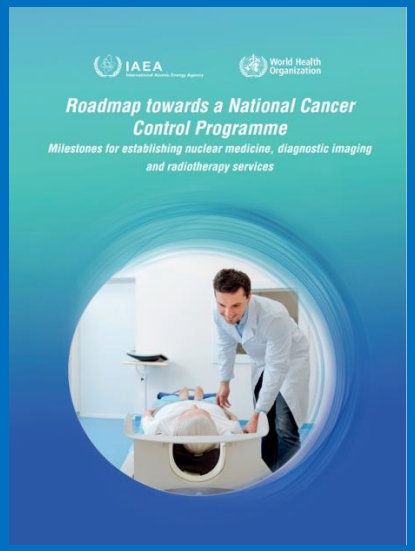
Guidance on establishing radiotherapy departments

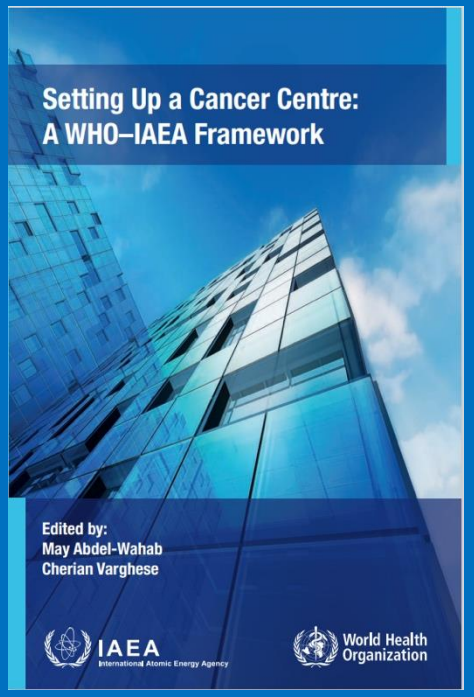


2008

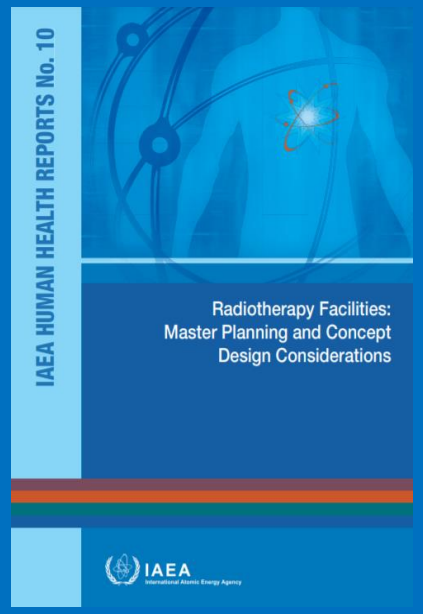


2017

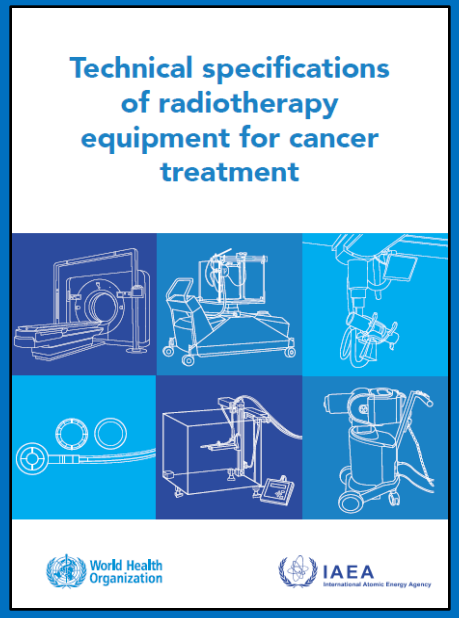


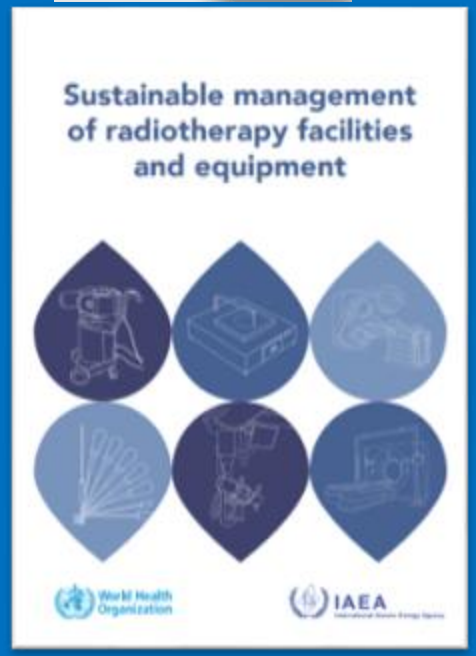


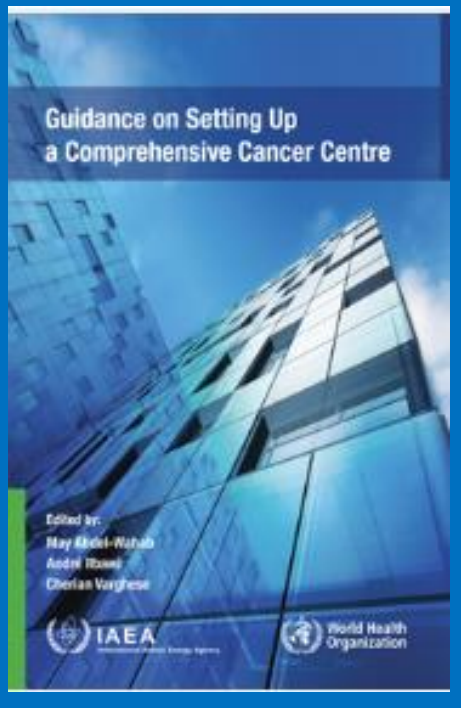
2022



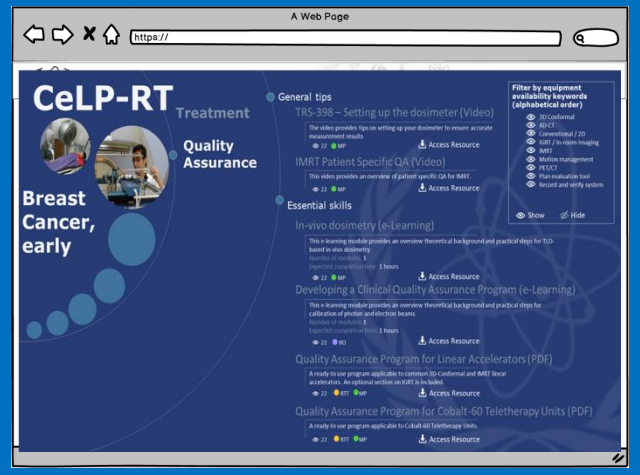
2014

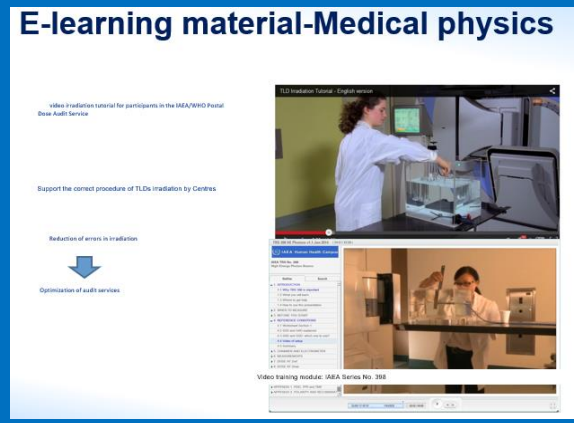


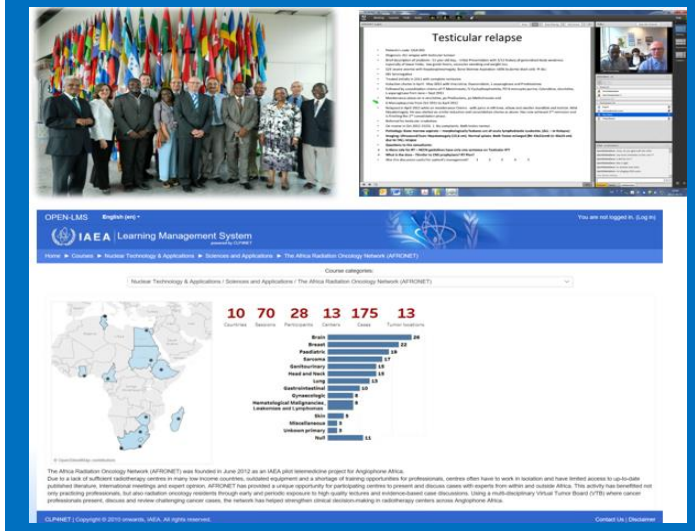




E-Learning Resources



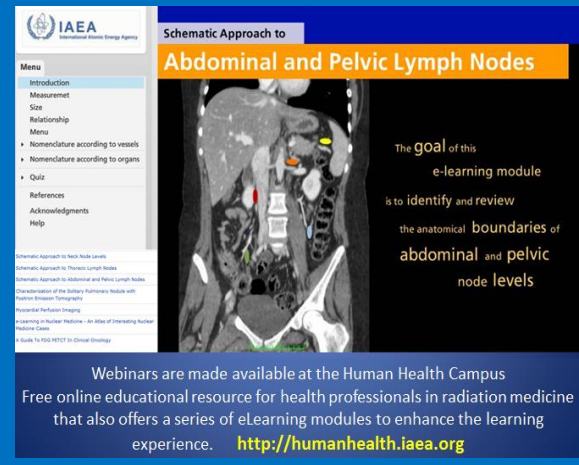




Virtual Tumor Boards

Complete curricula

Webinars and online training

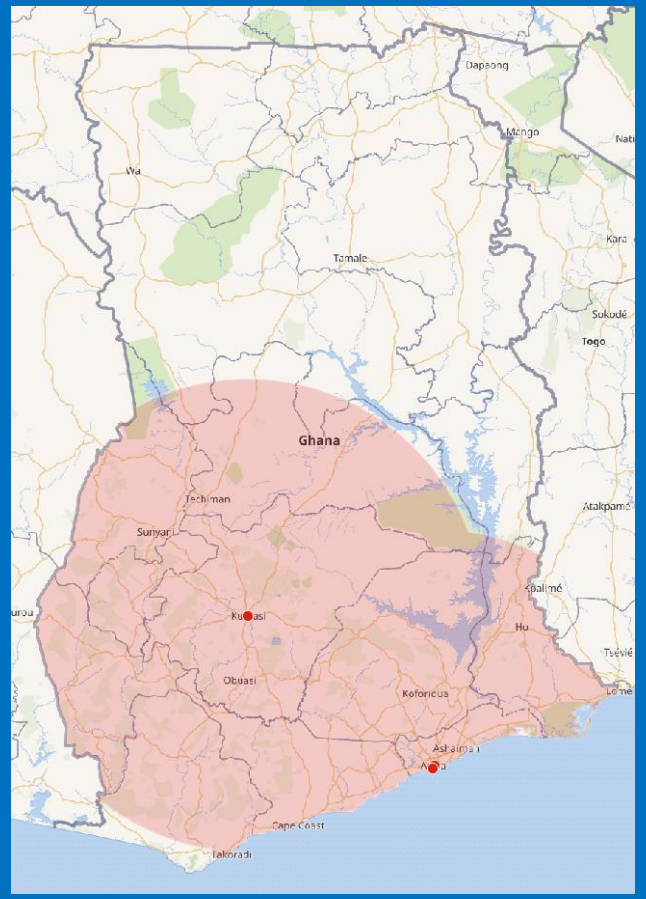


Interactive E-Learning modules

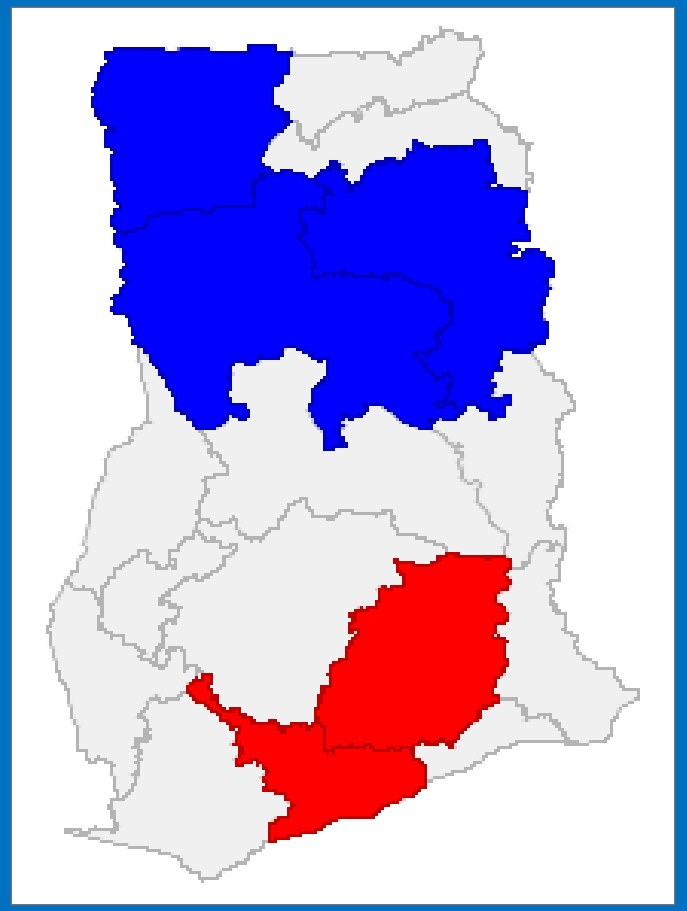
http://humanhealth.iaea.org

Health Systems Research & Support of in-Country Planning

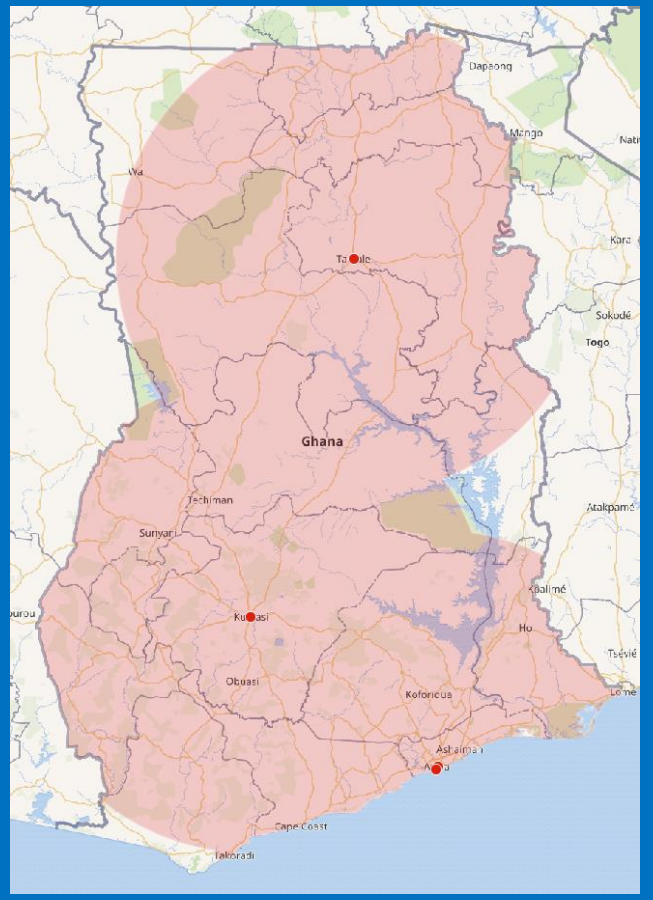
CURRENT SITUATION



SPATIAL AUTOCORRELATION MODEL



AFTER EXPANSION OF SERVICES



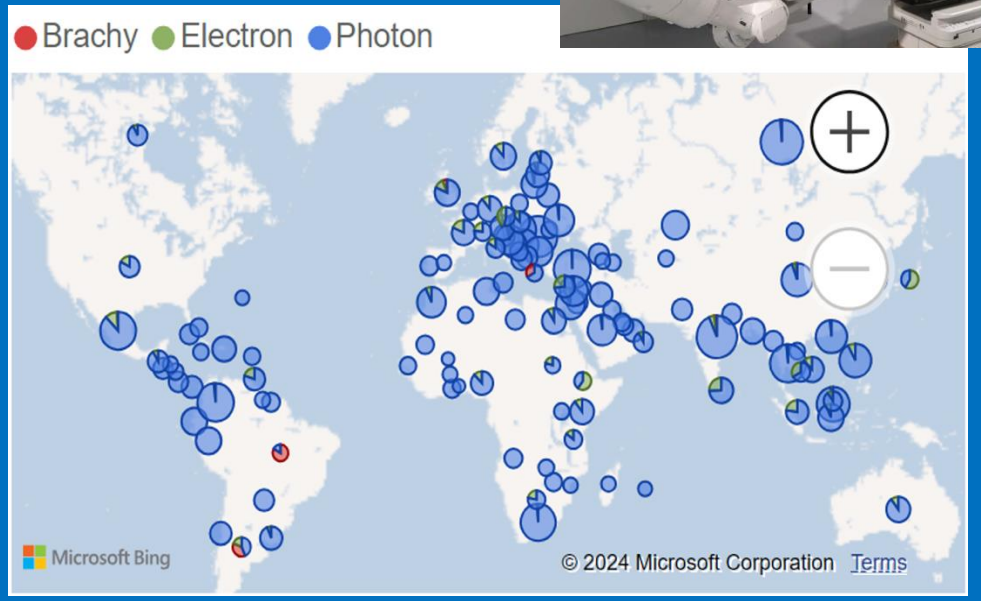
Analysis of inequities using quantitative methods and Geographic Information Systems

Quality Assurance: Calibrations and Comparisons

- IAEA Dosimetry Laboratory (DOL) is the central lab of the IAEA/WHO Network of Secondary Standards Dosimetry Laboratories (SSDLs)
  through it, the IAEA establishes a direct link between countries and the International System of Units
  134 ionization chambers calibrated and 269 certificates issued to labs in 39 countries in 2022/23

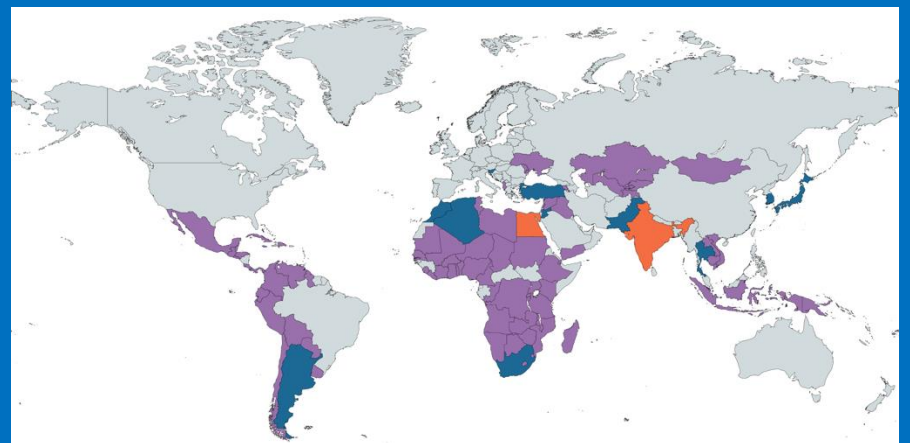
- IAEA/WHO postal dose audit programme –
  15,000+ beams checked in 2,700+ radiotherapy centres across 144 countries since 1969

- IAEA-developed independent quality audits through comprehensive reviews of practices in radiotherapy (QUATRO), nuclear medicine (QUANUM), and diagnostic radiology (QUADDRIL)
  - "train the trainer" workshops to train complete teams of radiation medicine professionals to carry out and train others in QUATRO, QUANUM, and QUAADRIL



Pillars of Rays of Hope

- Supporting access through technical assessments and economic evaluations, equipment, and capacity building (technology transfer and training)
- Sustainability through Anchor Centres – regional knowledge and capacity building hubs
- Innovation through research and development



Visiting Panama's National Oncology Institute, January 2025

Examples of Progress to date

- **Democratic Republic of the Congo**: **Training** of medical professionals ongoing
- **Kenya**: **Procurement** of radiotherapy equipment completed; **training** ongoing
- **Chad**: Construction of a **radiotherapy** centre and the **training** of professionals are ongoing
- **Malawi**: Construction of bunkers, **procurement** of equipment and the **training** of professionals are ongoing

the country's first public radiotherapy centre is expected to open at the end of the year

Laying the foundation stone of what will be the first public radiotherapy centre in the Democratic Republic of the Congo, November 2023

Examples of Progress to date

- **Dominican Republic**: New oncological centre being built in the southwest; **procurement** of radiotherapy equipment and **training** ongoing
- **Honduras**: Support for the **procurement** of radiotherapy equipment and plans for capacity building
- **Mexico**: **Procurement** of radiotherapy equipment in progress
- **Latin America**: **32 mammography units** being procured for breast cancer screening services and diagnosis across 18 countries

Visiting hospitals in Uruguay, one of the countries that will receive mammography units, December 2023

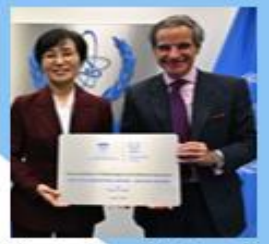
IAEA Collaborating Centre - Anchor Centres

(as of 31 Jan 2025)

Institute of Oncology Ljubljana (Slovenia)

Ege University Faculty of Medicine (Türkiye)

Atomic Energy Cancer Hospital, Nuclear Medicine, Oncology and Radiotherapy Institute, Islamabad (Pakistan)



Korea Institute of Radiological and Medical Sciences (Republic of Korea)

University Hospital Centre of Bab El-Oued and Pierre and Marie Curie Cancer Centre (Algeria)

Institut National d'Oncologie (Morocco)

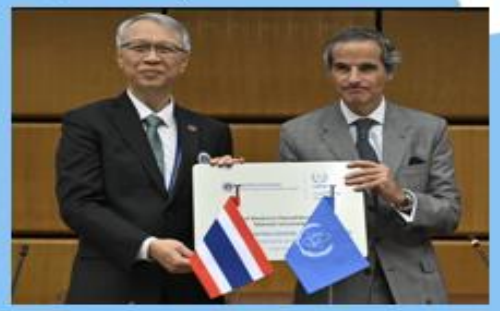
King Hussein Cancer Center (Jordan)

The Japanese Network of Cooperation in Radiation Medicine for Rays of Hope (Japan)

Comisión Nacional de Energía Atómica (Argentina)

Steve Biko Academic Hospital – NuMeRI (South Africa)

Mahidol University Faculty of Medicine Ramathibodi Hospital (Thailand)



Anchor Centre Hosted Capacity Building Events

Regional workshop on the status of paediatric radiotherapy services across Latin America, held at the Anchor Centre in Argentina in November 2024

Regional workshop on paediatric radiotherapy services across Europe, held at the Anchor Centre in Turkiye in April 2024

Regional training course on streamlined and emerging theranostic techniques, held at the Anchor Centre in Japan in August 2024

Expert Missions

Week-long, on-site visits to identify key areas and needs where the IAEA can provide its support

Opportunity to modify and further tailor the joint workplan with each Anchor Centre

Anchor Centre in South Africa

Anchor Centre in South Africa

Anchor Centre in Algeria

Anchor Centre in Morocco

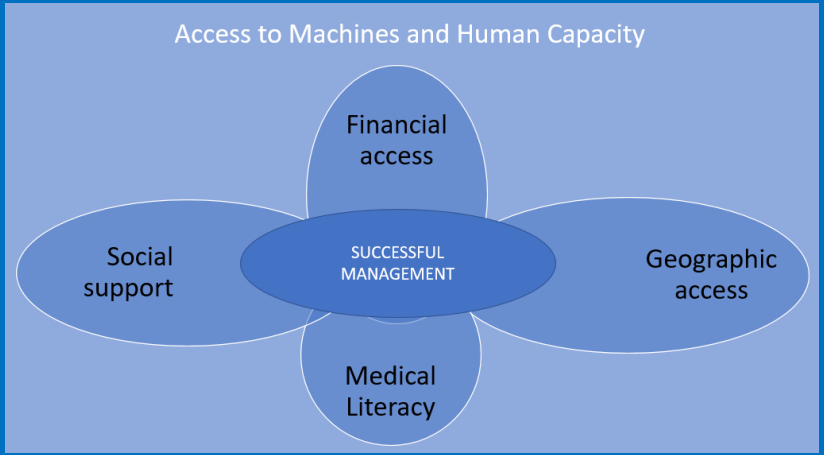
Anchor Centre in Argentina

SUNRISE

- Data is pivotal for advancing cancer treatment, research and education
- Under Rays of Hope, the IAEA is developing SUNRISE: The Sustainable United Network for Radiation Medicine Innovation and Scientific Excellence
- This envisaged database will :
  - enhance cancer care for all by assessing & improving patient outcomes,
  - increasing cost-effectiveness,
  - informing decision making,
  - facilitating research,
  - optimizing healthcare systems and advancing excellence globally

Additional Factors and areas to be addressed

- Interim housing for traveling patients
- Increased community education to reduce late-stage diagnoses
- Use of virtual visits to avoid travel



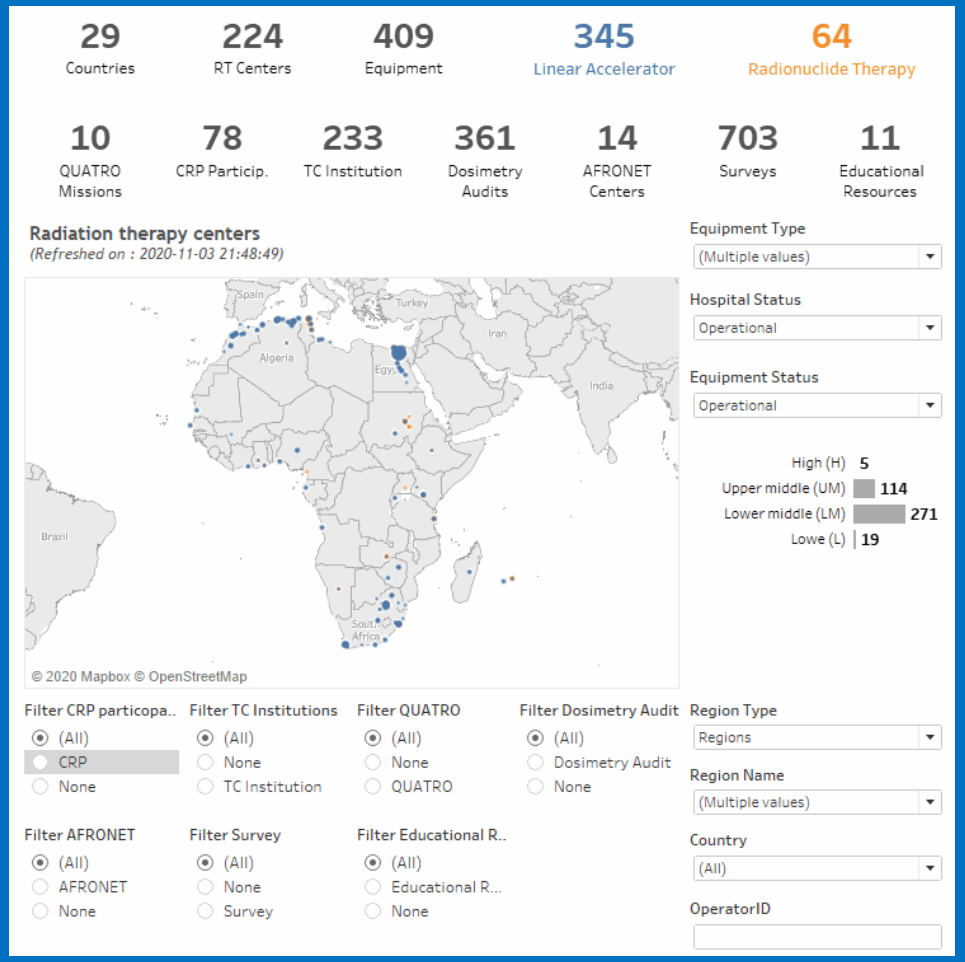
Factors Impacting Care Seeking Behaviors

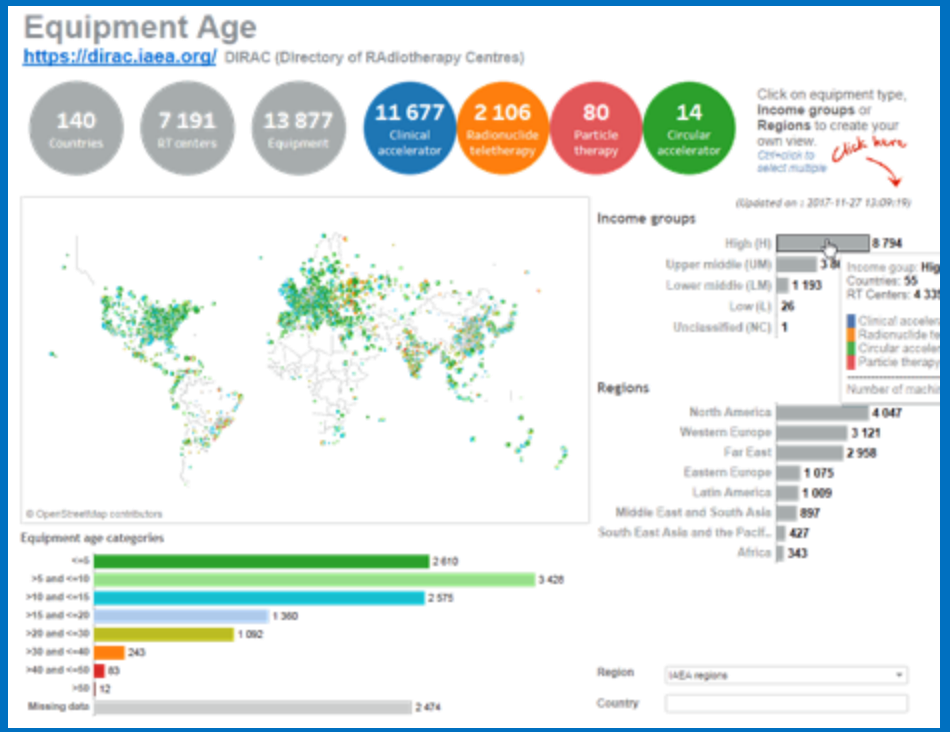
Factors increasing likelihood of seeking care	Factors decreasing likelihood of seeking care
Positive awareness of cancer/family history	Lack of awareness of cancer/education
Strong Support System	Lack of health seeking behaviours at symptom onset
Protestant Affiliation	Preference for traditional or religious healers
	Fear of ostracization or stigma in community
	Fear of treatment
	Low SES
	Challenging referral system; Previous negative experience in hospitals/ healthcare; HIV +ve

Beltran Ponce et al JCO Clin Oncol 2023, 9: e2200218

Together we can

- Education
- Training
- Planning
- Project Design
- Procurement support
- Health economics
- Bunker design
- Masters Programs
- Gender Parity





THANK YOU!

https://www.iaea.org/services/key-programmes/rays-of-hope

https://www.iaea.org/about/organizational-structure/department-of-nuclear-sciences-and-applications/division-of-human-health