



VCDNP

Vienna Center for Disarmament
and Non-Proliferation

STELLA Project: *addressing challenges for improving radiotherapy access in Africa through collaboration and innovation*

Manjit Dosanjh, STELLA Project Coordinator, ICEC and Oxford, UK



International
Cancer
Expert Corps

Partnering to transform global cancer care



UNIVERSITY OF
OXFORD

The Problem:

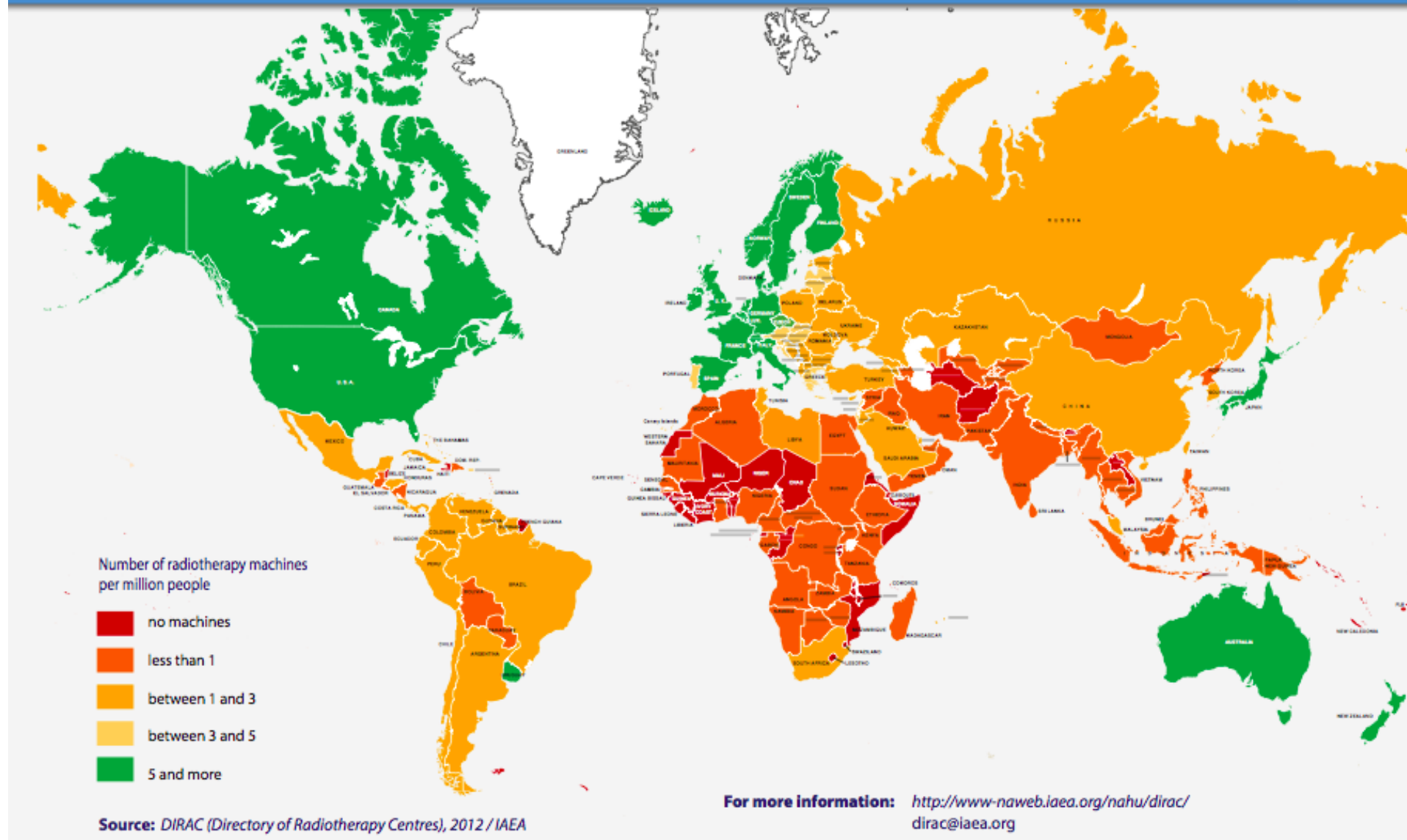
Much of the world has limited or no access to Radiation Therapy

- 1. Even though RT is one of the most useful tool** for cancer cure or pain-relief there is
 - Inadequate supply of RT linear accelerators (Linacs)
 - Gap greatest in low-middle income countries (LMICs)
 - **Only 10%** patients in Low Income Countries have access to RT
- 2. Cannot deliver high-quality cancer care without a well-trained and adequate workforce**
- 3. If you don't know you have cancer you cannot treat it** so imaging technology is key and unfortunately the challenge is similar as for access

Availability of **RADIATION THERAPY**

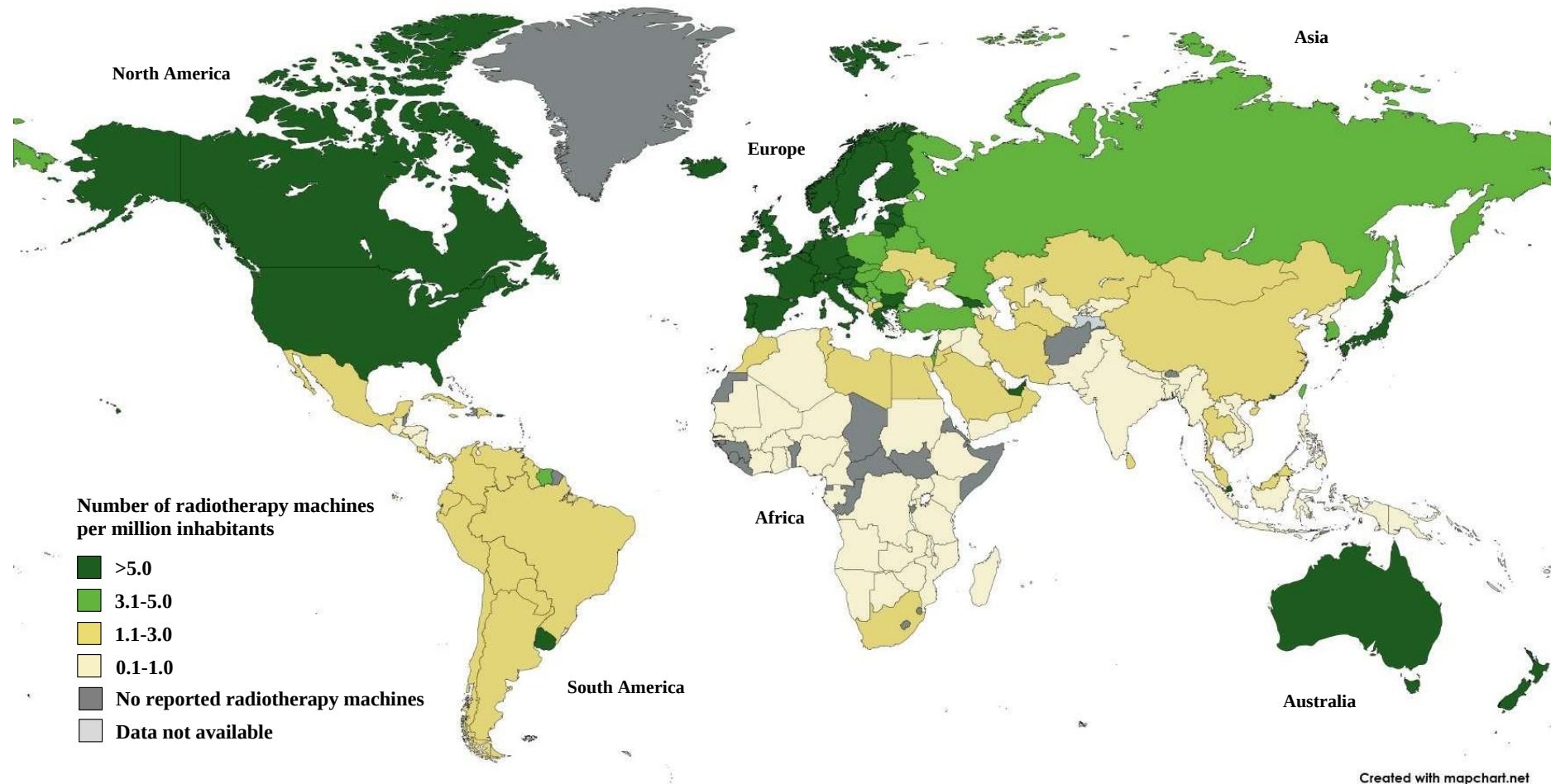
Number of Radiotherapy Machines per Million People

IAEA, 2012



25 MILLION CASES PREDICTED IN 2035, 65–70% WILL OCCUR IN LOW-AND MIDDLE- INCOME COUNTRIES

Lancet Oncology Commission : RT access still showing huge disparities



CT Scanners Distribution per Million Population

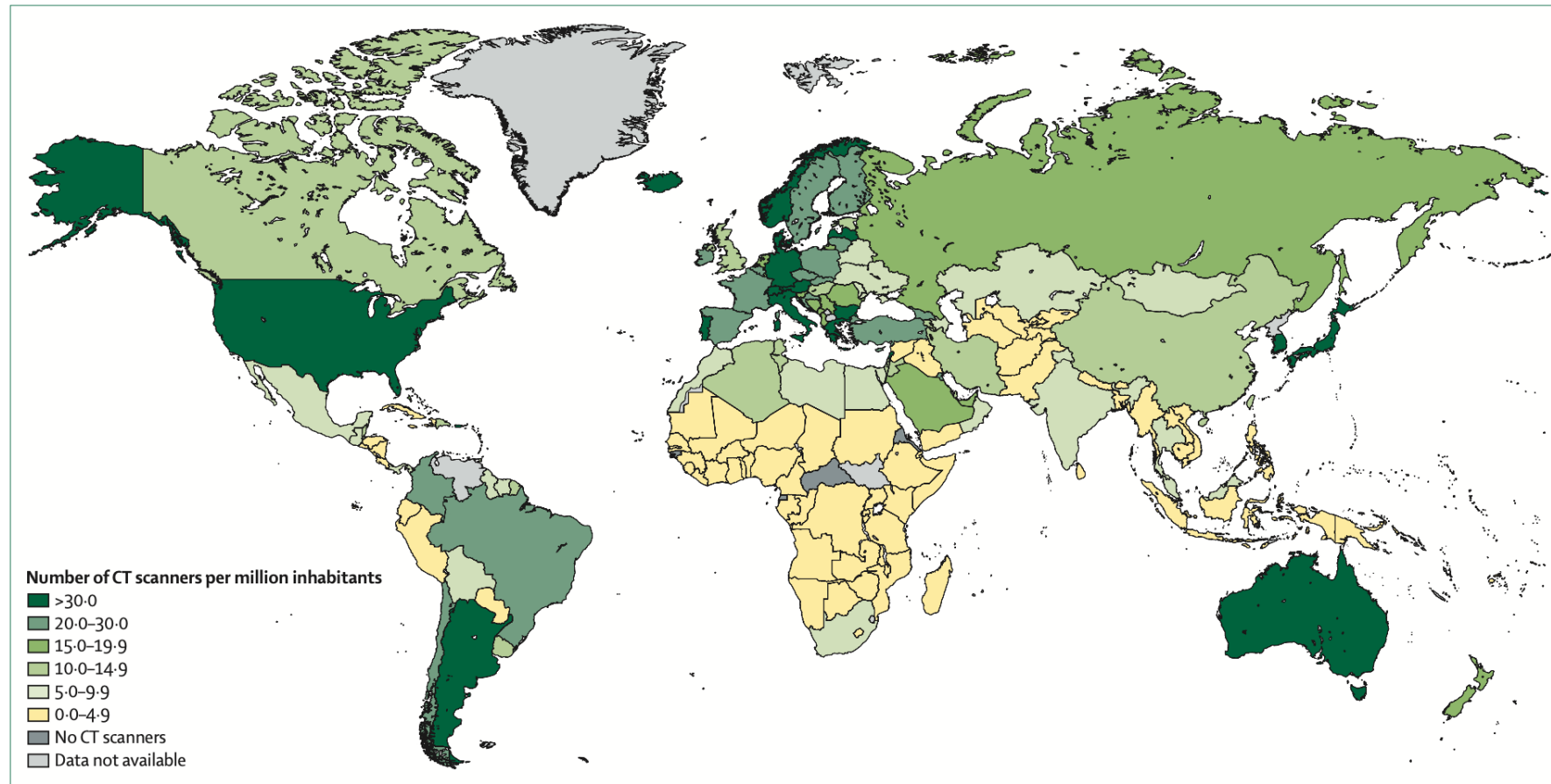


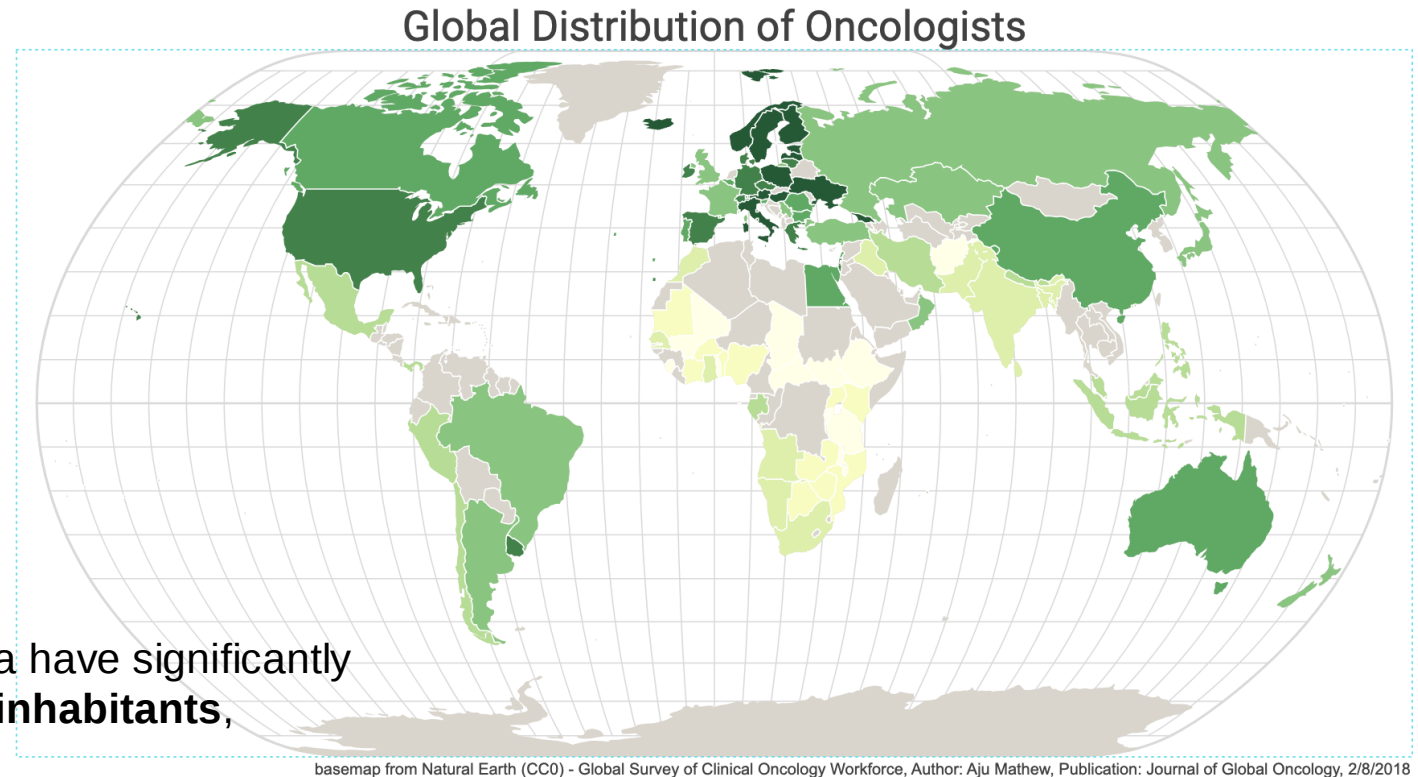
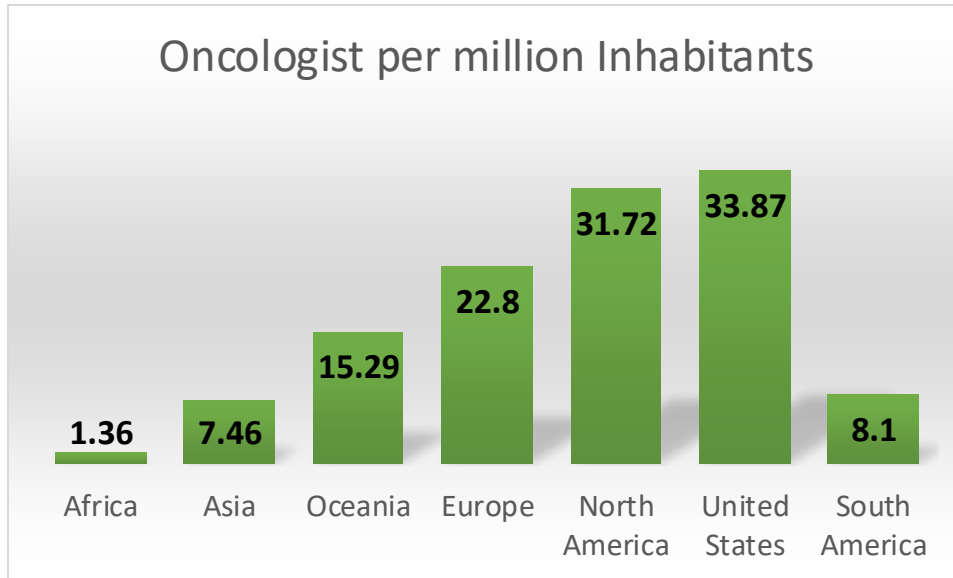
Figure 2: Estimates of the number of CT scanners per million inhabitants

Data are from the International Atomic Energy Agency medical imaging and nuclear medicine global resources database (IMAGINE). The map was produced by the International Atomic Energy Agency (Vienna, Austria) and is included here with permission.

CT scanners are an essential diagnostic tool in cancer care. However, high-income regions like North America and Europe have significantly higher access to CT scanners compared to LMICs.

Disparities in Access to Oncologists

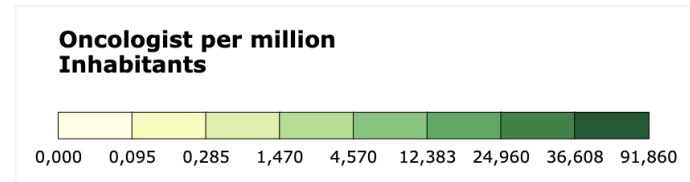
The global distribution of oncologists per million inhabitants varies greatly, highlighting disparities in cancer care.



High-income regions like the US and North America have significantly more oncologists, with **33.87 and 31.72 per million inhabitants**, respectively.

Low-resource regions, such as Africa and South America, face severe shortages, with only **1.36 and 8.1 oncologists per million inhabitants**.

This imbalance means that **cancer patients in lower-income countries have far less access to specialized cancer care**, directly affecting outcomes and treatment availability.



Cancer Care is a Multidisciplinary Team Effort

PROJECTED WORKFORCE SHORTAGE 2030

18 mil*
GLOBALLY*

6.1 mil**
AFRICA**

80% of the population
in LMIC is without
access to a trained
oncology provider



*Srivastava A, et al: Tracking the Workforce 2020-2030: Making the Case for a Cancer Workforce Registry; JCO Global Oncology September 22, 2024

**Ahmat A, et al. The health-workforce status in the WHO African Region: findings of a cross-sectional study. BMJ Glob Health 2022;

There are dramatic disparities in Access in LMICs

Africa: 400 RT units for around **1.4 billion** people

1 machine per 3.5 million people

US: 4000 RT units for around **340 million** people

1 machine for 86, 000

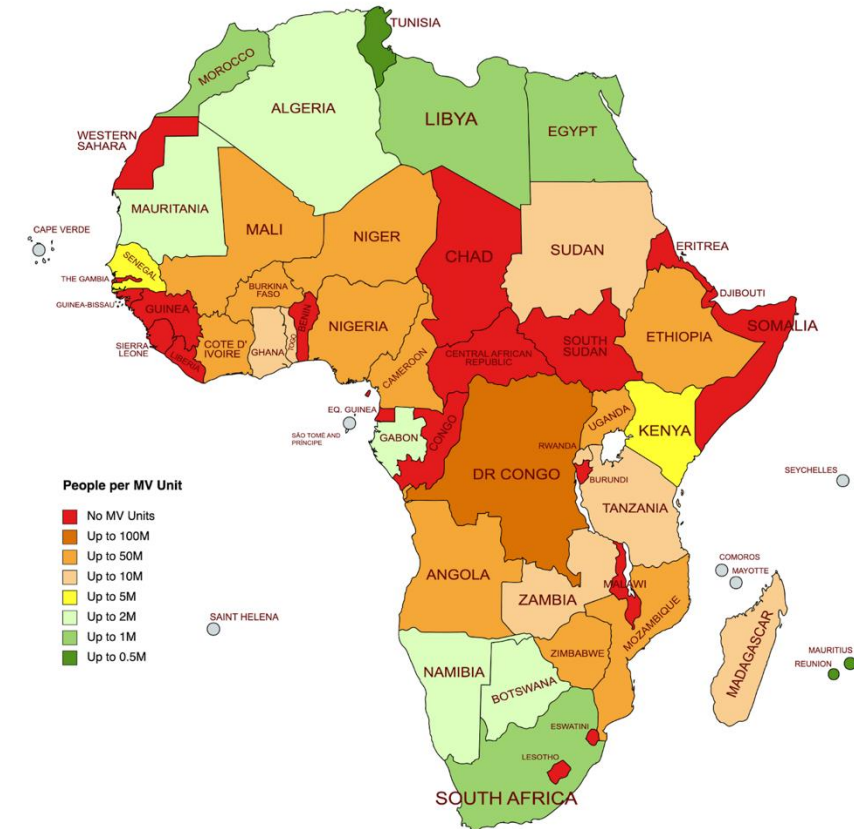
UK: 360 RT units for around **68 million** people

1 machine per 190,000

Switzerland: 85 for **8.8 million** people

1 machine for 100,000

- By 2030, there will be **1.4 million** new cases of cancer and there will be **1 million** cancer deaths in Africa
- In 2019 only **28** countries had RT facilities
- Over **60% are in just 3 countries**: South Africa, Egypt and Morocco
- 20 countries have none



The Project STELLA is dedicated to:

- Expanding access to high-quality cancer treatment globally
- Developing an innovative and transformative radiation therapy treatment system
- Driving down the cost out of RT and cancer care
- An enhanced training, education and mentoring program that catalyses RTT implementation in the global context

Building the STELLA collaboration and defining a strategy

- 1st Design Characteristics of a Novel Linear Accelerator for Challenging Environments, November 2016, CERN
- 2nd Bridging the Gap Workshop, October 2017, CERN
- 3rd Burying the Complexity Workshop, March 2018, Manchester



- 4th Accelerating the Future Workshop, March 2019, Gaborone



Data Obtained from African Countries That Have LINAC-based RT and from HICs

Country	Total number of LINACs surveyed
UK	25
USA	14
Canada	11
Switzerland	2
Jordan	1

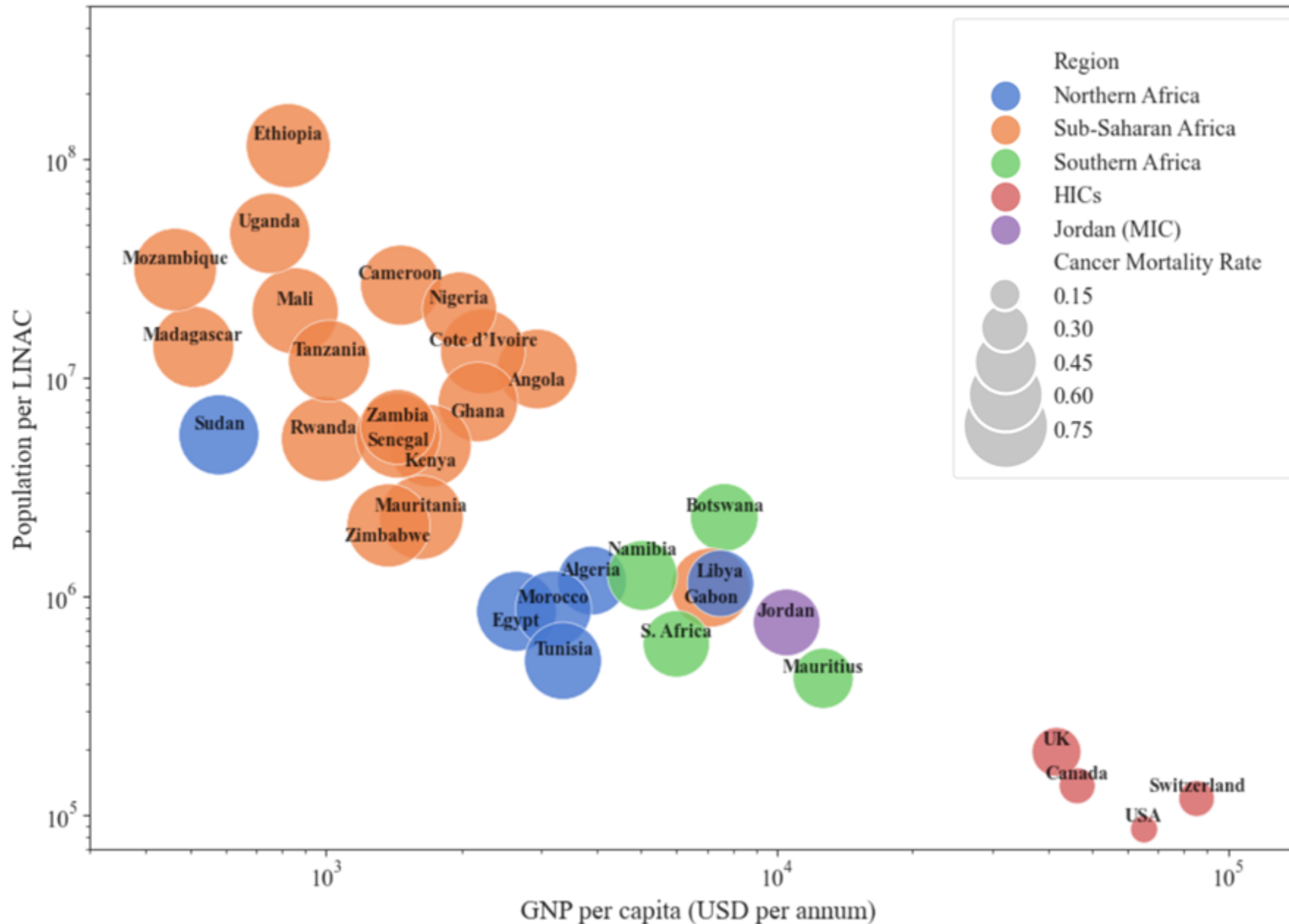


Total LINACs surveyed

HICs: 52

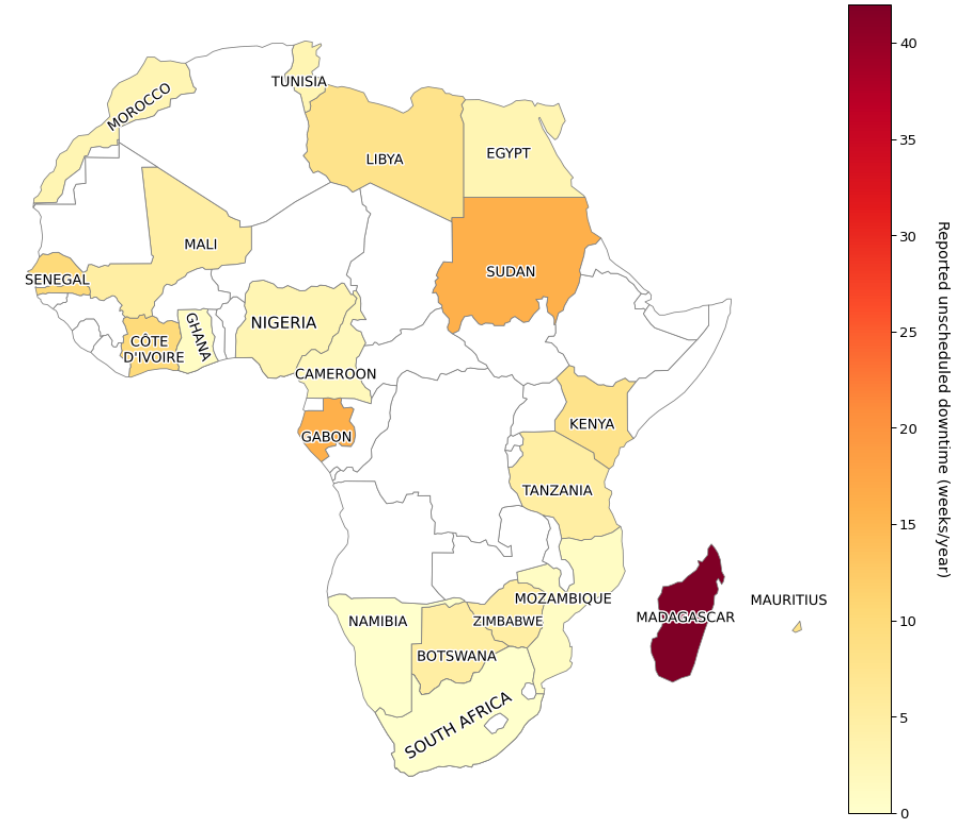
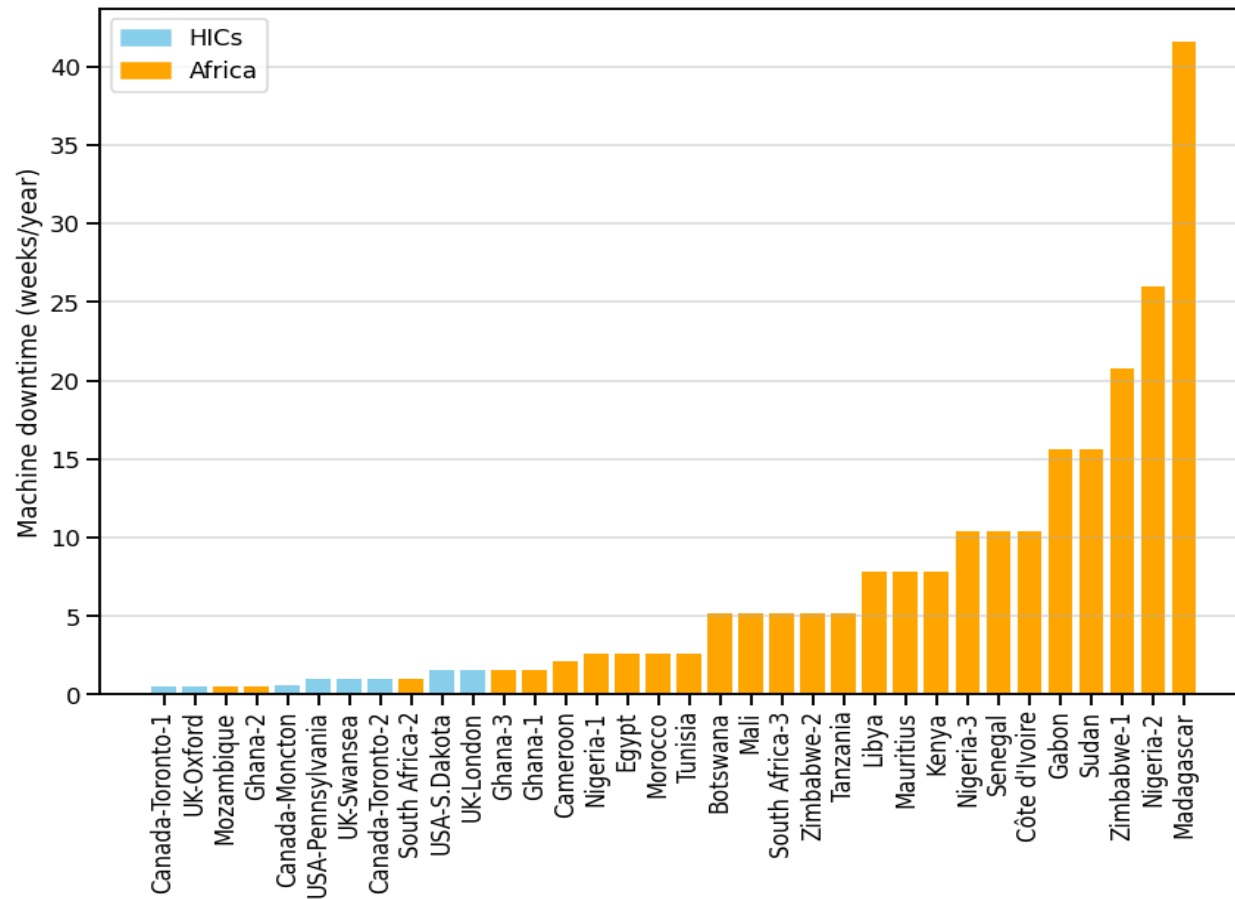
Africa: 59

GNP and Ratio of Inhabitants to Linacs and Cancer Mortality

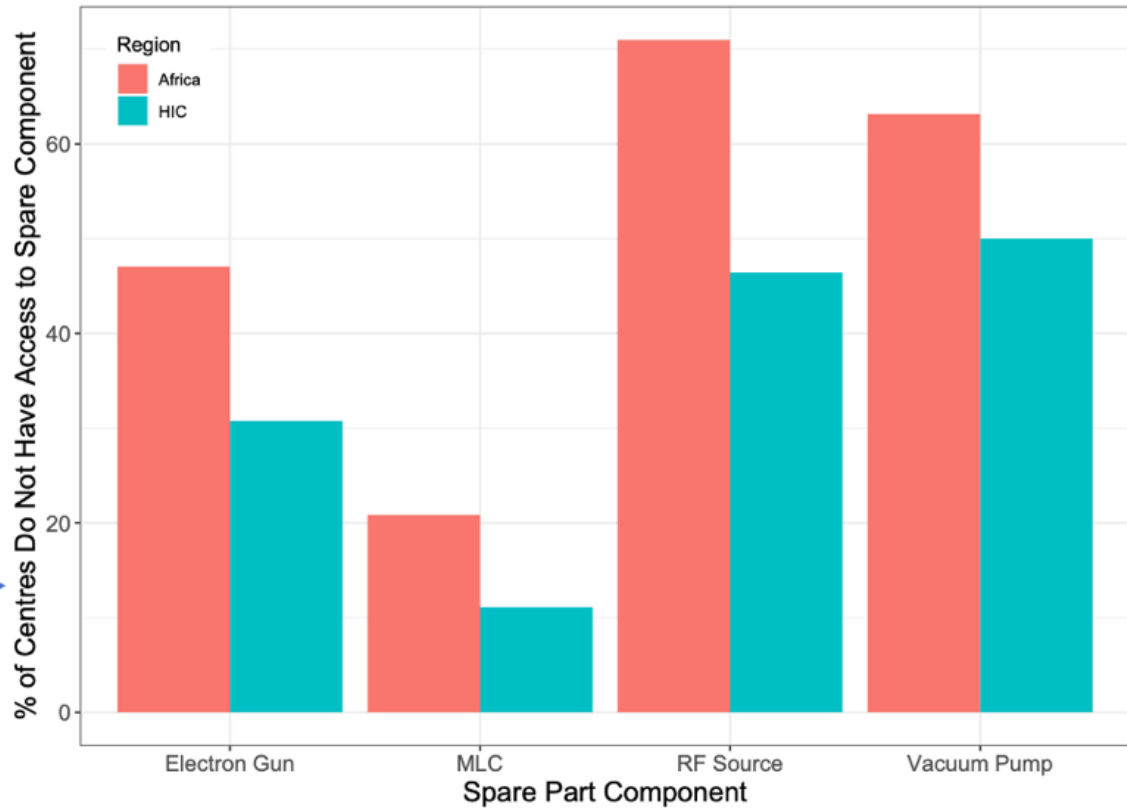
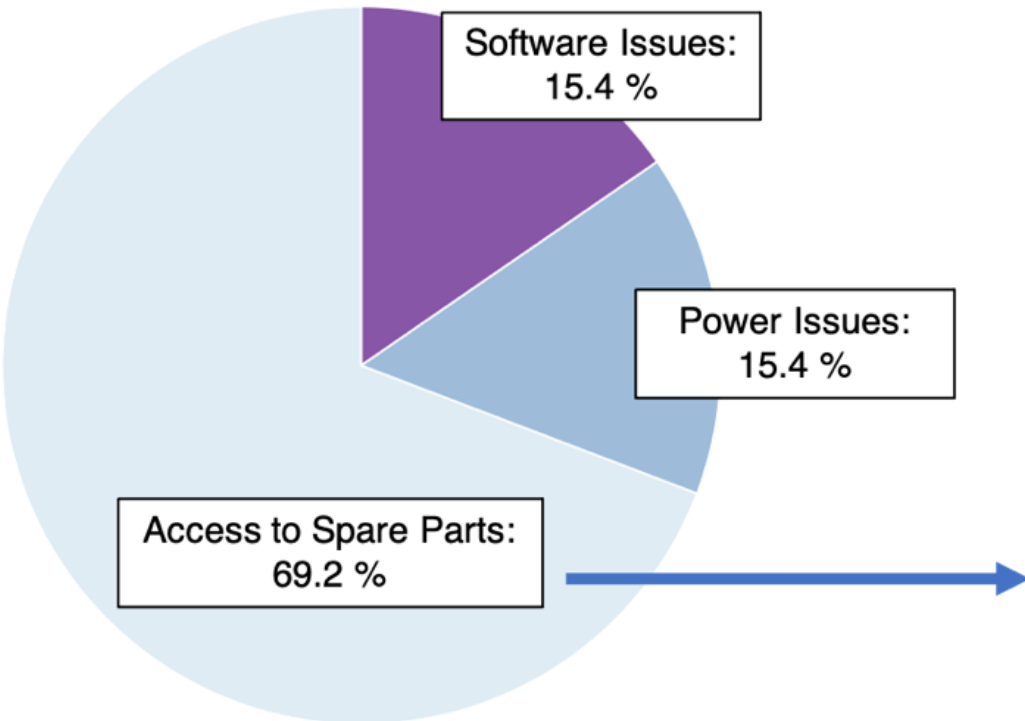


Ige et al,
*Surveying the
Challenges to
Improve Linear
Accelerator-based
Radiation Therapy
in Africa: A
Unique
Collaborative
Platform of All 28
African Countries
Offering Such
Treatment.* Clin
Onco, 2021
33e521-e529
<https://doi.org/10.1016/j.clon.2021.05.008>

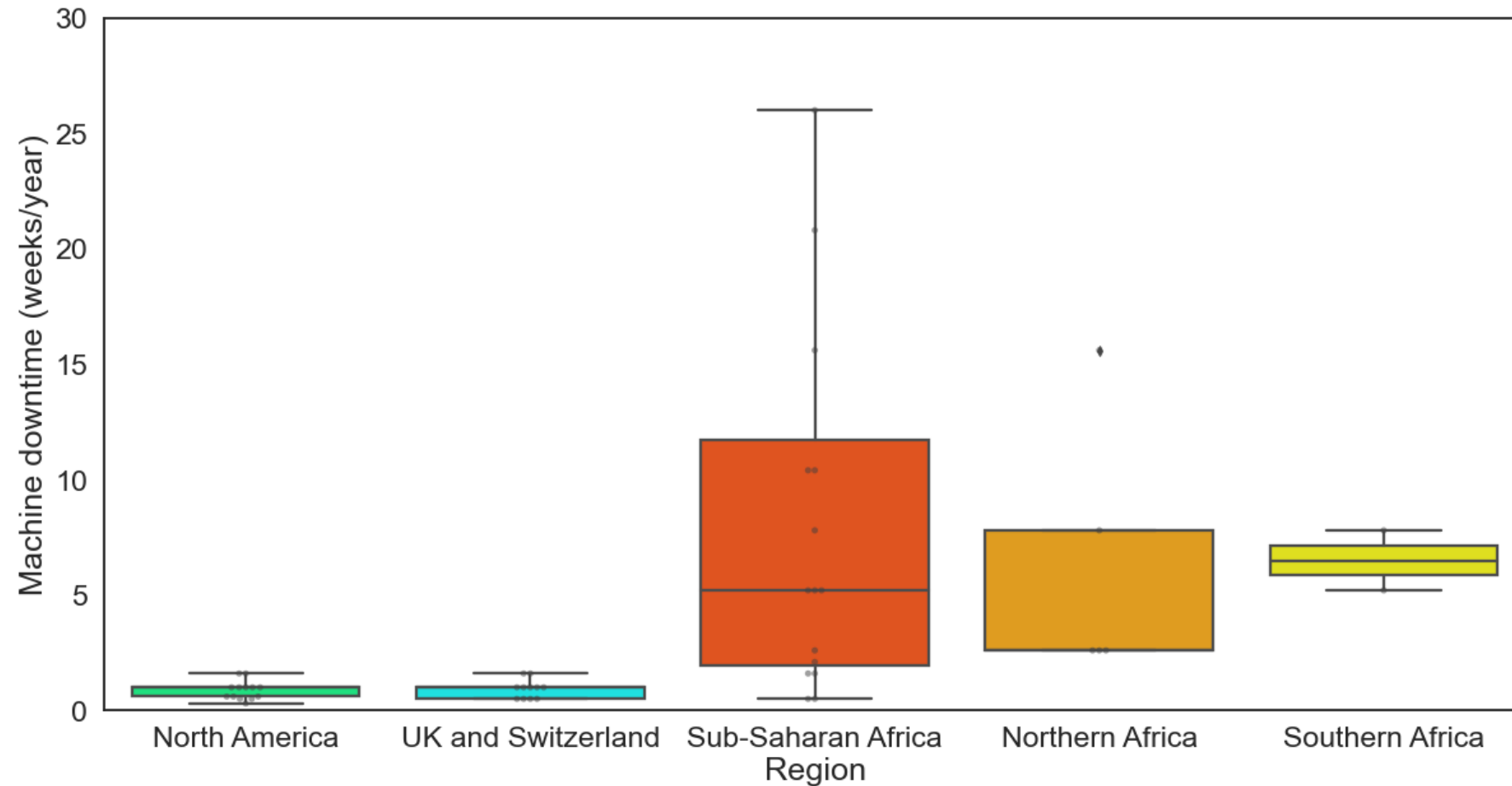
LINAC Downtime by Country



Main Reason for LINAC Downtime: Access to Spare Parts



Downtime: General Comparison Between African Regions and HICs





Reducing the cost of
'Gray per day'

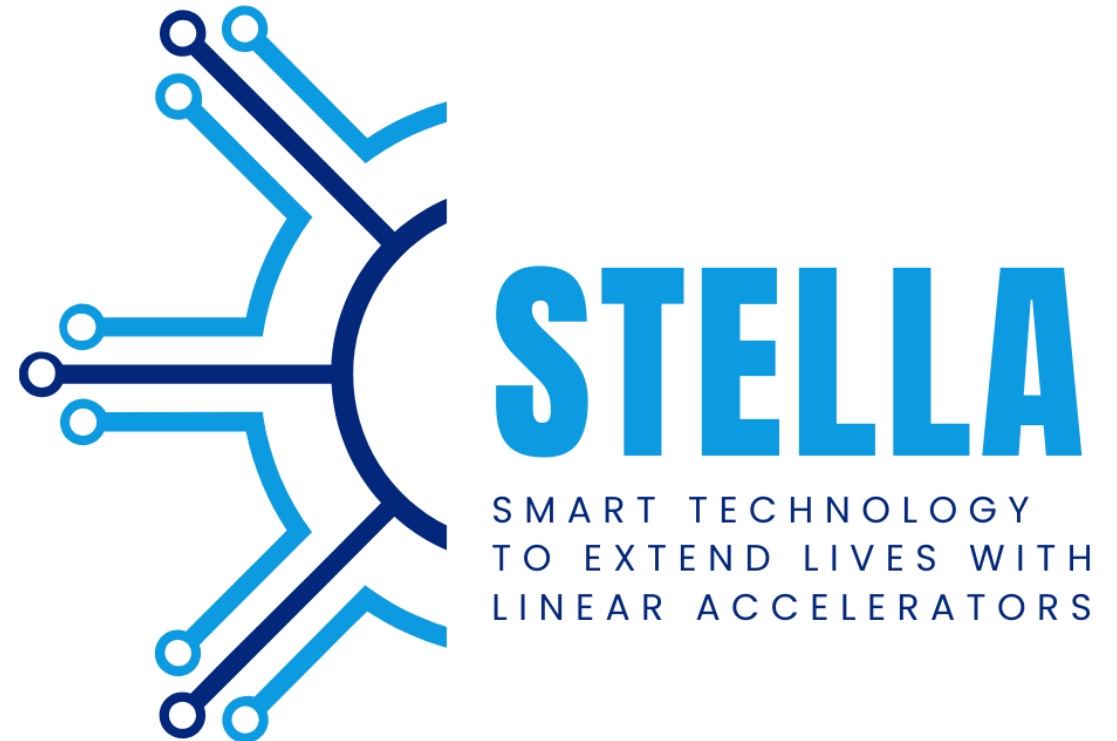


Reducing the head count of
specialists per Linac

Raj Jena, Cambridge

Our STELLA researchers are working on a number of novel AI applications to achieve both goals

*“Where someone lives should not
determine whether they live”*



Thank You for Listening and to STELLA team

