Overview of the challenge: What did we learn from the ART Study – what's next?

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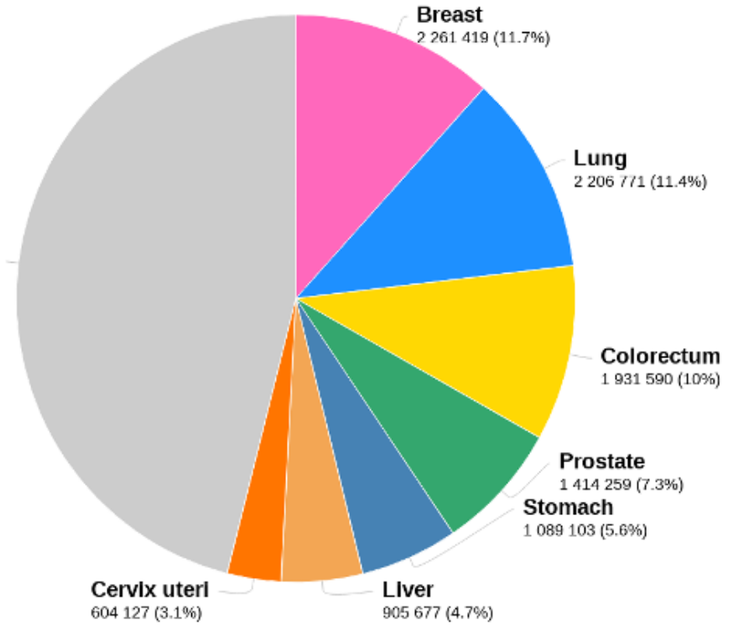
Cancer is a growing global challenge

- In 2020 globally **19.3** million new cases per year diagnosed and **10** million deaths
- By 2040 this will increase to **27.5** million new cases per year and **16.3** million deaths
- **70% of these deaths** will occur in low-and-middle-income countries (LMICs)
- **9 out of 10 deaths** for cervical cancer and **7 out of 10** breast cancer are in LMICs



Total : 19 292 789

Data source: GLOBOSCAN 2020

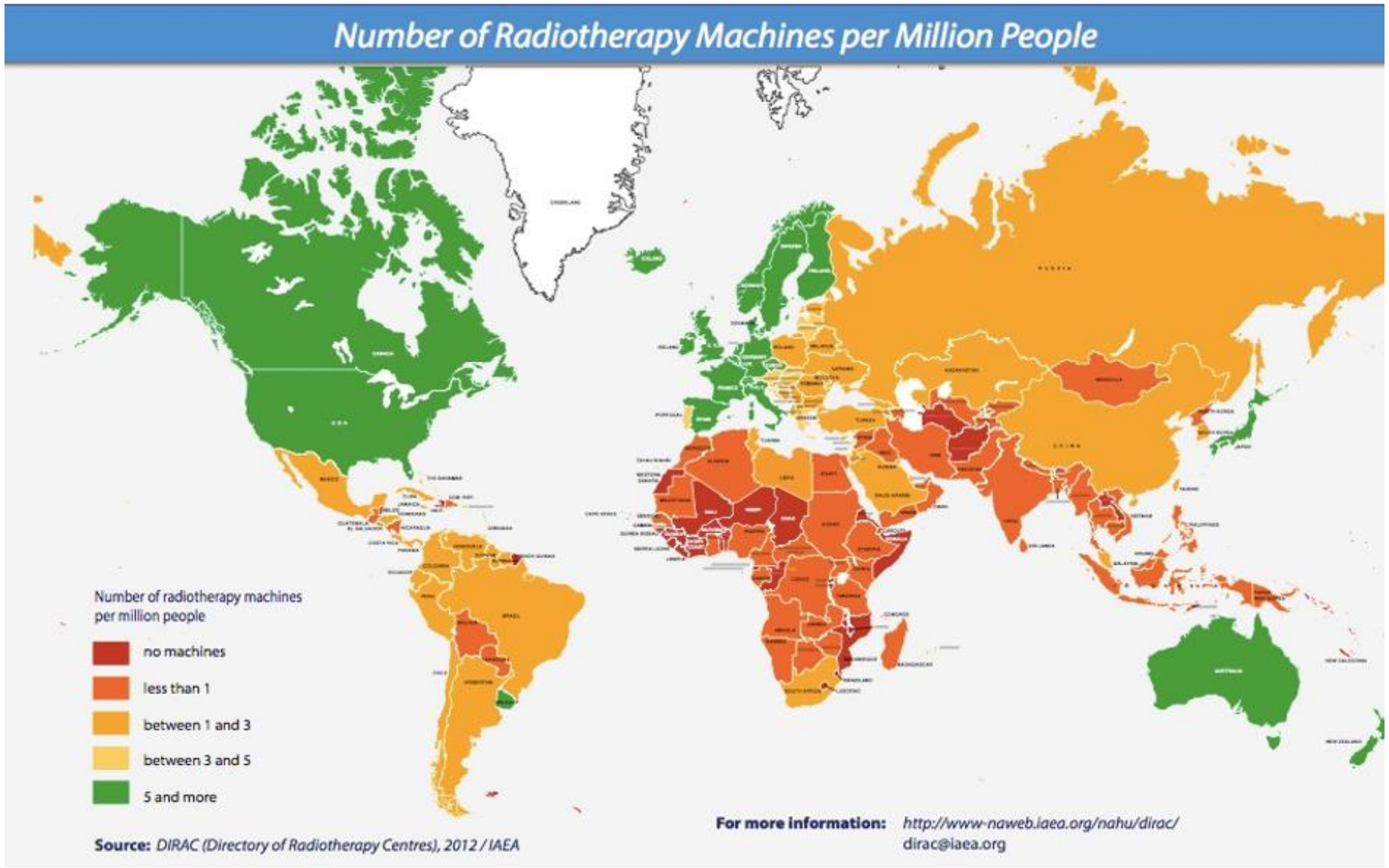
Radiation therapy is a key tool for treatment for 50-60% patients

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

Even though the RT is one of the most useful tool for cancer cure or pain-relief:

- 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

IAEA 2012 data showing huge disparities in global access



Most of the current were and are 18,000 RT units are in High-Income Countries

Global Task Force for Radiotherapy for Cancer Control (GTFRCC) - 2015

The Lancet Oncology Commission

Lancet Oncol, 2015, 16: 1153

Expanding global access to radiotherapy

Rifat Atun, David A Jaffray, Michael B Barton, Freddie Bray, Michael Baumann, Bhadrasain Vikram, Timothy P Hanna, Felicia M Knaul, Yolande Lievens, Tracey Y M Lui, Michael Milosevic, Brian O'Sullivan, Danielle L Rodin, Eduardo Rosenblatt, Jacob Van Dyk, Mei Ling Yap, Eduardo Zubizarreta, Mary Gospodarowicz

Our results provide compelling evidence that investment in radiotherapy nc only enables treatment of large numbers of cancer cases to save lives, but also brings positive economic benefits.

Atun

Jaffray

Gospodarowicz

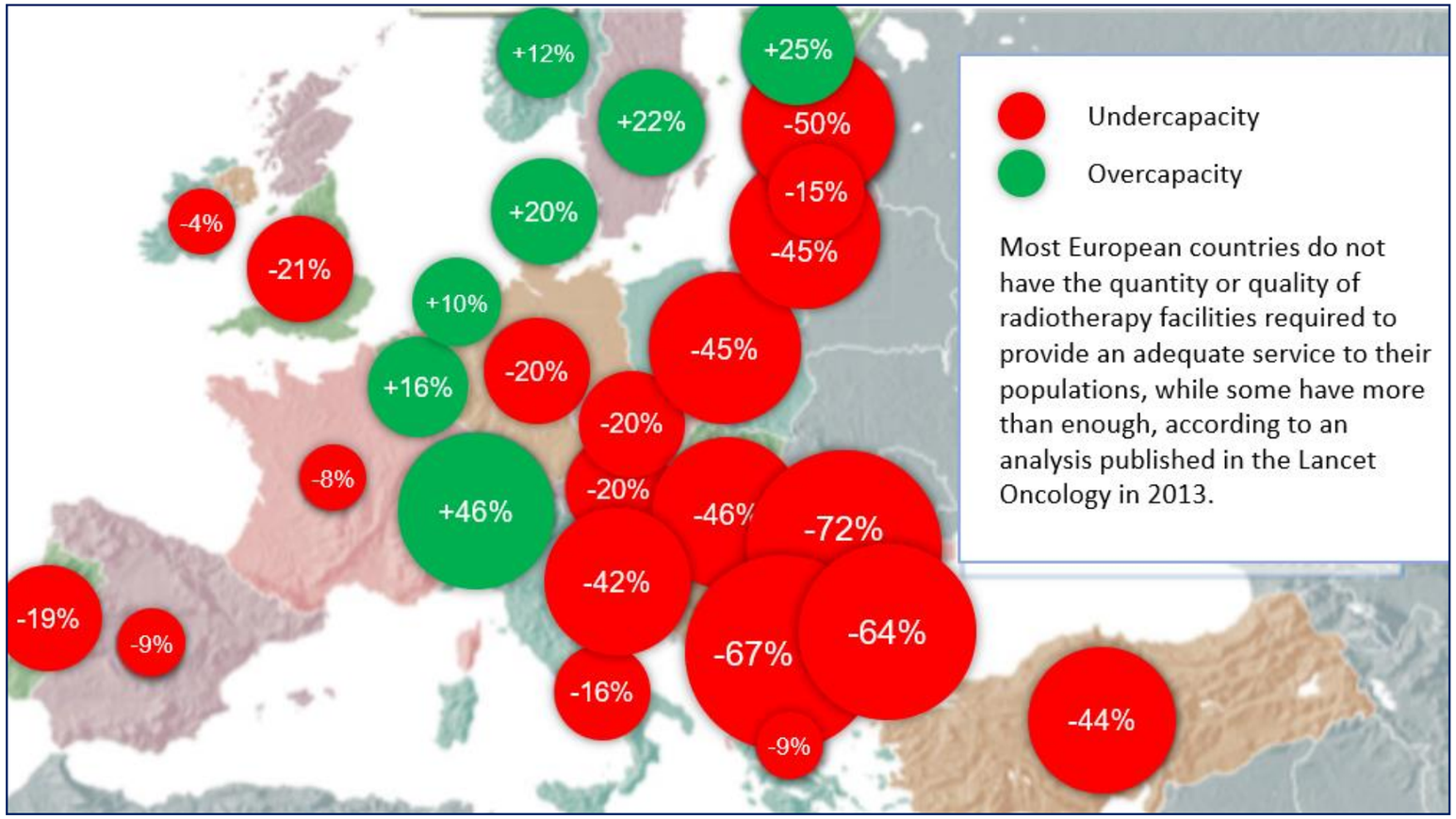
The verdict is in: the time for effective solutions to the global cancer burden is now **C Norman Coleman, Bruce D Minsky*

Lancet Oncol, 2015, 16: 1146

Globally 15 million cases in 2015 to 25 million in 2035:

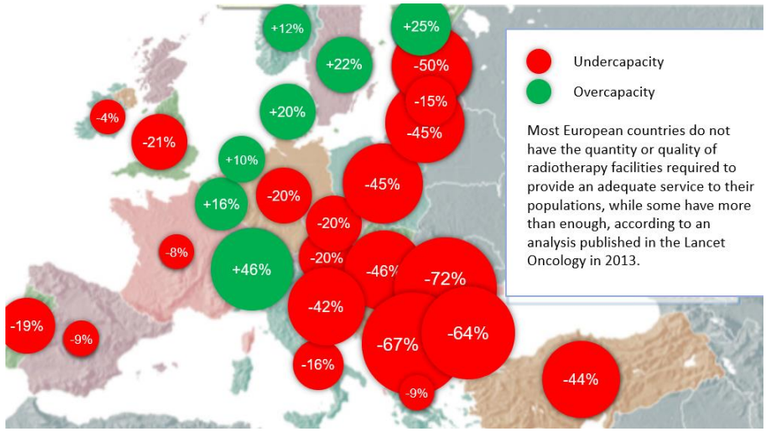
- 12,600 megavolt-class treatment machines
- 30,000 radiation oncologists
- 22,000 medical physicists
- 80,000 radiation technologists

ESTRO Study: Access to RT technology in the European region (2013)



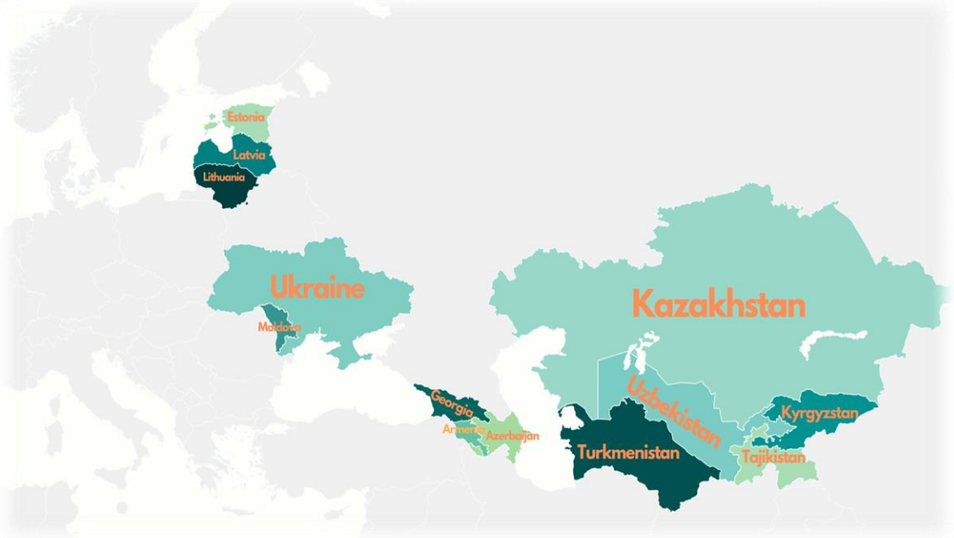
ESTRO – HERO Study (Health Economics and Radiation Oncology): Eastern and South-Eastern European countries need to expand and modernise their radiotherapy equipment.

Shortage and challenges are not only in Africa



Radiation therapy capacities in Europe 2013

Rosenblatt E, et al. Lancet Oncol 2013;14:e79–86



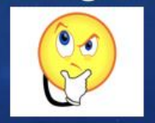
Access to Radiotherapy Technologies Study (ART) in the Baltics, Eastern Europe, Central Asia and the Caucasus

For ART study, in these FSU countries, another important point is the replacement of legacy Cobalt 60 units with Linacs because not only do they offer state-of-the-art treatment but have less security risk

What we know about SEE from the SEEIIST?

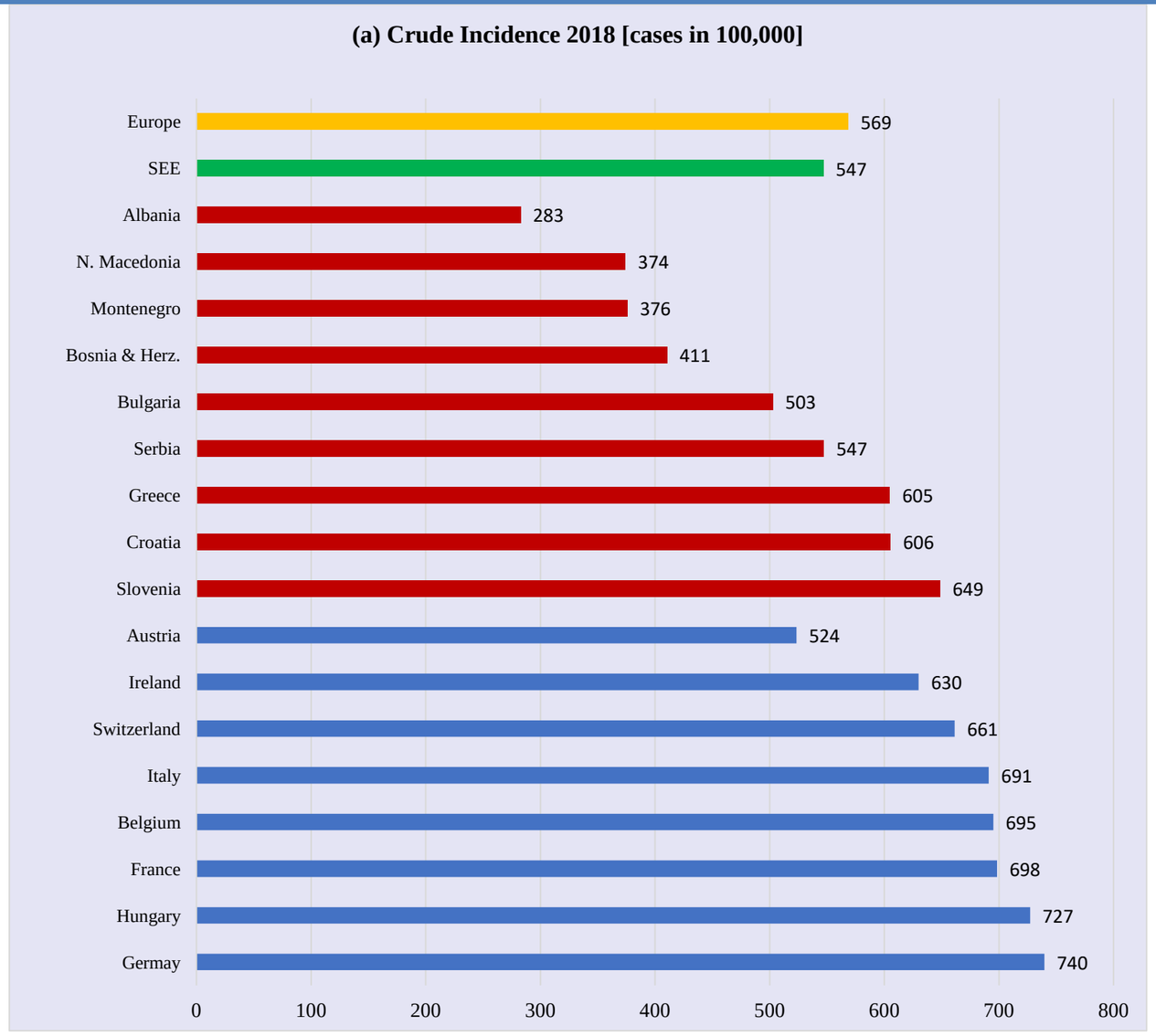
Geographical map of the region

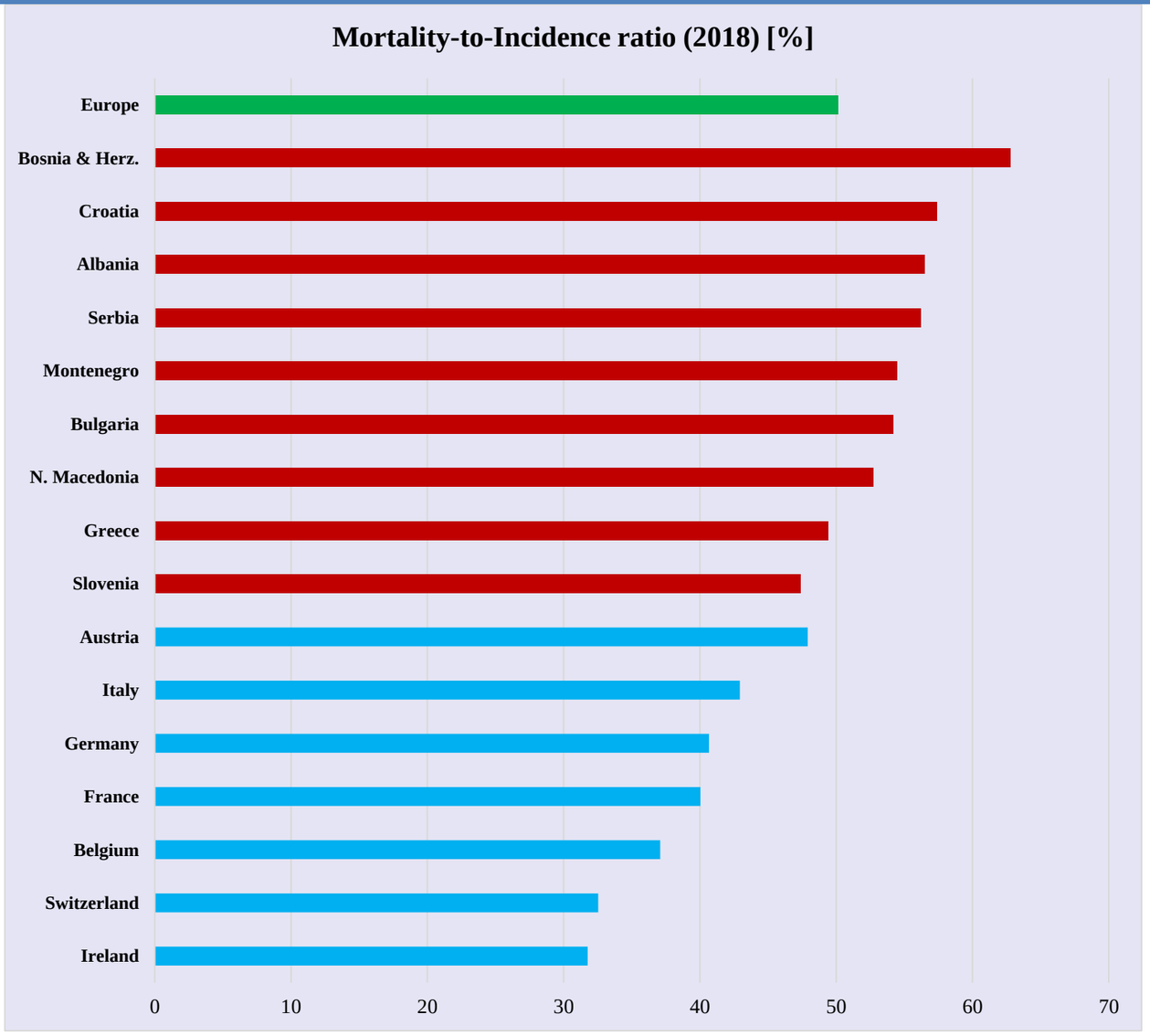
Map of equipment for cancer diagnosis and treatment



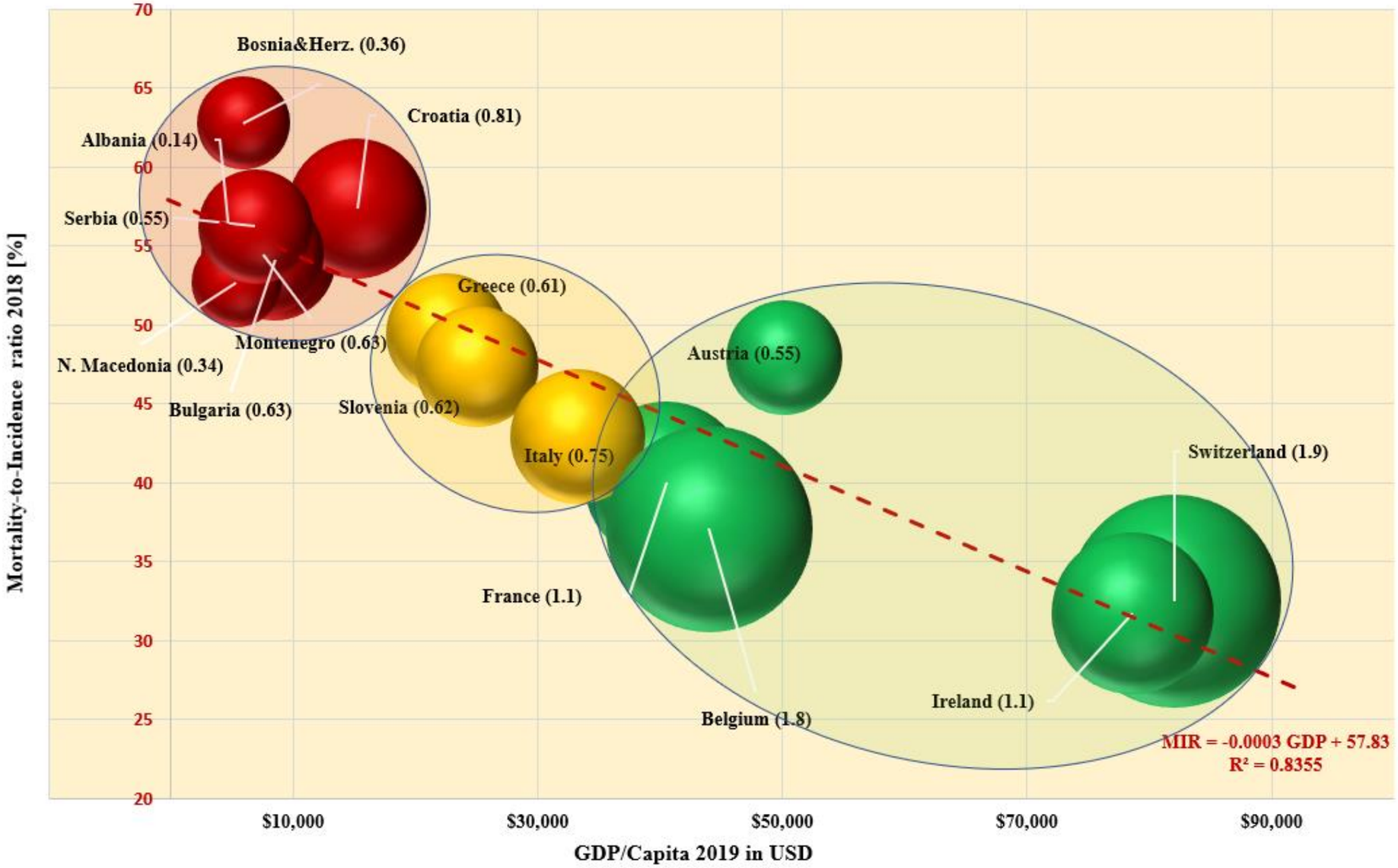
Map of human resources and research in particle physics[4]

Cancer Incidence and Mortality-to-Incidence ratio (MIT)





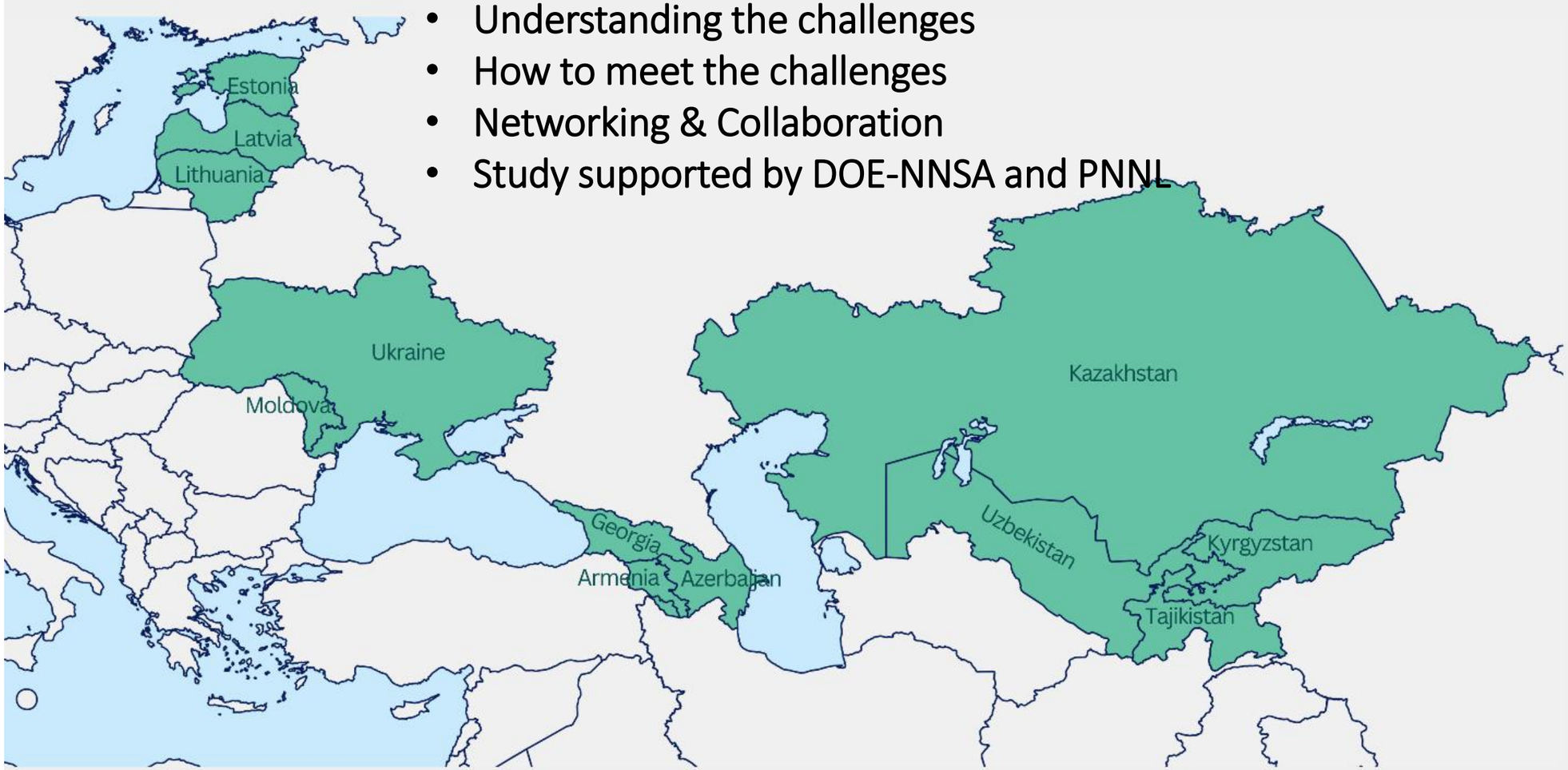
Cancer Mortality to Incidence as function of GDP and RT equipment



Dependence of the MIR on the GDP per capita and the density of conventional RT equipment. The radius of the spheres is proportional to the density of RT equipment per 100,000 population in the respective countries.

Access to Radiotherapy Technologies (ART) Study

- Current status of RT in all former Soviet Union countries
- Understanding the challenges
- How to meet the challenges
- Networking & Collaboration
- Study supported by DOE-NNSA and PNNL



Access to Radiotherapy Technologies (ART) Meeting, 13-15 September 2022 Almaty, Kazakhstan

ACCESS TO RADIOTHERAPY TECHNOLOGIES STUDY (ART) IN THE BALTICS, EASTERN EUROPE, CENTRAL ASIA AND THE CAUCASUS

ИССЛЕДОВАНИЕ ДОСТУПА К ЛУЧЕВЫМ ТЕХНОЛОГИЯМ (ART) В ВОСТОЧНОЙ ЕВРОПЕ, ЦЕНТРАЛЬНОЙ АЗИИ И НА КАВКАЗЕ

ART STUDY COLLABORATORS

International Cancer Expert Corps
Partnering to transform global cancer care

ISTC
МНТЦ

STCU
SCIENCE & TECHNOLOGY CENTER IN UKRAINE

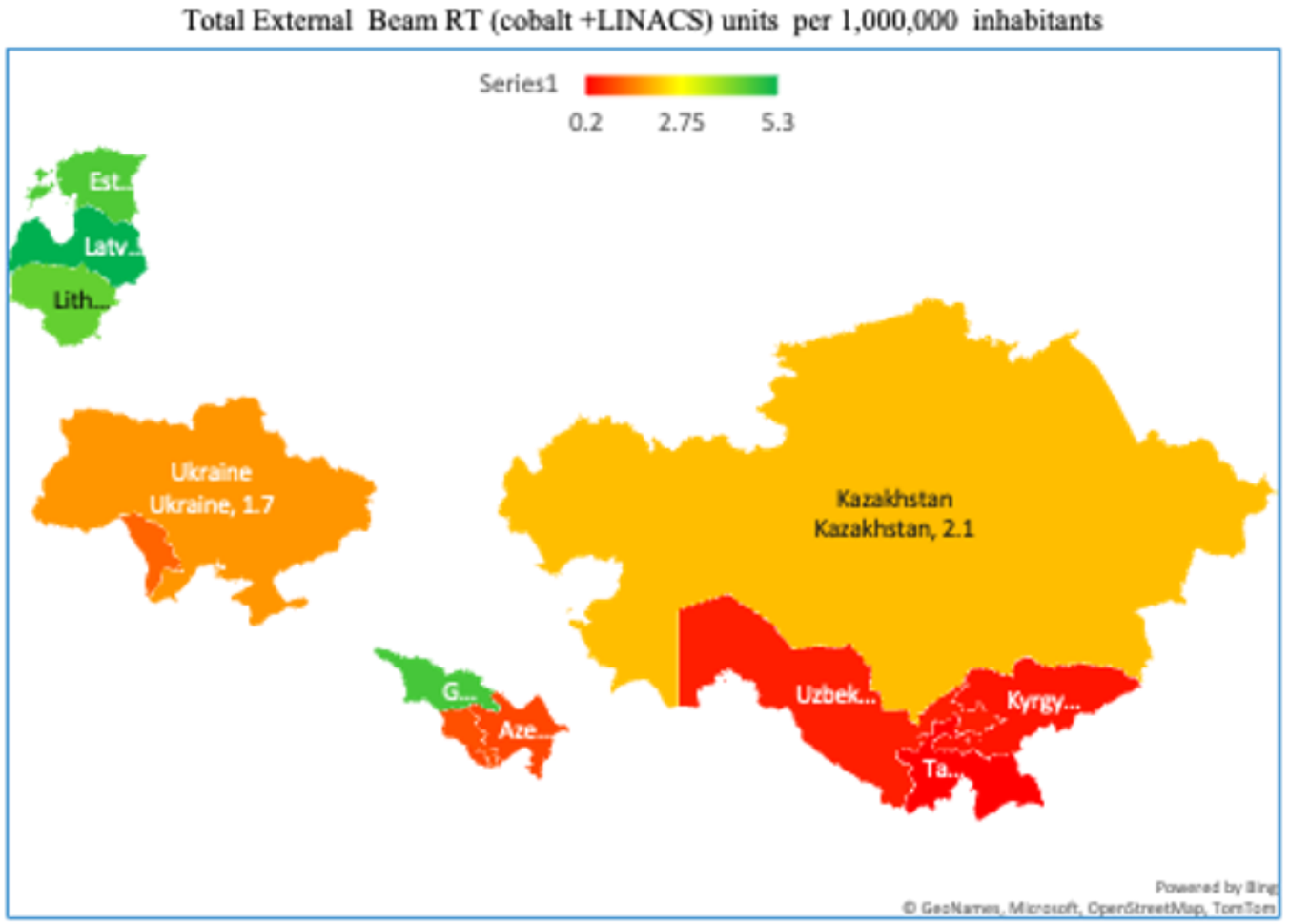
BALTIC states

COUNTRIES

Armenia, Azerbaijan, Estonia, Georgia, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Moldova, Tajikistan, Turkmenistan, Ukraine and Uzbekistan

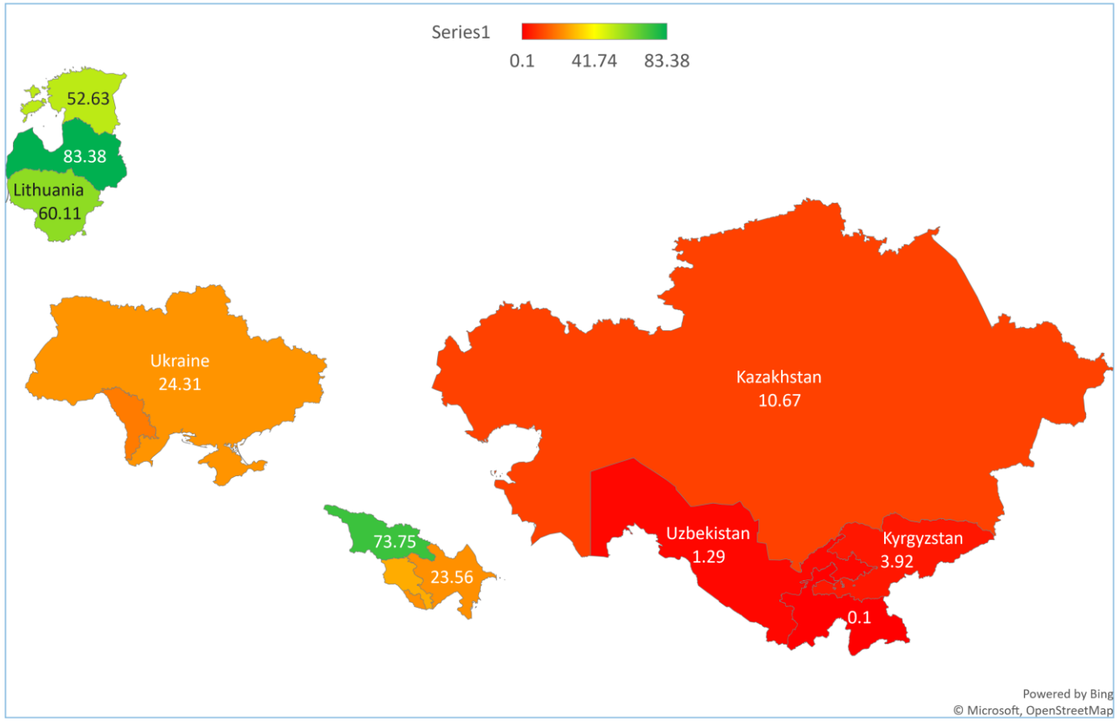
HTTPS://WWW.ICECCANCER.ORG/ACCESS-TO-RADIOTHERAPY-TECHNOLOGIES-STUDY-ART/

Total External Beam RT (cobalt +LINACS) units per 1,000,000 inhabitants

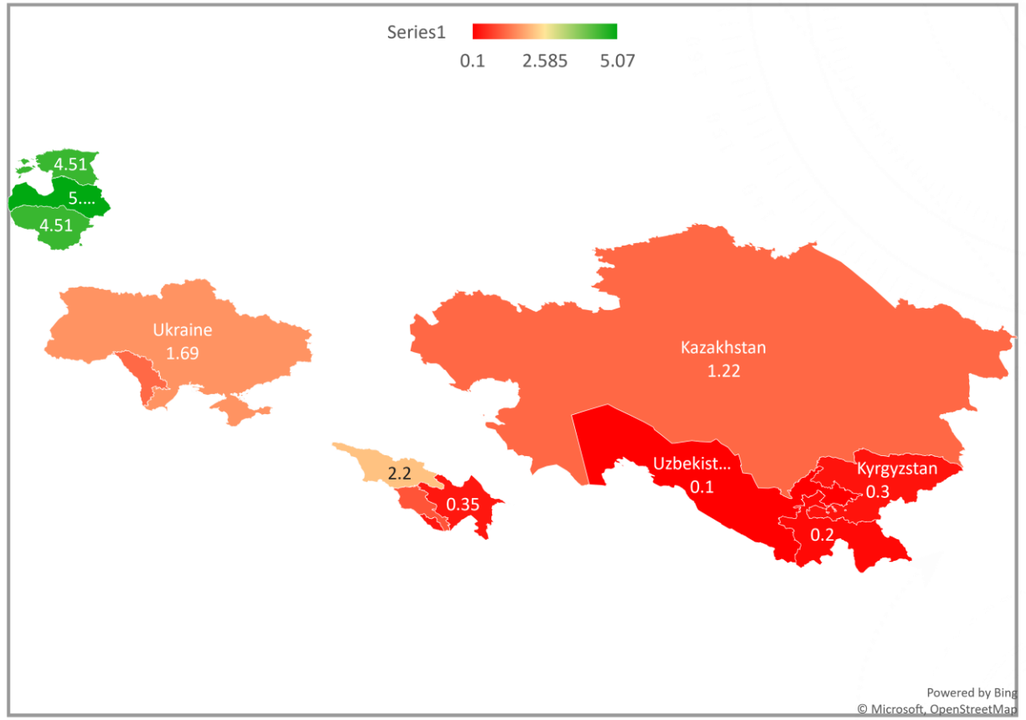


Shortages and challenges are not only in Linacs

Number of total imaging equipment per 1000 000 population

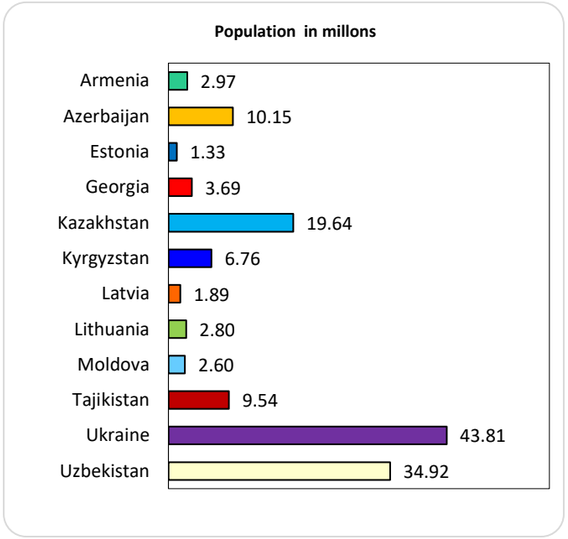


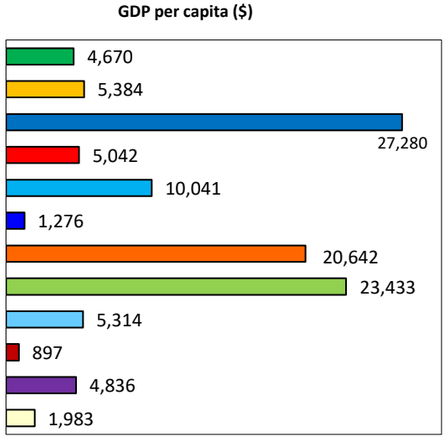
Experts per 100,000 inhabitants

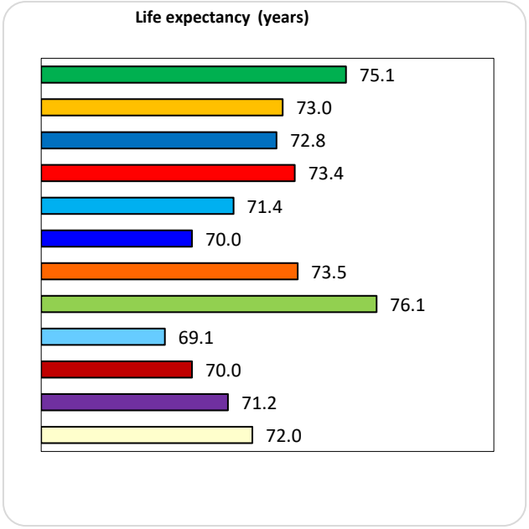


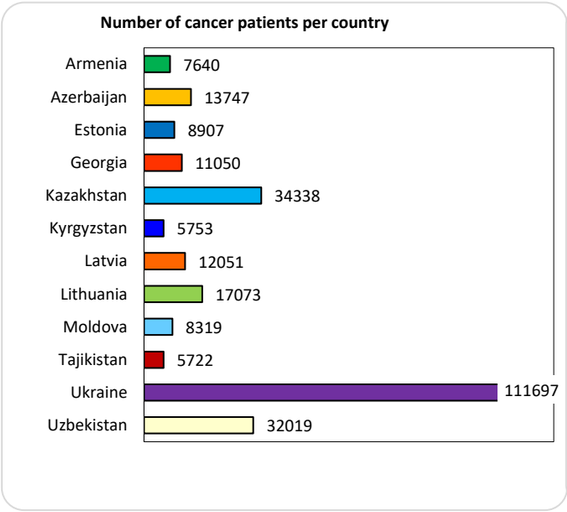
Access to Radiotherapy Technologies Study (ART) in Former Soviet Union countries (Azerbaijan, Estonia, Georgia, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Moldova, Tajikistan, Ukraine and Uzbekistan)

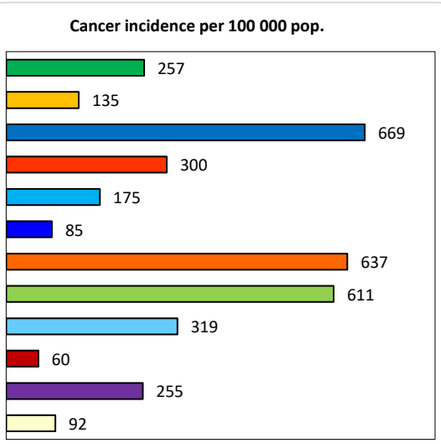
Selected ART country data: A. Population, **B.** GDP per capita, **C.** Life expectancy, **D.** Number of cancer patients, **E**. Cancer incidence per 100 000 population and **F.** Cancer deaths per 100 000 population

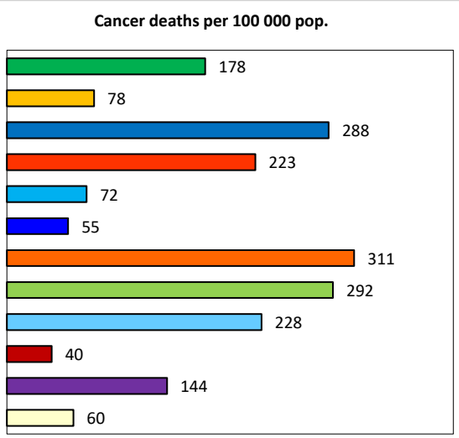




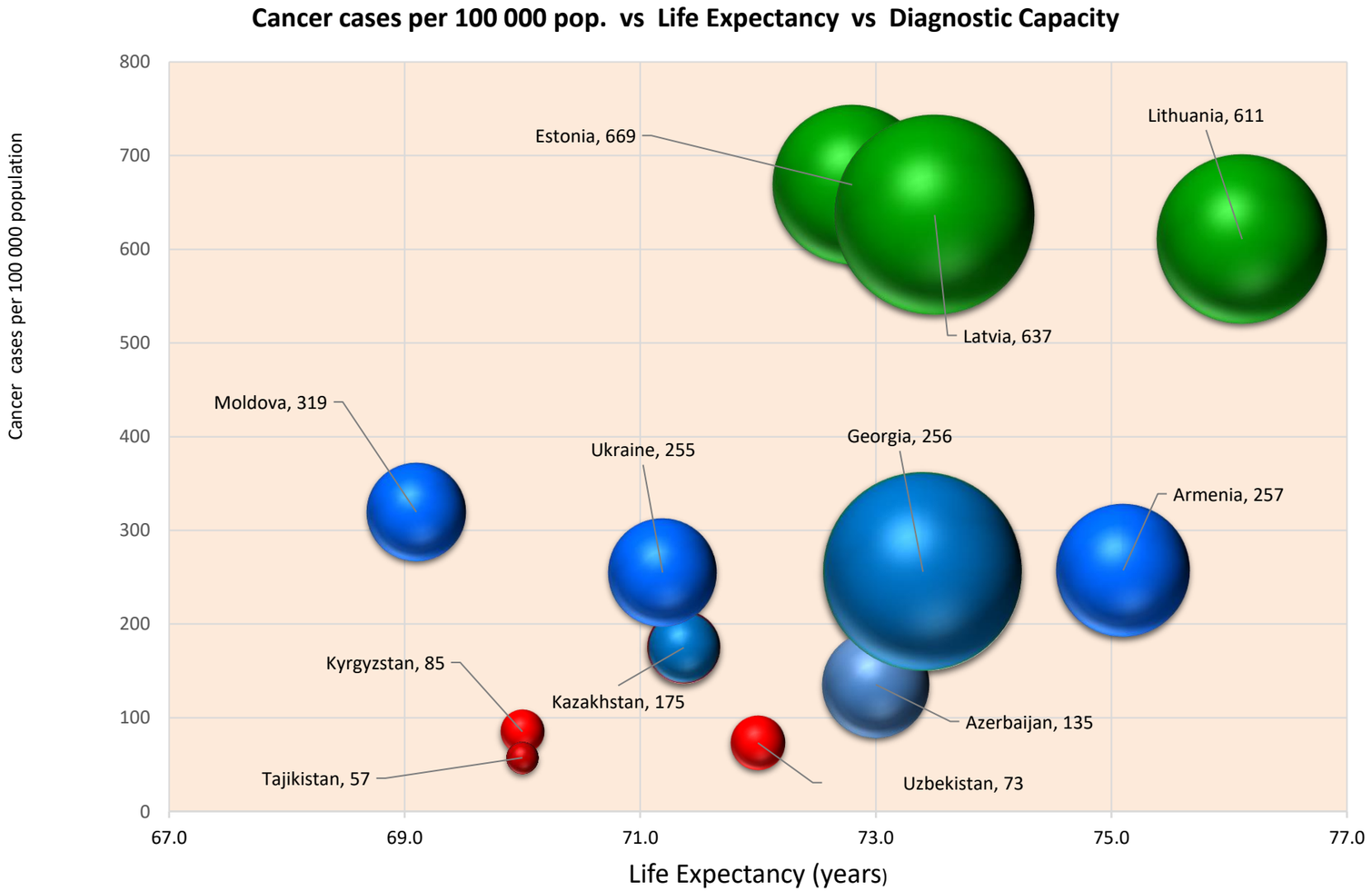




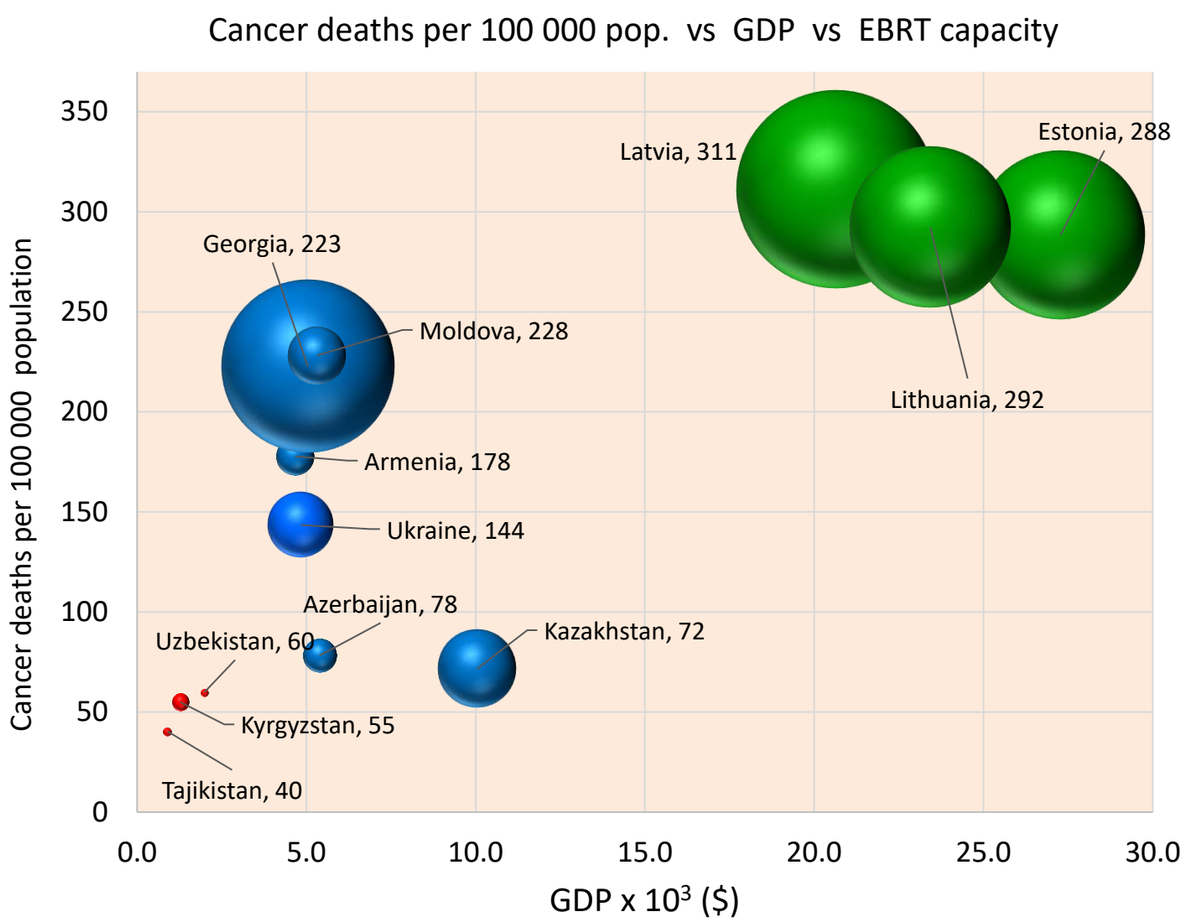


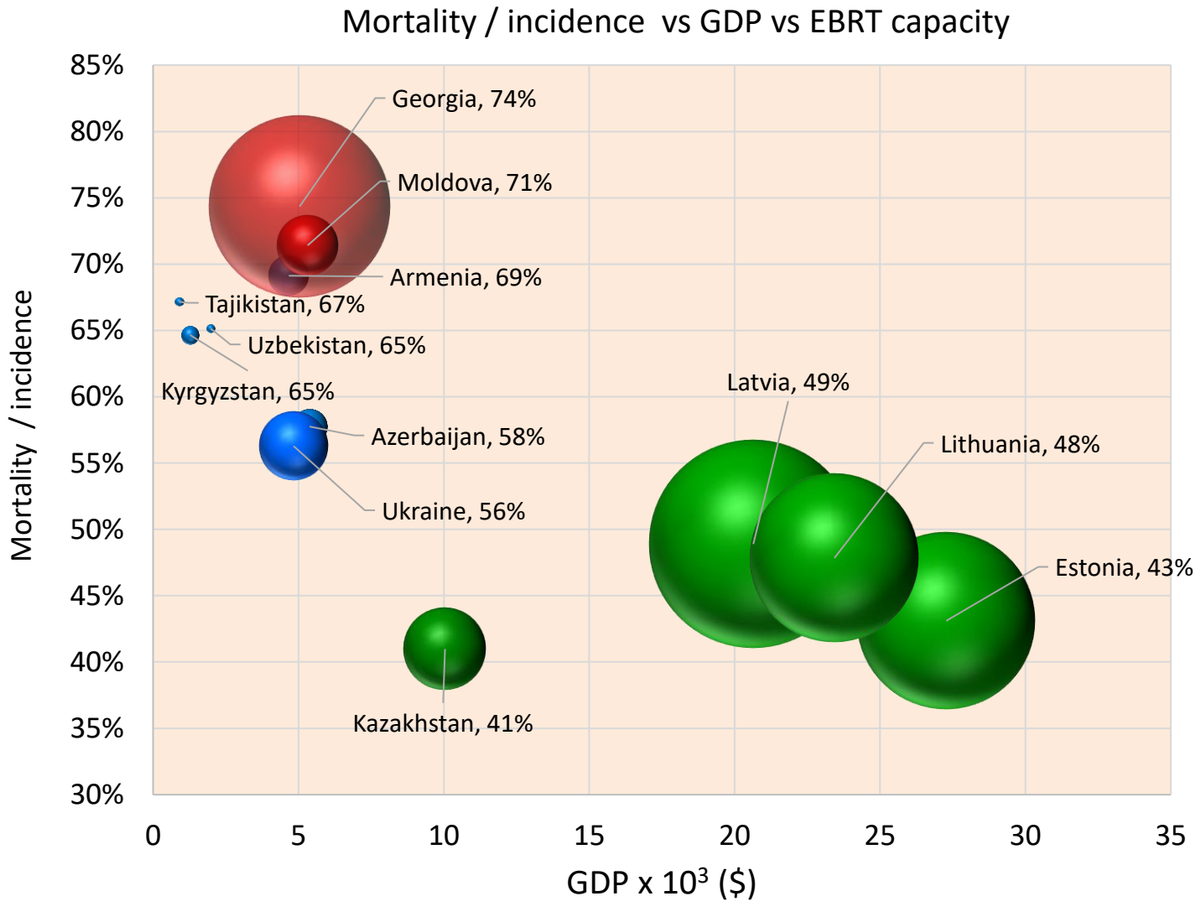


How successfully one country detects cancer? Mortality to Incidence ratio

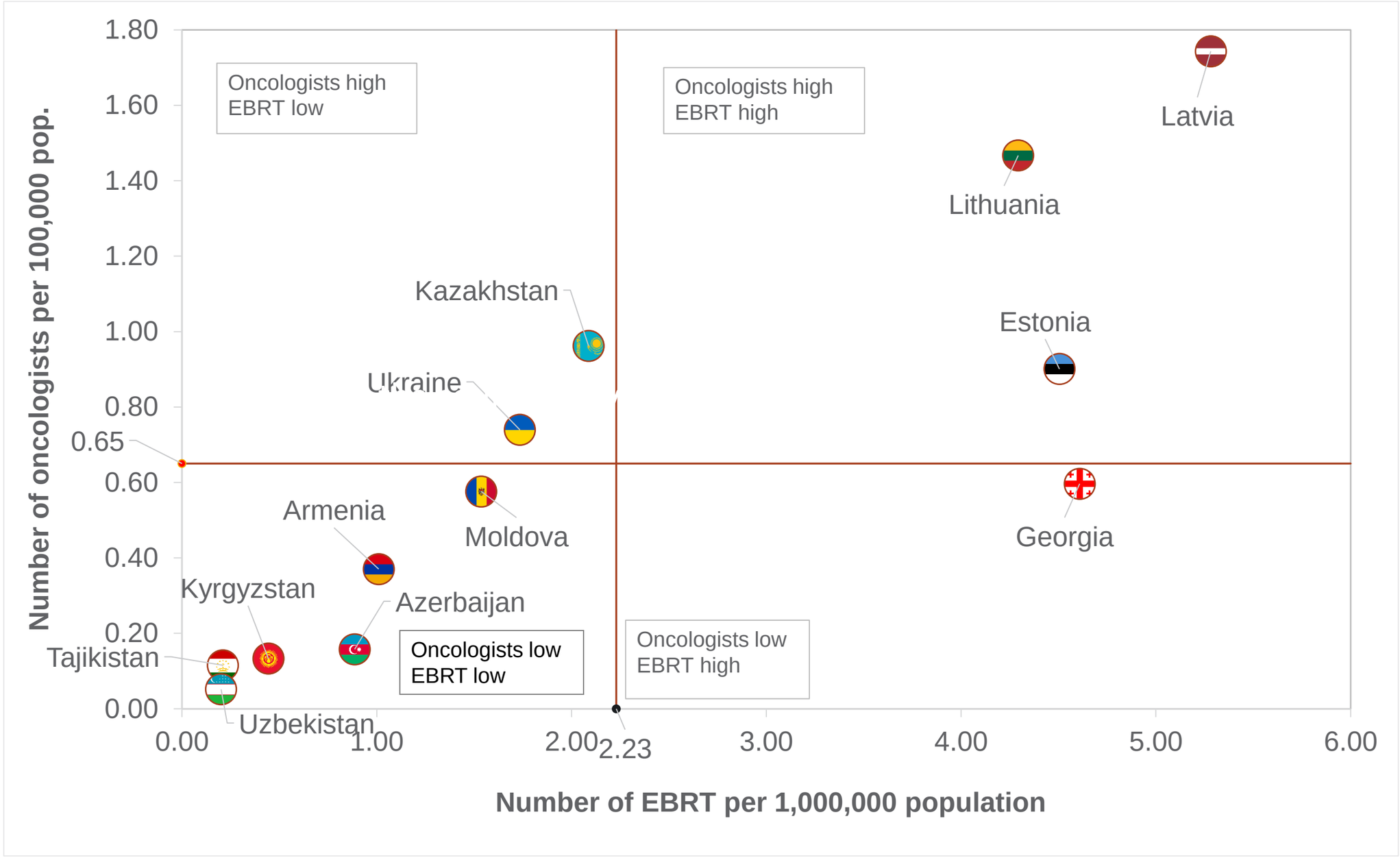


Cancer mortality and mortality /incidence ratio and in correlation with GDP and available EBRT equipment per 1 million inhabitants.





Showing the countries by available EBRT and oncologists



In summary

- Need data from grass roots to understand what, which and where are the challenges in order to develop an effective regional strategies
- Using the ART study we found that lack of both specialized equipment and technical staff are key barriers to improving cancer treatment and survival
- To our surprise we saw that ART countries are only second to Sub-Sahara region
- The study shows that the challenges that inadequately resourced countries currently face and how adequate funding could improve their RT and other cancer-related services.
- Our results showed that providing greater education and training opportunities is a critical need. Almost all ART countries need more medical physicists, radiation therapy technologists as well as engineers to maintain radiation therapy equipment.

What’s next after the ART Study?

Moldova: A Scoping Project

Developing a Sustainable Adoption Plan for the Public Hospital Oncology Institute's (PHOI) New Linear Accelerator

- Understand and assess current and anticipated RT staffing and priority needs
- Examine research potential impact of future Moldovan LINAC projects
- Identify resources and partners for PHOI to support their staff in operation of the LINAC

Regional Workshop in Tbilisi, Georgia

Making a Compelling Case to Procure LINACs & Leveraging Existing Resources in the Region

happening as we speak……

Thank you