IAEA
International Atomic Energy Agency
Atoms for Peace and Development

Dosimetry and Medical Radiation Physics: IAEA activities in support of alternative technologies in medicine

Division of Human Health

10 June 2020

Session 1.4: Alternative Technologies of Radioactive Sources in Medical Applications

The National Academies of Sciences, Engineering and Medicine

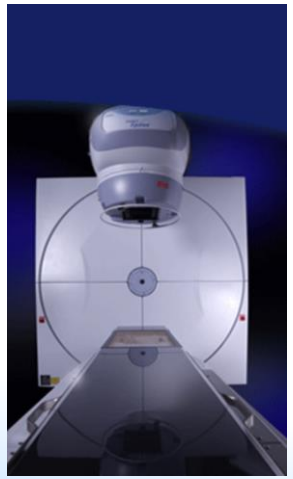
Objective of the Section

To enhance the capability of Member States to implement radiation imaging and treatment modalities safely and effectively through optimized dosimetry and medical physics practice.

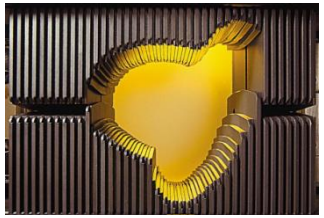
- Clinical medical physics expertise, including education
- Dosimetry Laboratory for MS services (calibrations, comparisons and dosimetry audits)

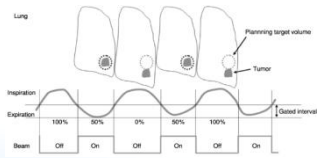
External beam radiotherapy

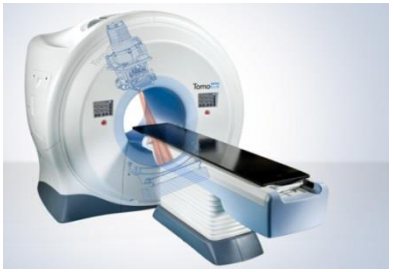
Standard



Complex



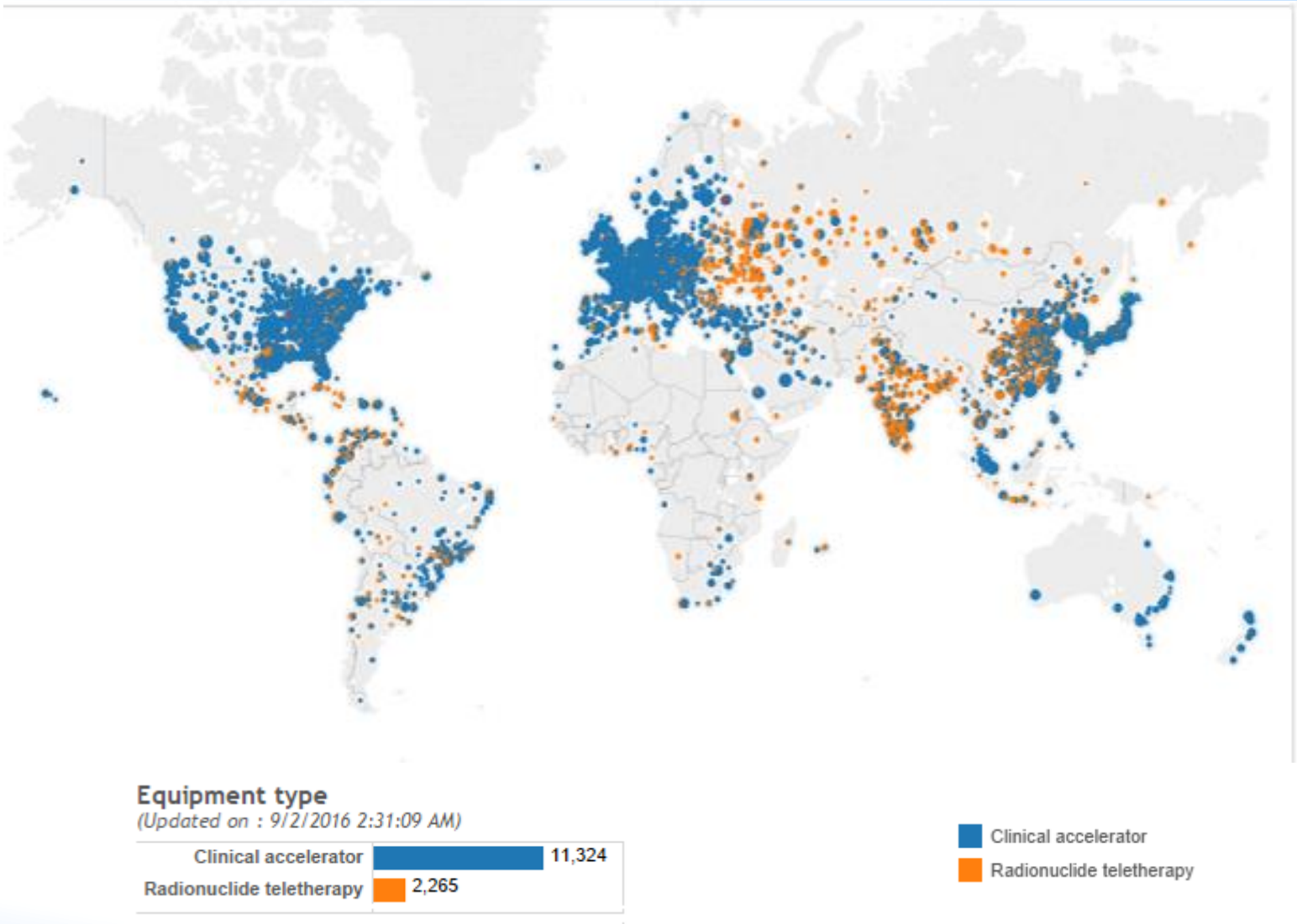




Advanced

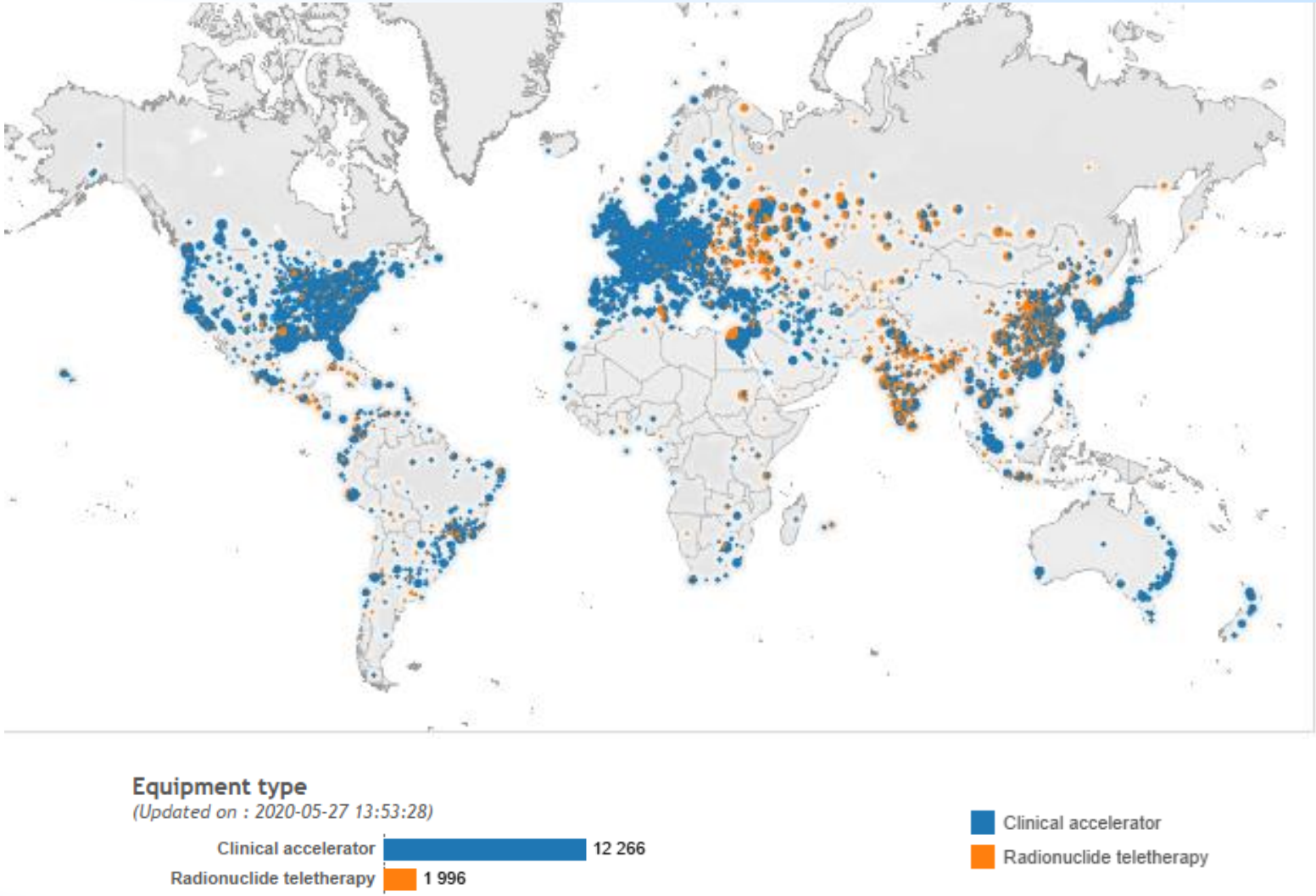
DIRAC 2016

https://dirac.iaea.org/

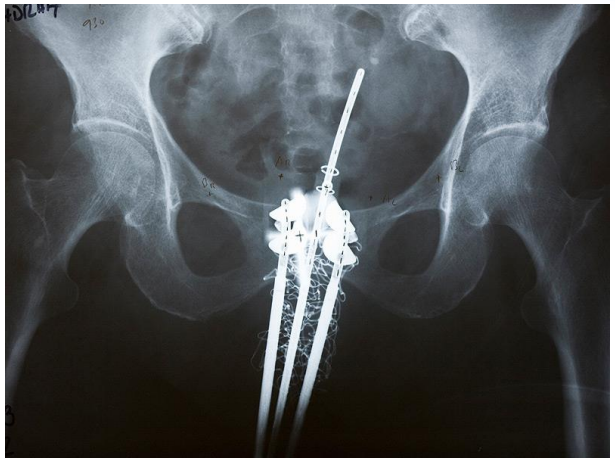


DIRAC 2020

https://dirac.iaea.org/



Brachytherapy (standard of care)



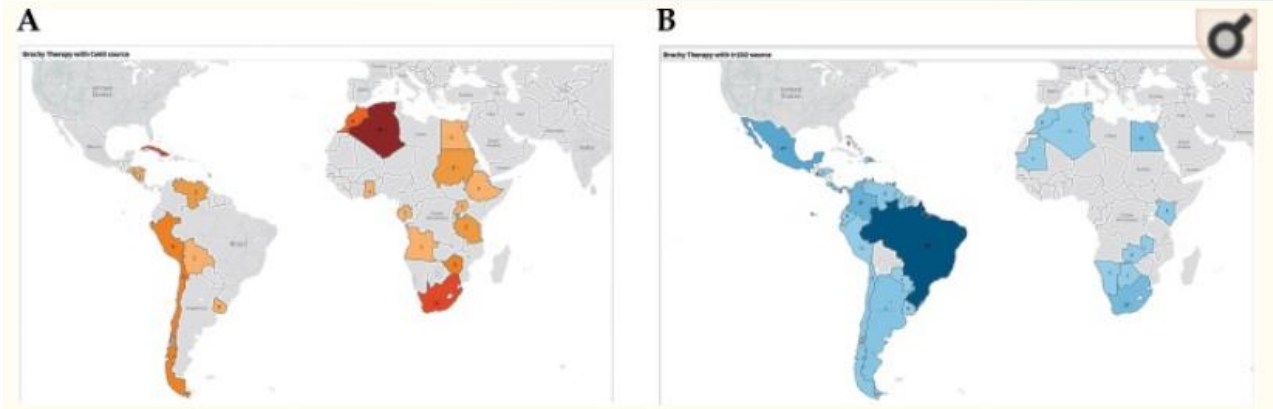
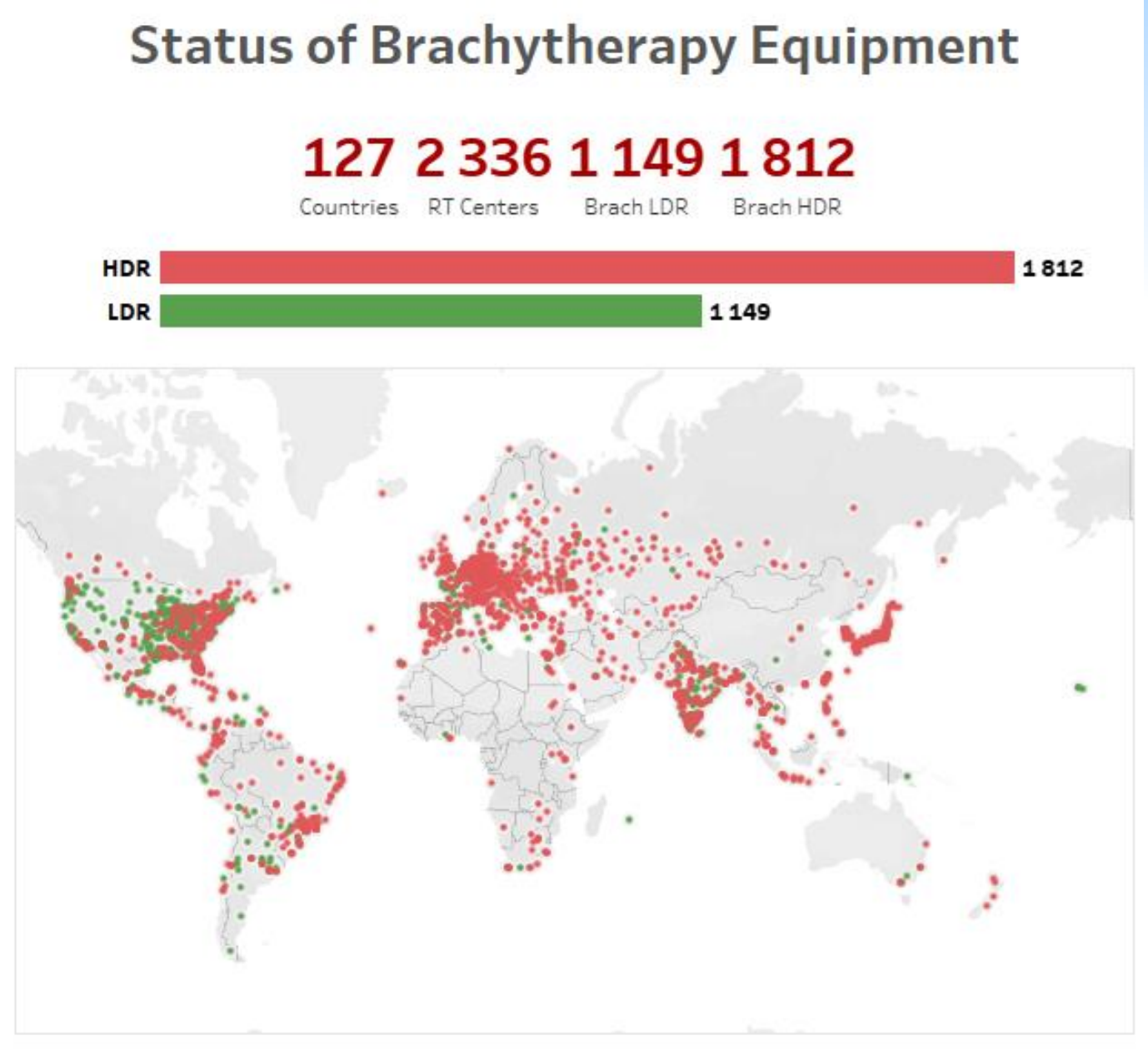


Fig. 2

Geographic representation of high-dose-rate afterloaders for Co-60 (**A**) and Ir-192 (**B**) for the Caribbean, Central and South America, and Africa

RBM Vega, et. al..J Contemp Brachytherapy. 2018 Dec; 10(6): 503–509.

DIRAC 2020



https://dirac.iaea.org/

Calibration Services / Radiation Dosimetry

Dosimetry Laboratory Services

Services	Beams
Calibration of ion chambers: RT, DR, RP levels	X rays (10–300kV), ^{137}Cs, ^{60}Co beams
Calibration of well type ion chambers for brachytherapy (LDR/HDR)	^{137}Cs, ^{60}Co, ^{192}Ir
Comparison of RT level ion chamber calibrations for SSDLs	^{60}Co beams
RPLD audits for RT for SSDLs and hospitals	^{60}Co, h. e. X rays
OSDL audits for RP for SSDLs	^{137}Cs beams
Ref. irradiations of dosimeters for RT, RP	X rays (40–300 kV), ^{137}Cs, ^{60}Co beams

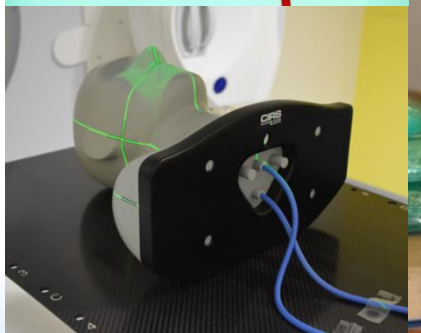
IAEA/WHO dosimetry postal service for external beam radiotherapy

Calibration service for national dosimetry standards

Calibration of a reference mammography ionisation chamber at the IAEA Laboratory in Seibersdorf

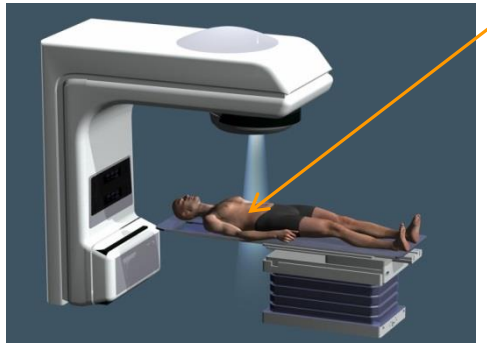
IAEA audits in radiotherapy

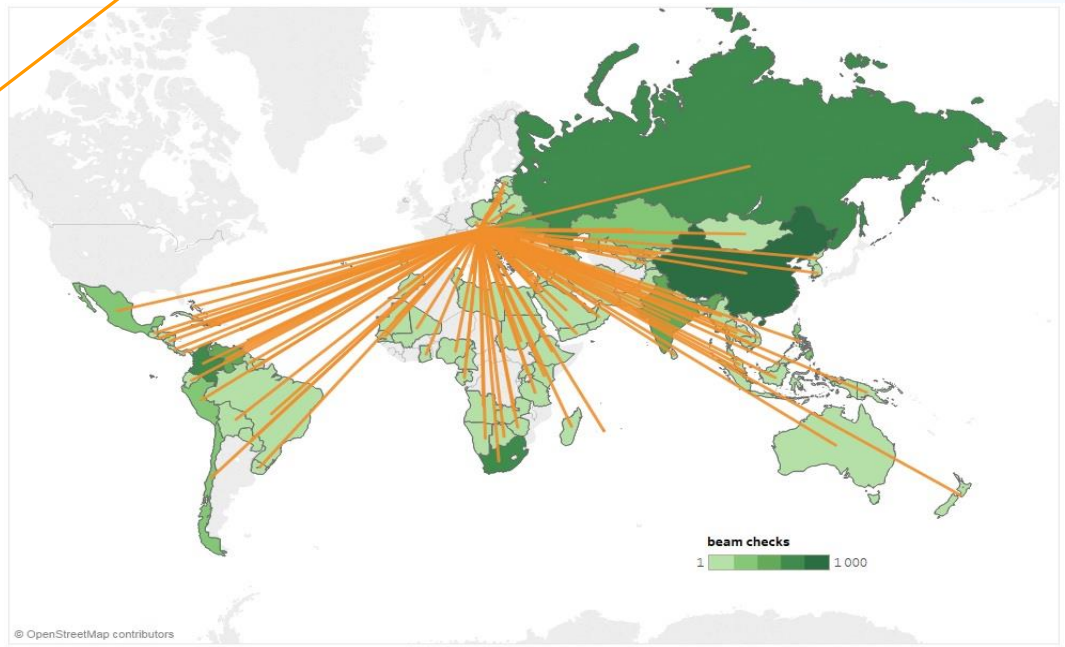
- **Since 1969:**
  IAEA/WHO postal dose audits of radiotherapy beam calibration (with TLD)
- **1995-2017:** CRPs to develop various remote audit methodologies
- **Since 2005:**
  Quality Assurance Team for Radiation Oncology (QUATRO)
- **Since 2010:**
  On-site TPS end-to-end audits
- **Since 2017:**
  RPLD-based remote audits
  Small field photon beam audit
- **Since 2018:**
  On-site IMRT/VMAT end-to-end audits



Dose audits for radiotherapy centres

How is the audit carried out?
Small dosimeters are sent to radiotherapy centres for irradiation to verify the beam output used for patients' treatments.



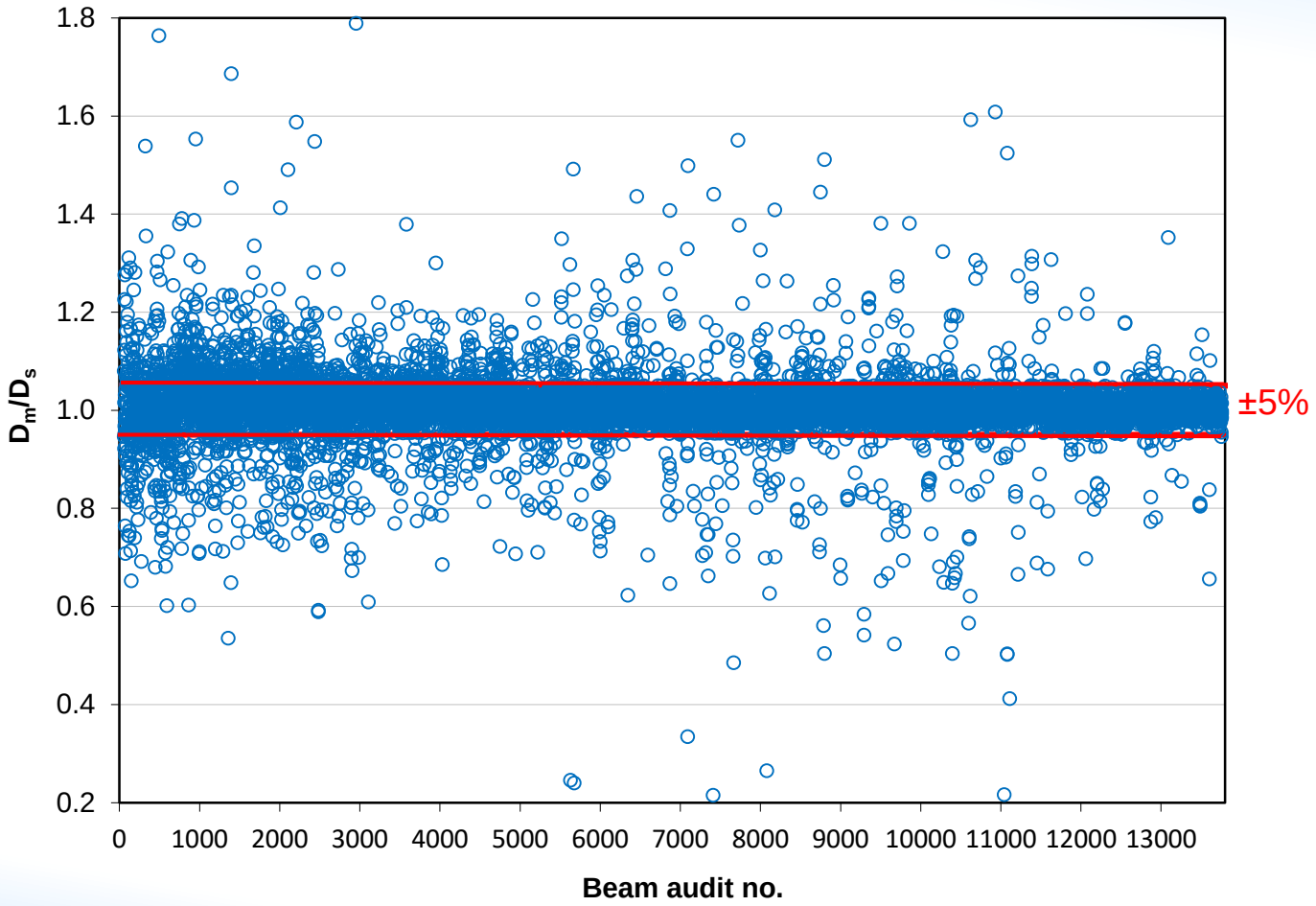


Dose audit service:

- 50 years of the IAEA/WHO postal dose audits (1969–2019)
- >14000 beam checks
- ~2400 radiotherapy centres in 136 Member States

https://dosimetry-audit-networks.iaea.org/

IAEA/WHO audit results for Co-60 and high energy X rays



1969 – 2019: 50 years of dosimetry audits

Promotion of Advanced Radiotherapy

Dosimetry Laboratory activities:

- Commissioning of the new linac (2019)
- Commissioning of the new robotic calibration bench (2020)
- Possibilities for research support, education and training

IAEA International Atomic Energy Agency

Press centre Employment Contact

TOPICS SERVICES RESOURCES NEWS & EVENTS ABOUT US Search

Home / News / How an IAEA Doctoral Coordinated Research Project Empowers Medical Physicists in Advanced Radiotherapy Techniques

How an IAEA Doctoral Coordinated Research Project Empowers Medical Physicists in Advanced Radiotherapy Techniques

Elodie Broussard, IAEA Office of Public Information and Communication

JAN 3 2020

Bertha García Gutiérrez is working to complete a PhD in medical physics through support from an IAEA doctoral coordinated research project. (Photo: C. Garcia)

In low- and middle-income countries there are often too few radiotherapy medical physicists available for cancer care services, and there are even fewer who are qualified to supervise training programmes of new medical physicists and advance research in this field. A series of IAEA doctoral coordinated research projects (CRPs) sets out to address this.

Related Stories

New CRP: Doctoral CRP on Advances in Radiotherapy Techniques (E24022)

E-learning Tool Helps Boost Medical Physics Expertise in Asia and the Pacific

Ensuring the Safe Use of Advanced Radiotherapy in Eastern Europe and Central Asia

Related Resources

Comprehensive cancer control

Radiation protection in radiotherapy

Radiotherapy - what patients need to know

Safe Cancer Treatment With Radiotherapy

Radiation Protection of Patients (RPOP)

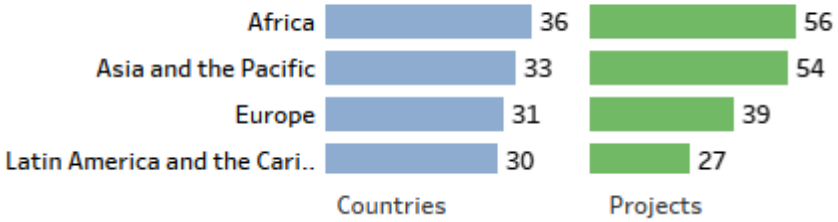
DMRP ARBR 2018/19 cycle active TC projects

174	130	22	2	16	156
Projects	Countries	Staff	Interregional	Regional	National

TC Projects

Last Update: 2020-02-16 18:47:02

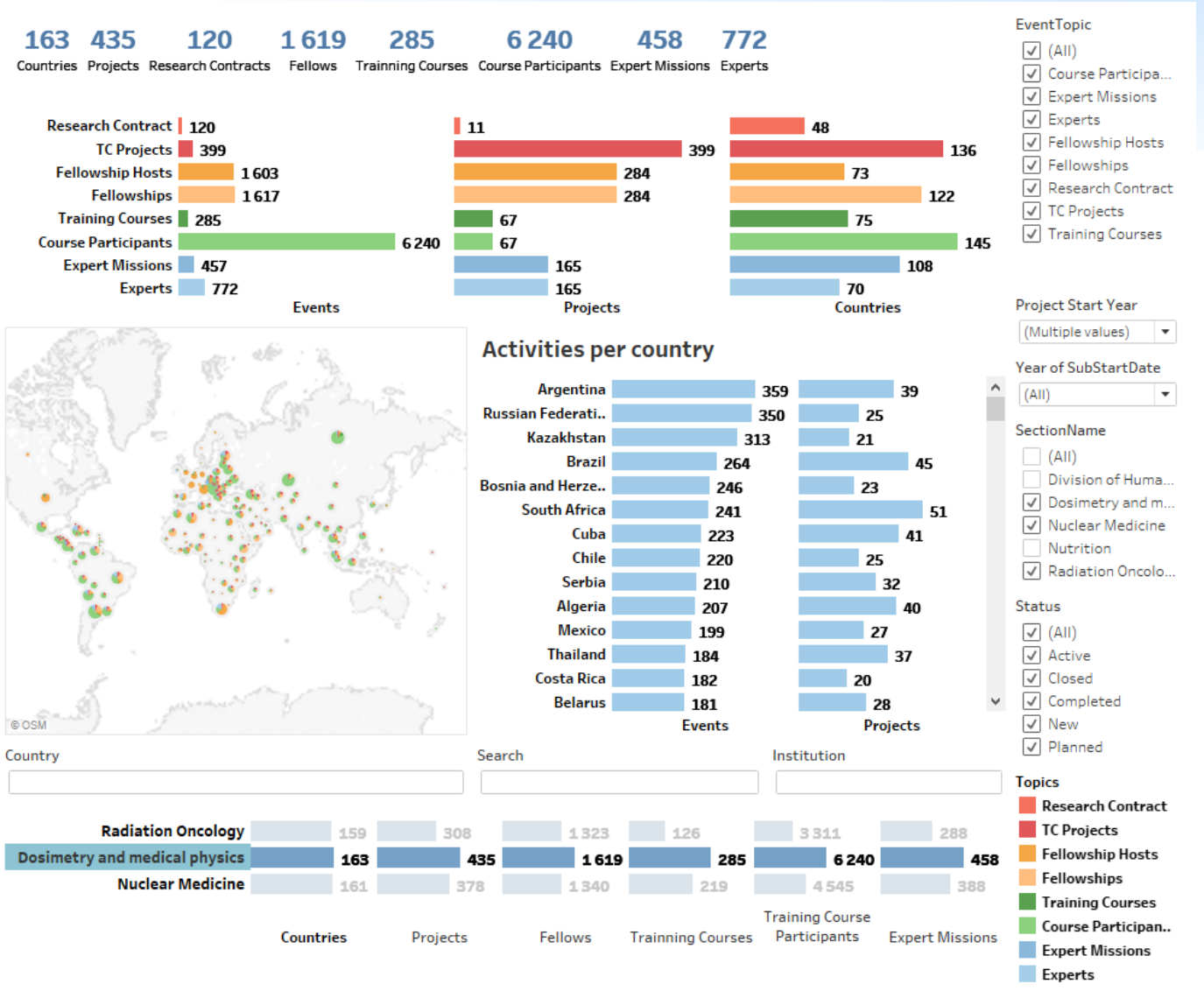
TC projects by region



TC projects by section

TO is a part of the project team

Symposia, Training Courses and Workshops



UT/ICTP Masters in Medical Physics

IAEA
International Atomic Energy Agency
Atoms for Peace and Development

Thank you!