

Heavy Ion Therapy Master Class - School 17 May 2021

# CANCER in the SEE region

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This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101008548



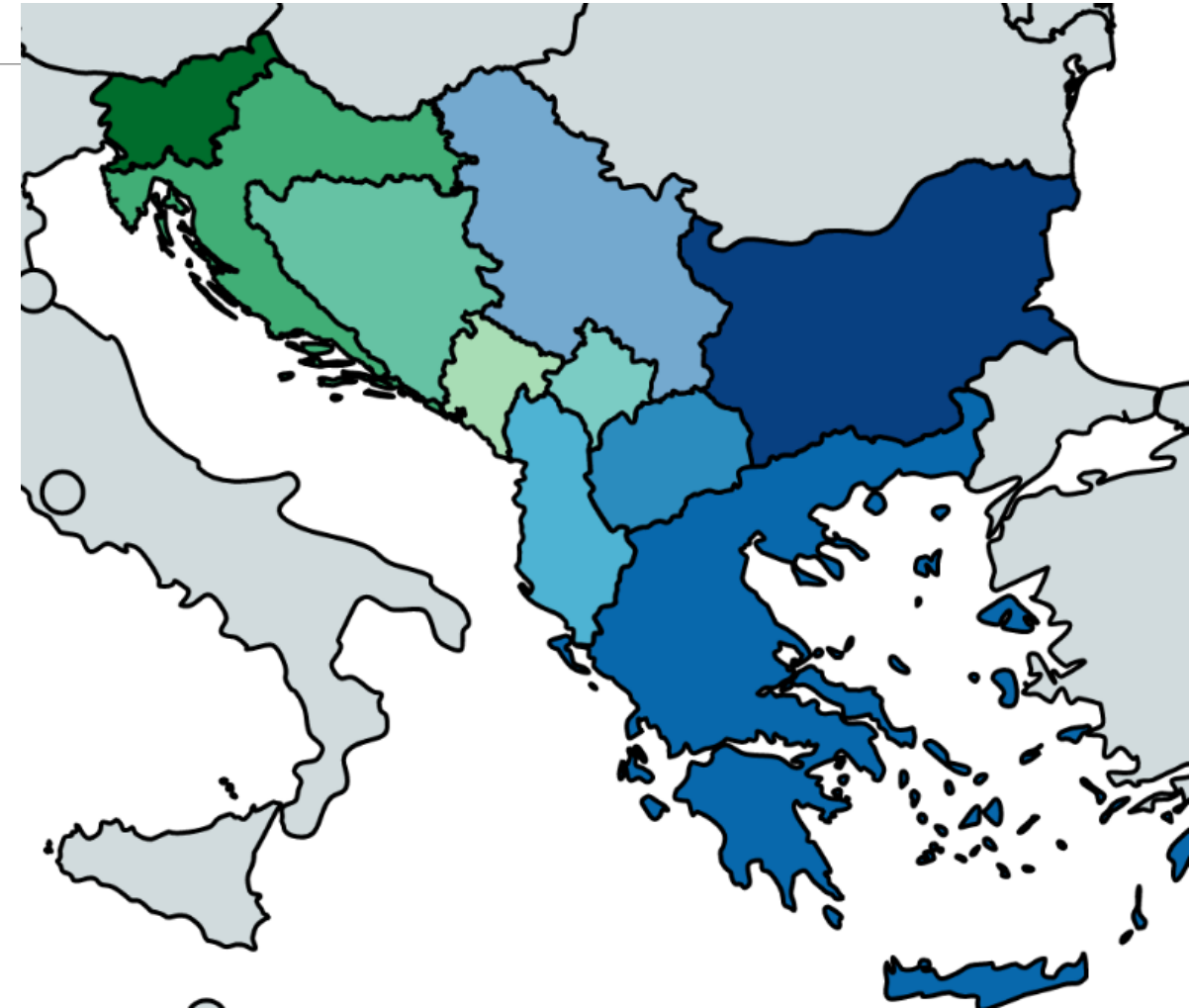




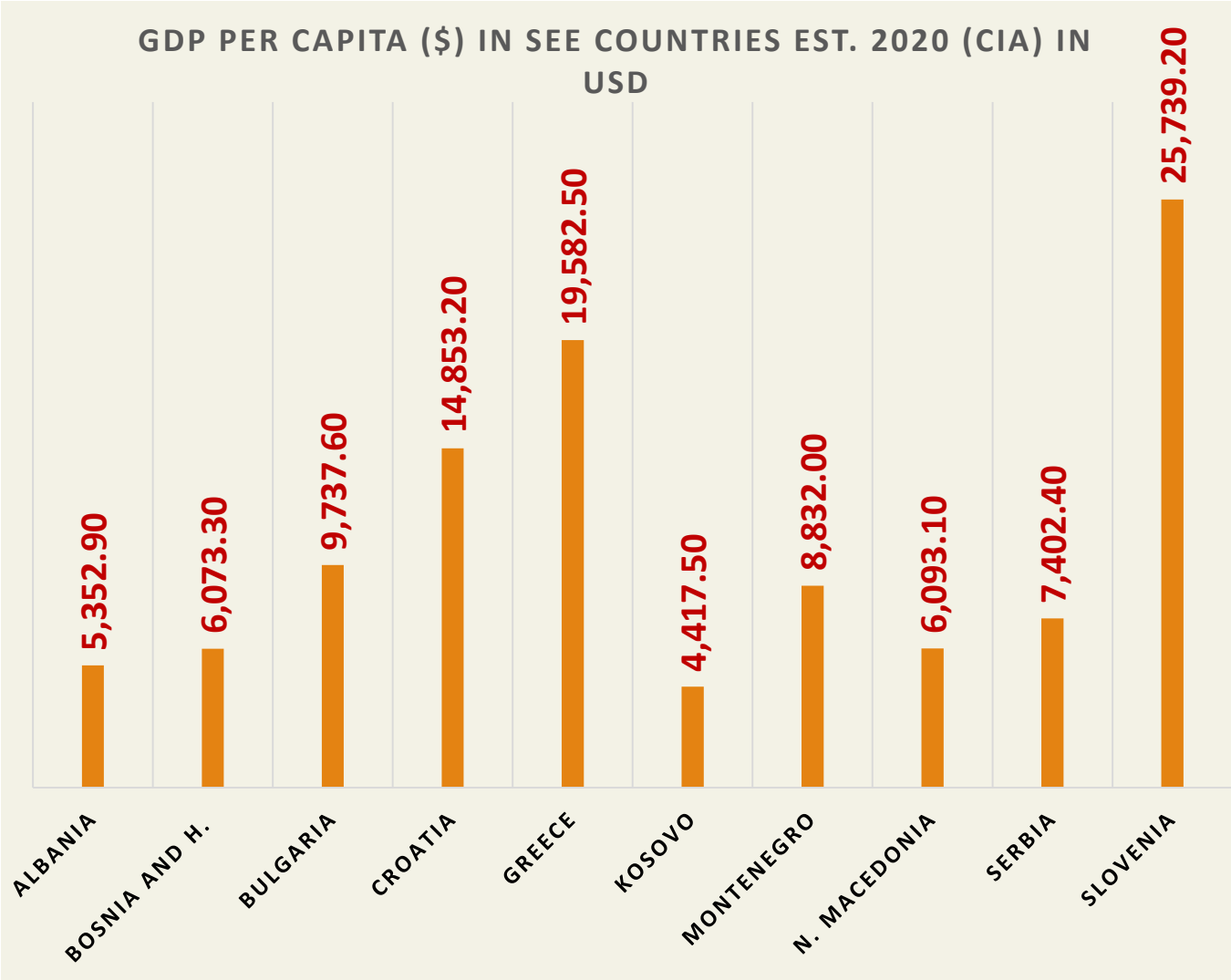
# SEE Region – geography and population



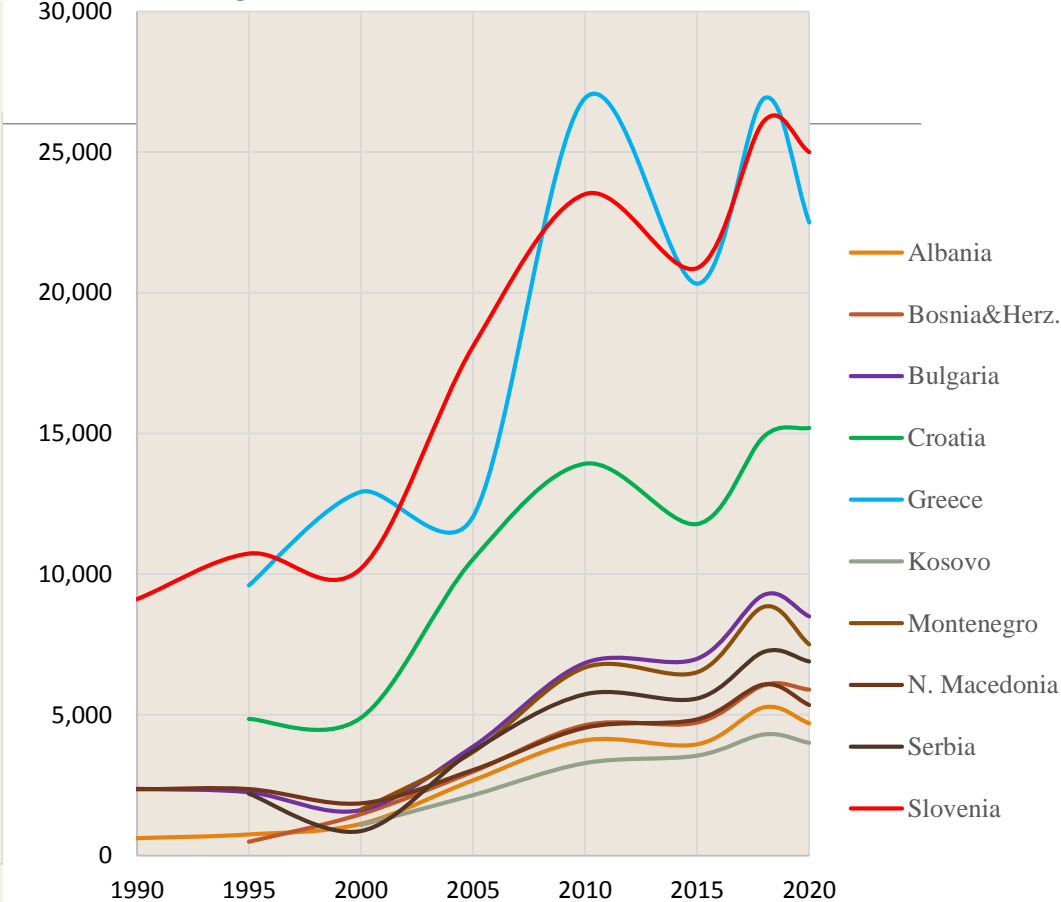
- Bulgaria (7 M)
- Greece (10.6 M)
- North Macedonia (2.1 M)
- Albania (3 M)
- Serbia (7.1 M)
- Kosovo (1.9 M)
- Montenegro (0.6 M)
- Bosnia (3.8 M)
- Croatia (4.3 M)
- Slovenia (2.1 M)



# SEE Region –GDP per Capita 2020 (USD)

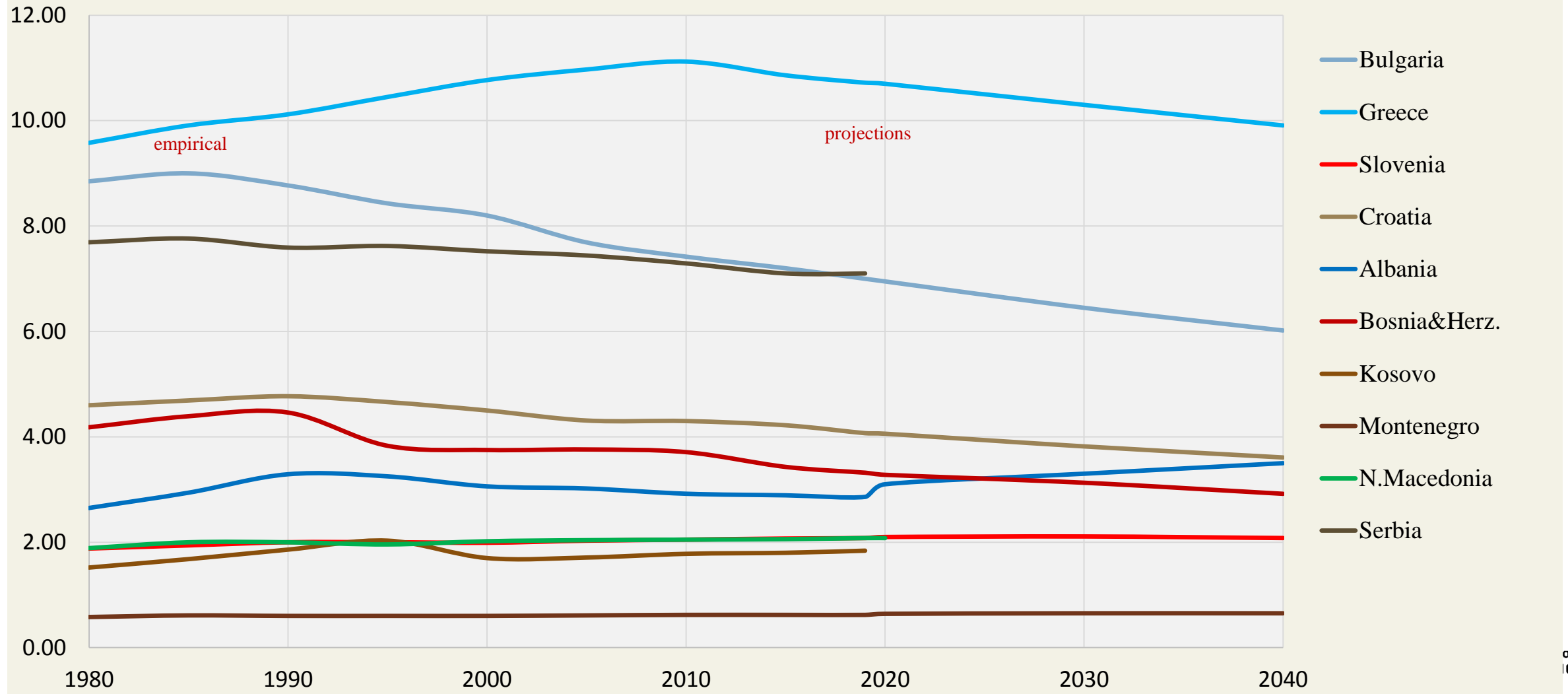


# GDP per capita in the SEE region in USD (1990-2020)



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# Population in Millions in the SEE countries (empirical data till 2018, projected for later than 2018 )



on 2020  
1008548

# SEE Region –Capacity to retain talent

The **Global Competitiveness Index** is an indicator for the capacity of each country to retain talent. Results from the **World Economic Forum** in 2019 show that most of the SEE countries are facing a sky-high youth unemployment that drives emigration from the SEE region. As the young talent leaves, their homelands' **economic prospects** decline even further. The ranking shows that in particular young and talented people from SEE are deserting their home countries, seeking professional development and recognition of their talent abroad.

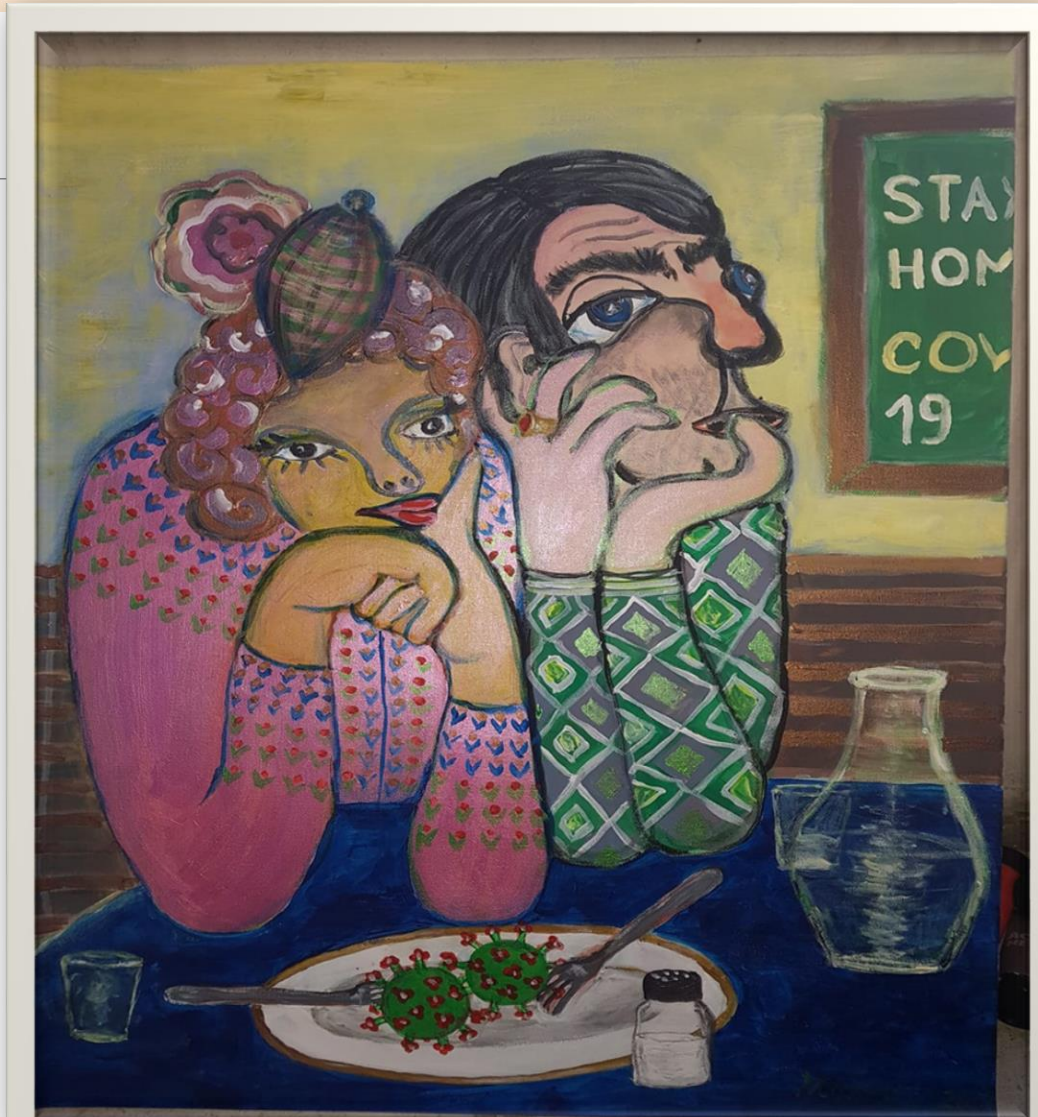
**SEEIIST** will offer research capacity to about **1000 researchers from and outside** the SEE region. These researchers will become users of SEEIIST, pursuing innovation in particle therapy and jointly advancing current knowledge.

2019 country rating by capacity to retain talent

Rank in 2019	Country
1	Singapore
2	USA
3	Hong Kong
4	Netherlands
5	Switzerland
35	Slovenia
49	Bulgaria
59	Greece
63	Croatia
72	Serbia
73	Montenegro
81	Albania
82	North Macedonia
92	Bosnia and Herz.
139	Congo
140	Yemen
141	Chad



# Where do we go after Covid-19 and Brexit-20?



NOT TO BE FORGOTTEN  
SEIIST Initiative proposed by Prof. Herwig Schopper,  
former Director General of CERN

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**Chronos**



**Kairos**





Trieste, January 2018, Herwig Schopper said:

**As a walk up this morning, Kairos came to me, and whispered to my ear:**

**“NOW IT IS A RIGHT TIME TO DO THIS PROJECT FOR SEE”**



# Cancer Rank list in SEE

Rank	AL	BH	BG	CRO	GR	MN	MK	SR	SLO
#1									
#2									
#3									
#4									
#5									
#6									
#7									
#8									
#9									
#10									

AL- Albania, BH – Bosnia-Herzegovina, BG-Bulgaria, CRO-Croatia, GR-Greece, MN-Montenegro, MK-North Macedonia, SR- Serbia, SLO- Slovenia

Cancer site	# in SEE
Lung	31.783
Colorec-tum	26.872
Breast	25.571
Prostate	20.498
Bladder	14.091
Stomach	7.552
Pancreas	7.406
Kidney	6.213
Liver	5.128
Brain, CNS	4.979
Other sites	72,222
Top10	150.093
All Cancers	222.315

## Globaly 2012

Breast

Lung

Prostate

Head and neck

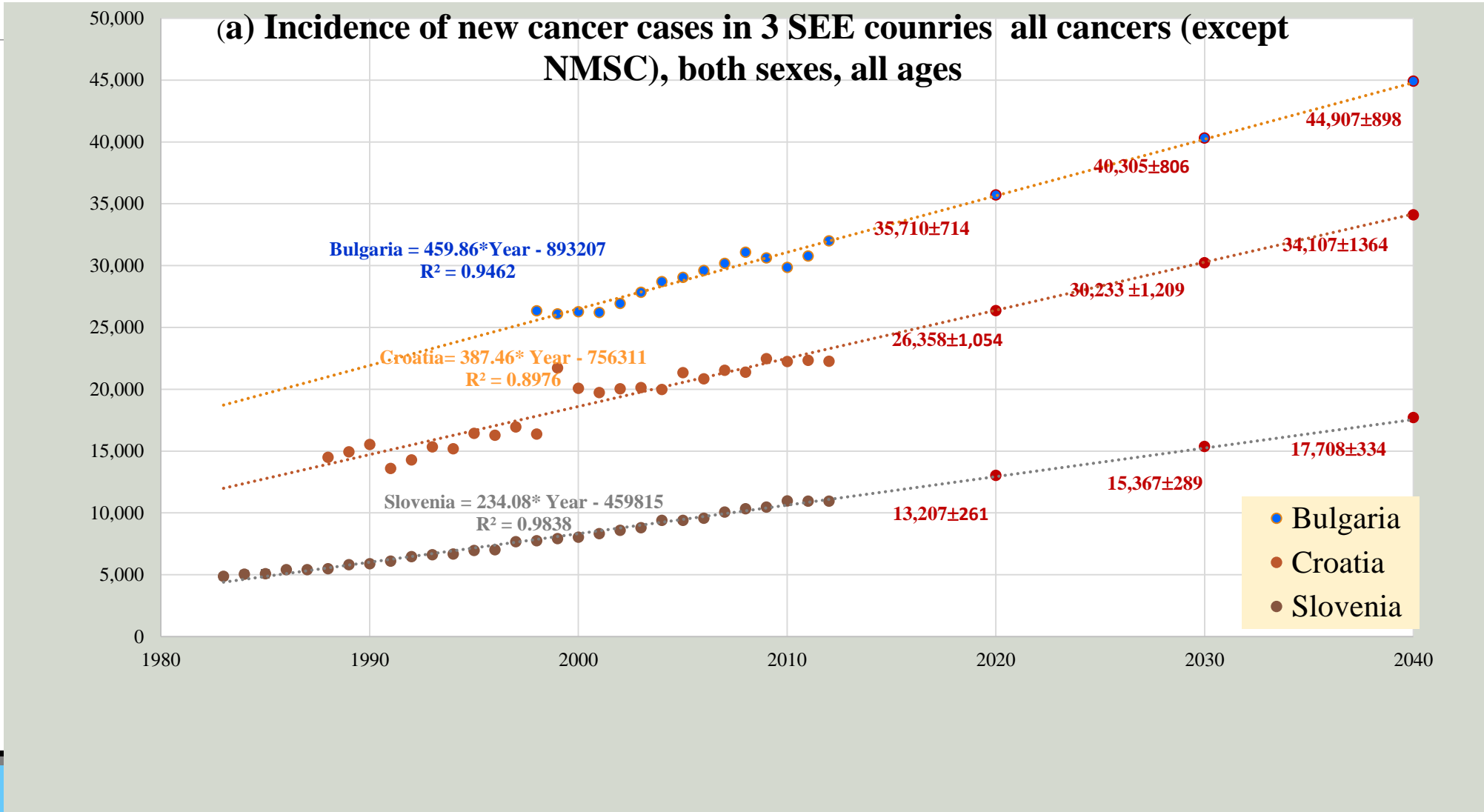
Colorectum



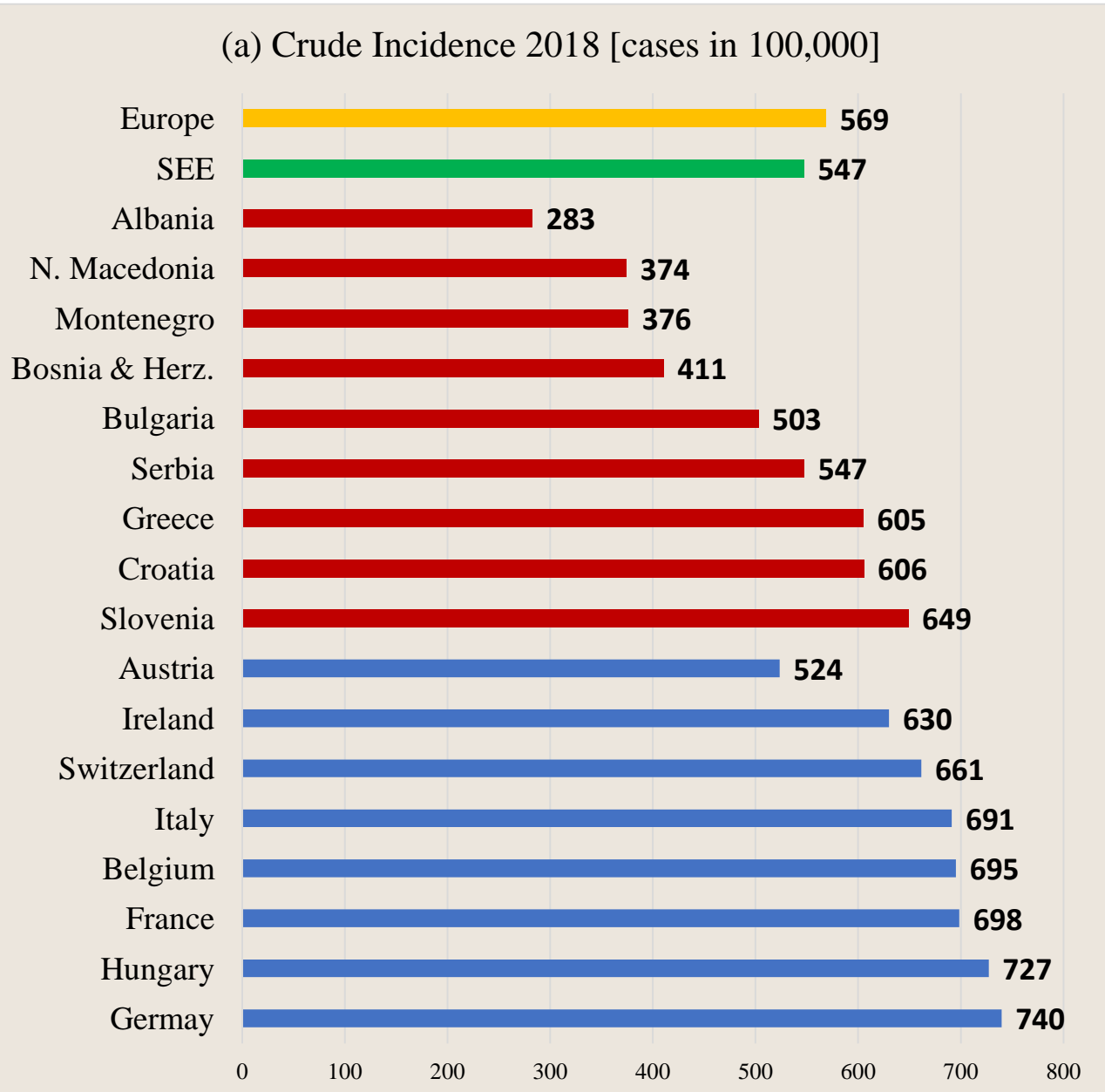
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# SEE- Cancer and time



# Cancer Incidence in SEE- Crude rate in 100.000 population



Lower cancer incidence in SEE than Western European countries due to:

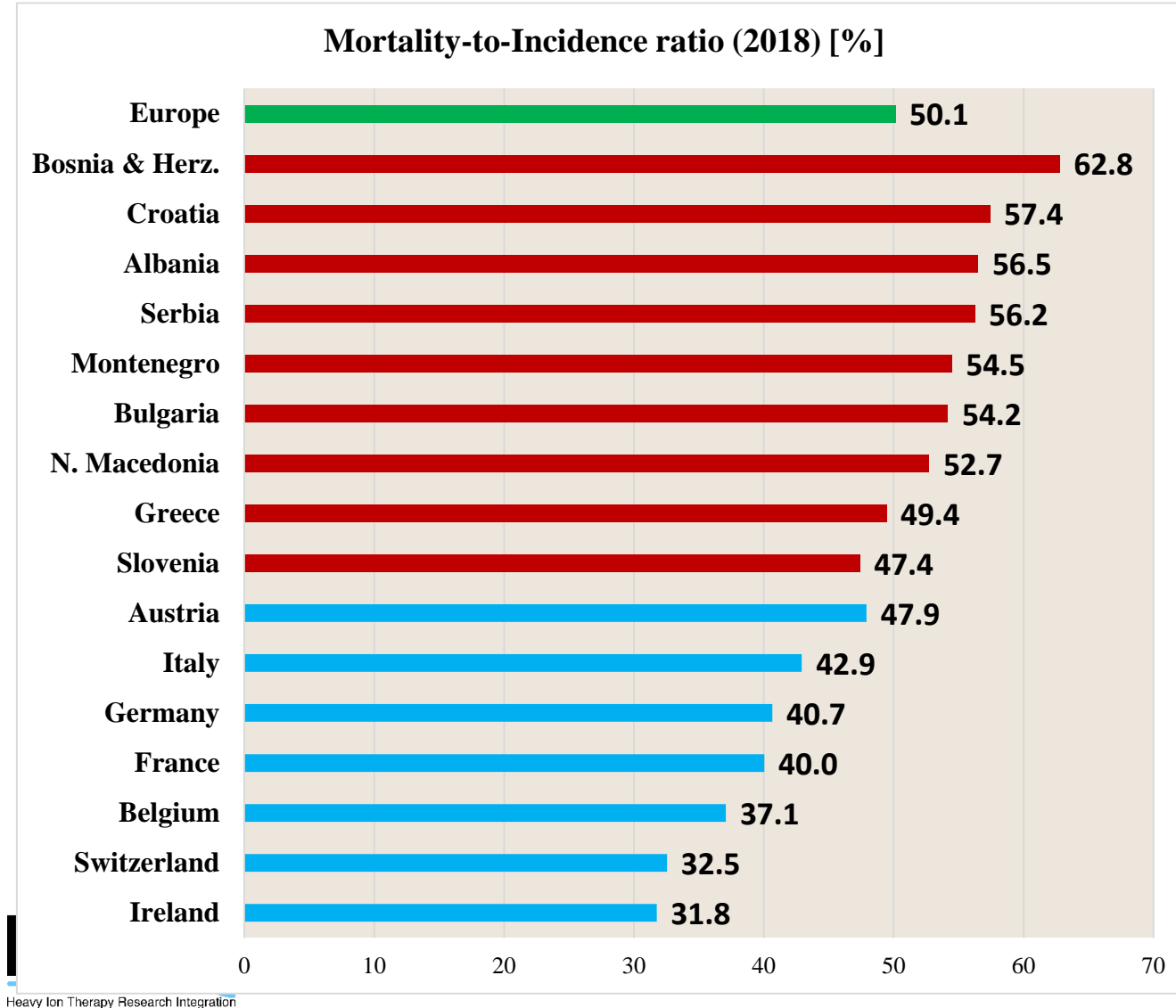
- (1) lack of screening programs
- (2) Lack of diagnostics equipment
- (3) Lack of qualified and skilled equipment operation staff



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# Mortality-to Incidence ratio (MIT)



- (1) Highest is the MTI in Bosnia&Herz. It is nearly double of that from Switzerland and Ireland.
- (1) SEE countries show high % of MTI compared to Western Europe.



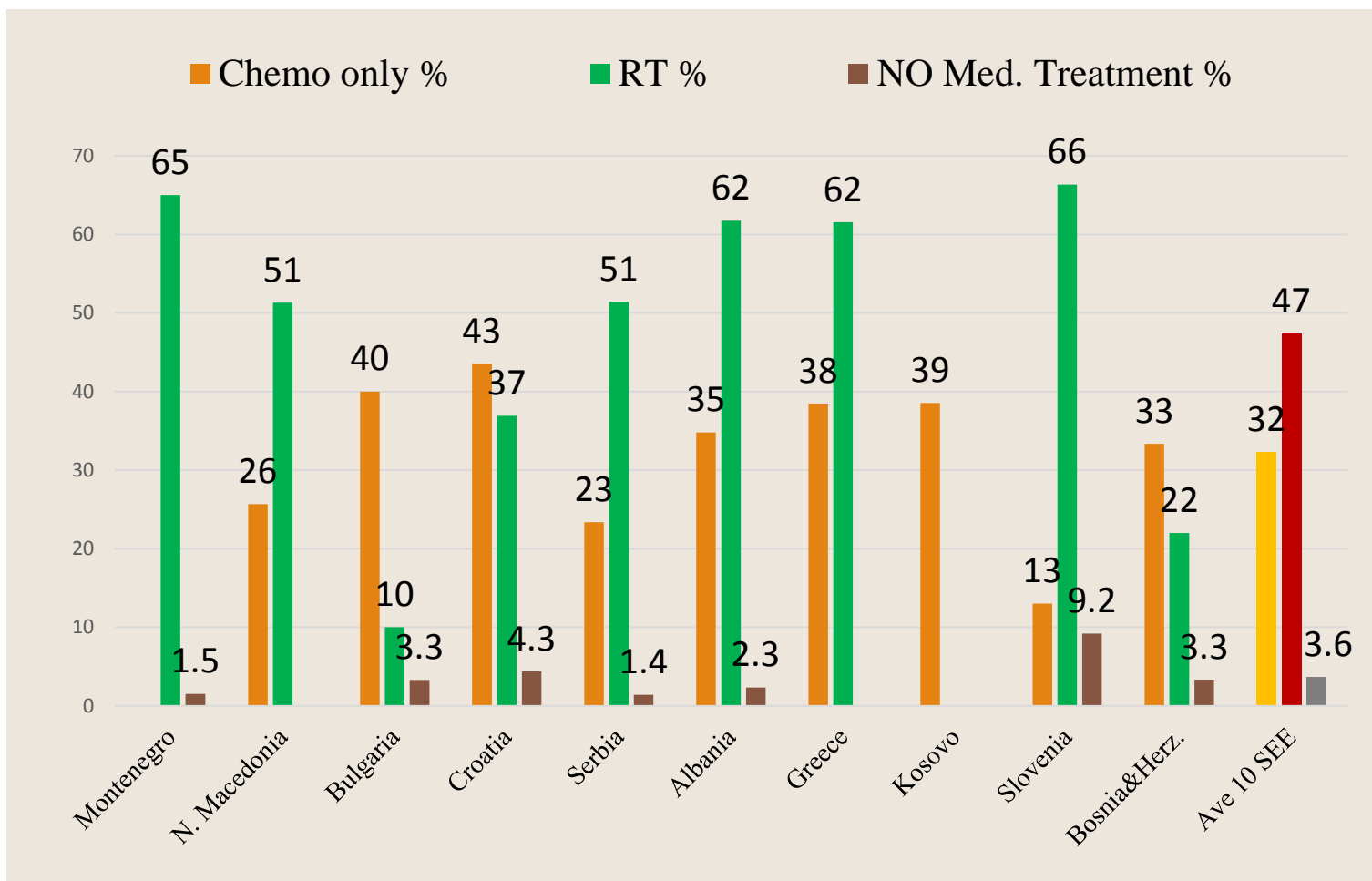
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# CANCER TREATMENTS AVAILABLE IN SEE 2020 (Data Onco)

Cancer therapy	Chemo	Radiation	Immuno	Gene	Hormonal	Targeted drug	Cryoablation
Montenegro	Y	Y	Y	N	Y	Y	N
N. Macedonia	Y	Y	Y	N	Y	Y	Y
Bulgaria	Y	Y	Y	N	Y	Y	N
Croatia	Y	Y	Y	Y	Y	Y	Y
Slovenia	Y	Y	Y	Y	Y	Y	Y
Serbia	Y	Y	Y	N	Y	Y	N
Albania	Y	Y	Y	N	Y	Y	N
Kosovo	Y	Y	Y	N	Y	Y	N
Greece	Y	Y	Y	N	Y	Y	N
Bosnia	Y	Y	Y	Y	Y	Y	Y



# SEE-region - Cancer treatment modalities (%)



(1) In average, in SEE there are 32% of the newly diagnosed cancer patients that undergo only to chemotherapy and 47% benefit from RT in their treatment.

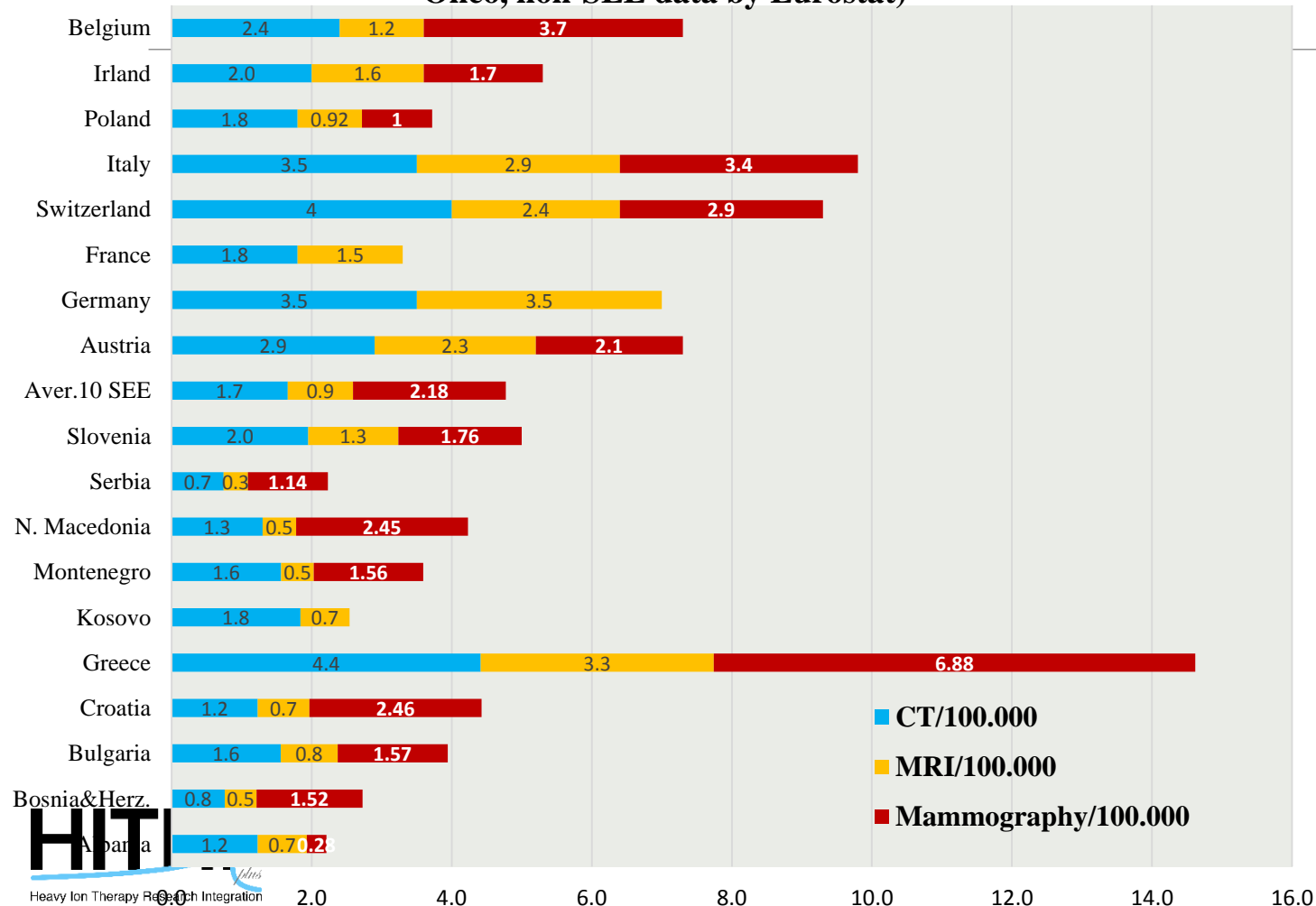
(1) About 4% of the newly diagnosed cancer patients in SEE do not submit to any medical treatment. Slovenia is 9.2% (2017)



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# Availability of Diagnostics Equipment in SEE countries-Onco Data (2020) – Density of CT, MRI and Mammo units per 100.000 population

Availability of Diagnostics Equipment in SEE on 100.000 (SEE Data by Onco, non-SEE data by Eurostat)



(1) Data for Mammography units from Kosovo and Germany are unavailable at the moment of writing this presentation.

(2) Greece is EU champion, much higher availability of diagnostics equipment than Switzerland and Italy.

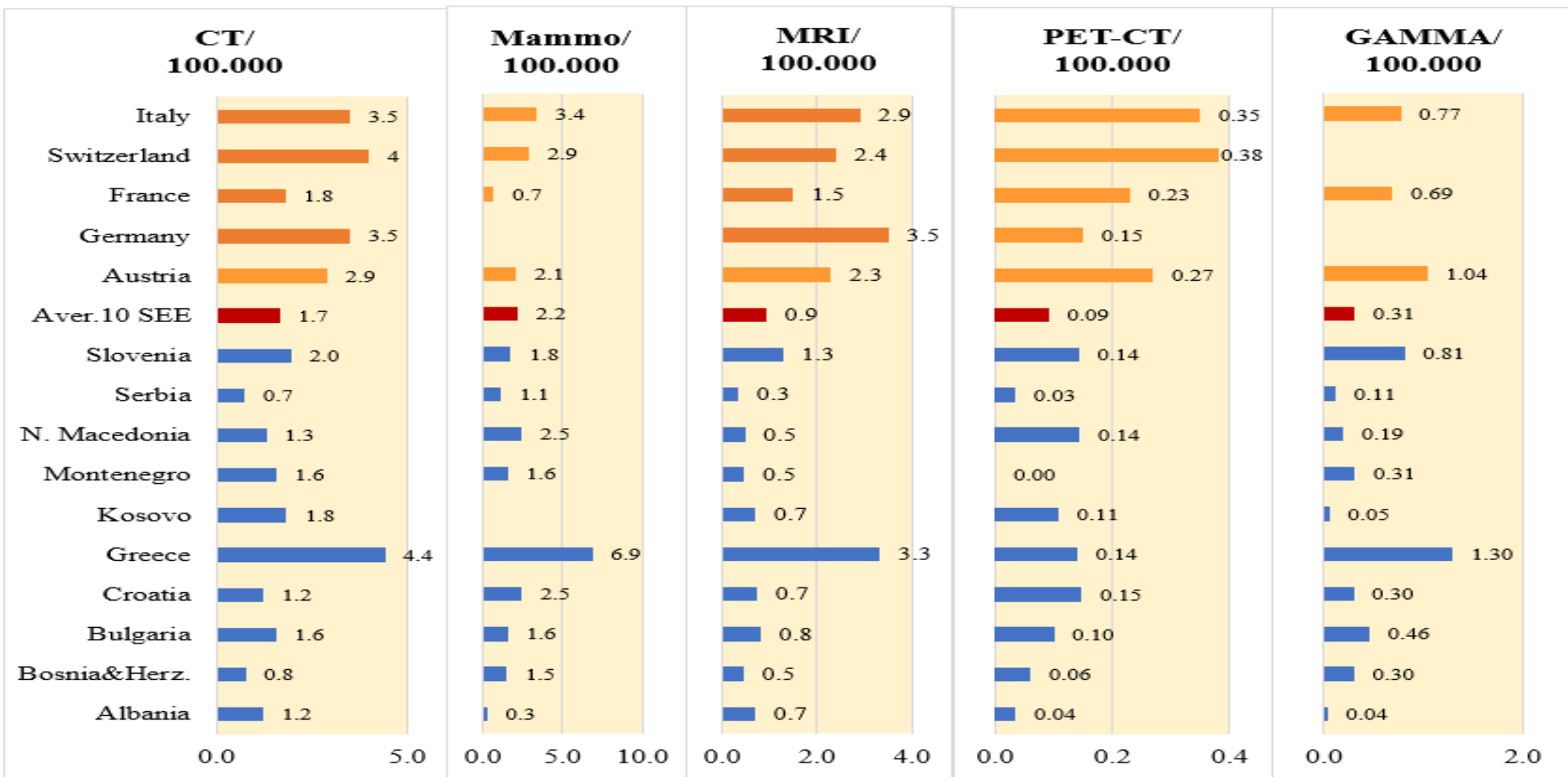
(3) Data for Serbia lower than those in Eurostat and those by regulators. For future calculations, an average of Onco and Regul was used for this country (3.3).

(4) France and Kosov (Mammography data missing)

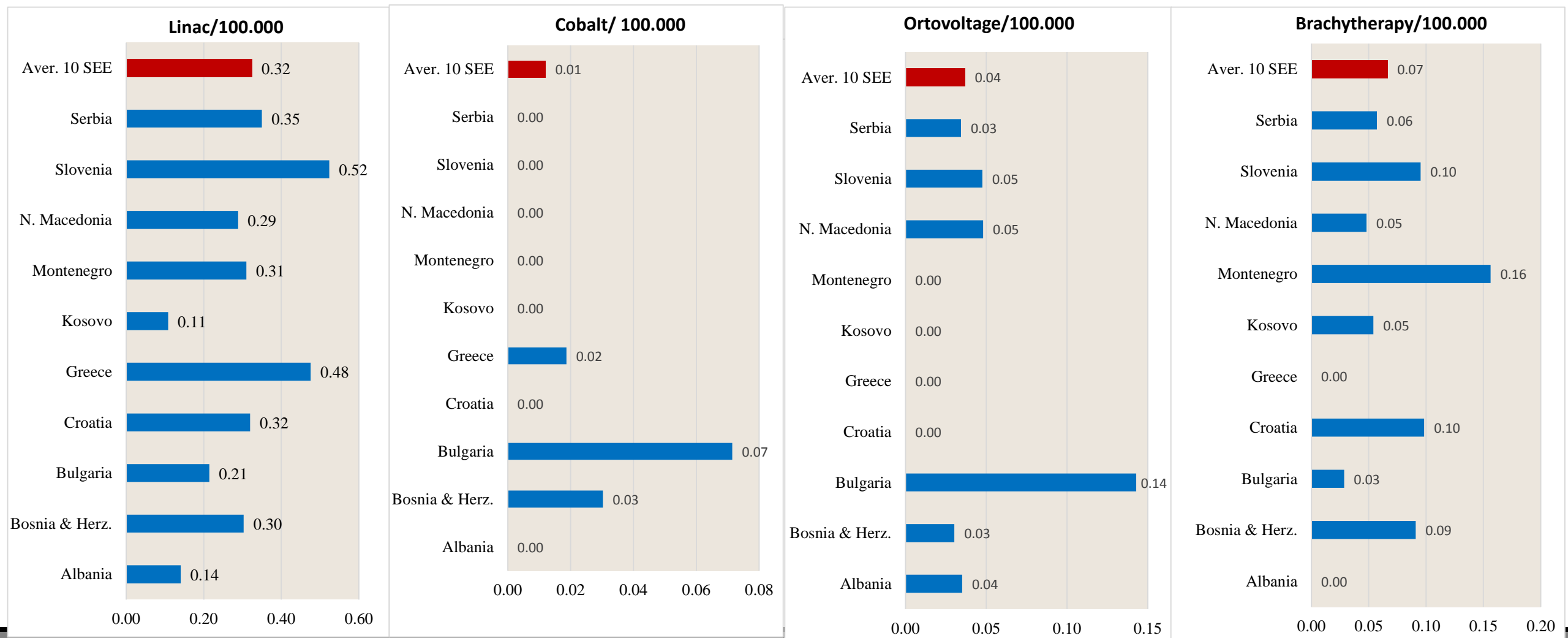


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# SEE-region: Cancer Diagnostics tools

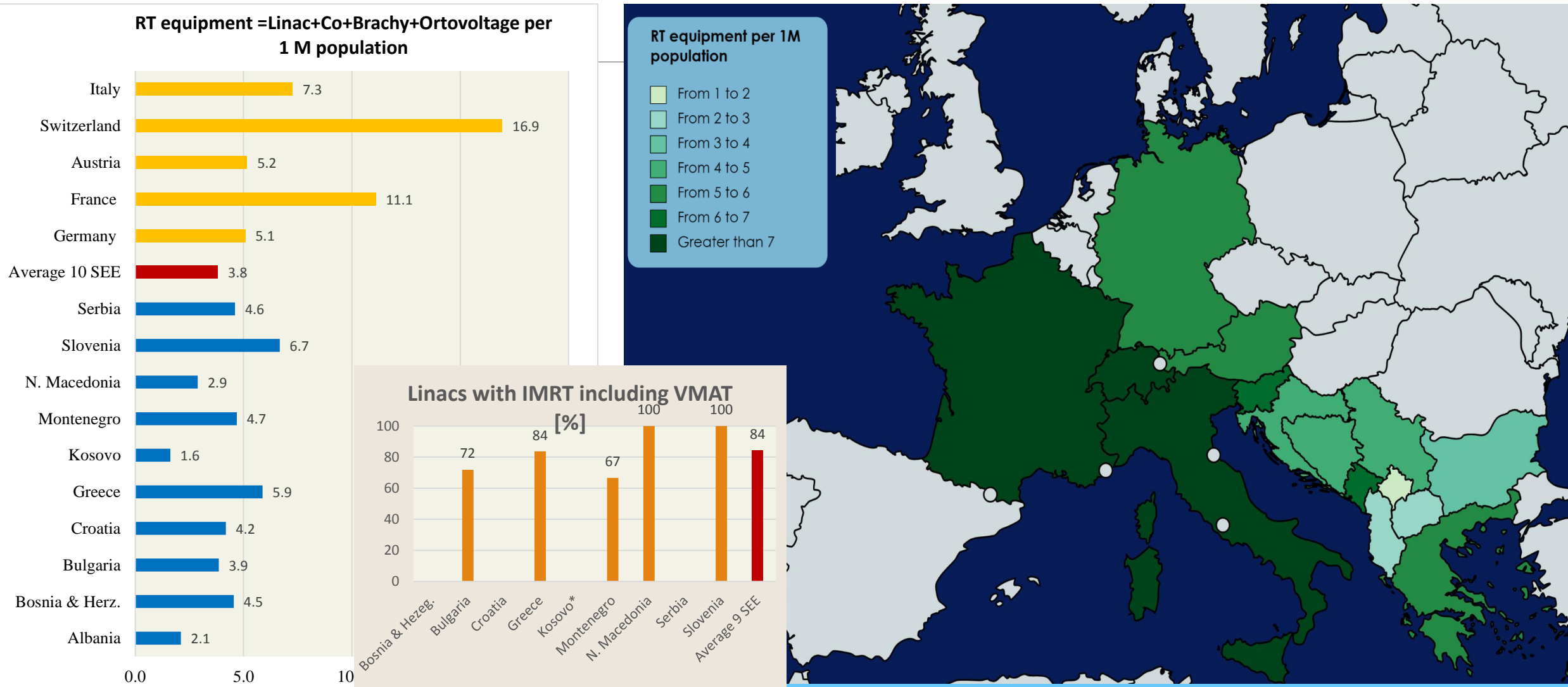


# Availability of RT Equipment (Linacs, Cobalt, Ortovoltage, Brachytherapy) Data in SEE 2020 (Data by Oncologists)



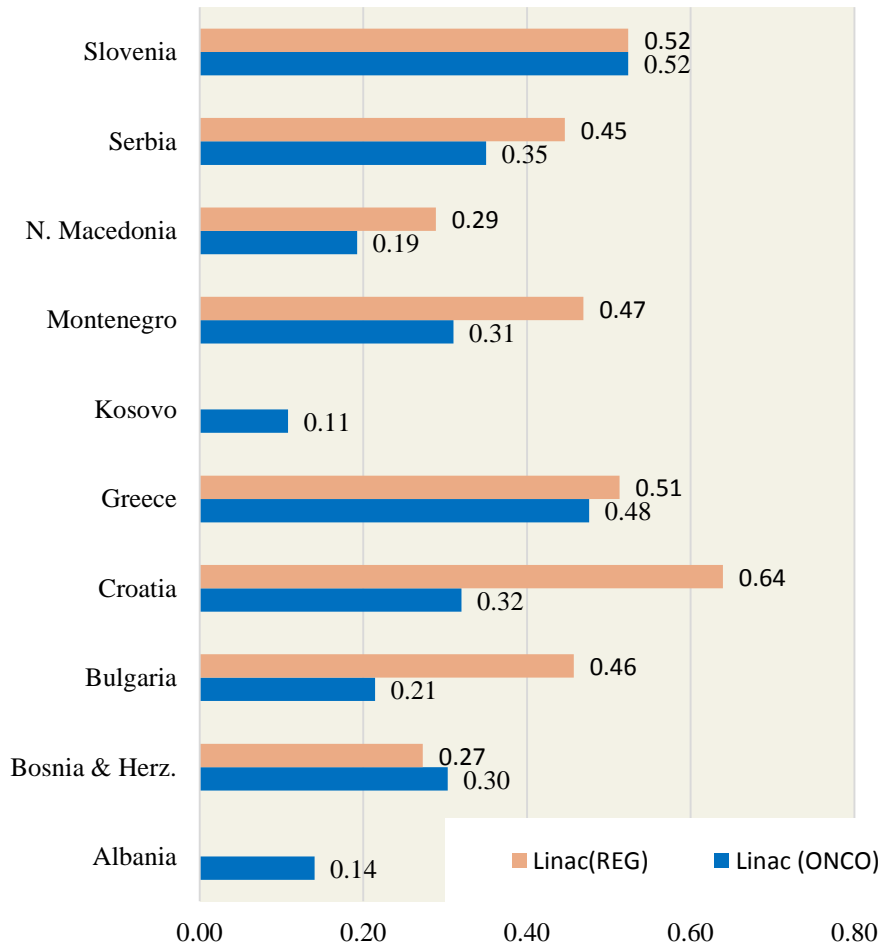


# RT units per 1 M population in SEE region and some reference European countries

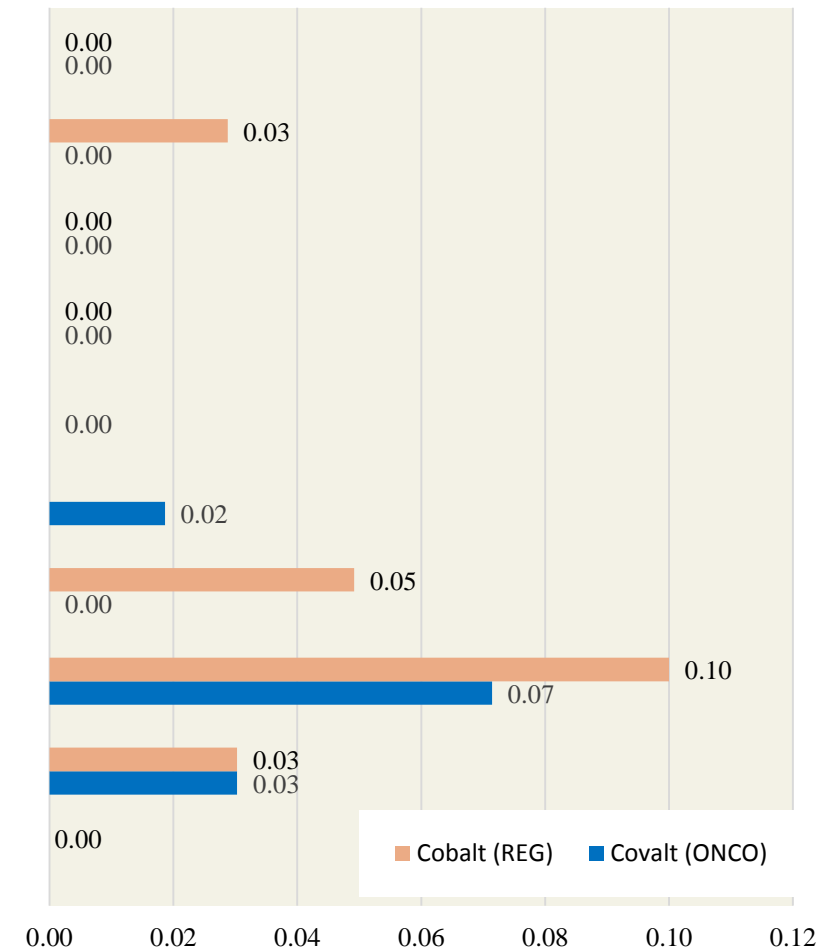


# Linacs and Cobalts: comparison ONCO and REGULATORS

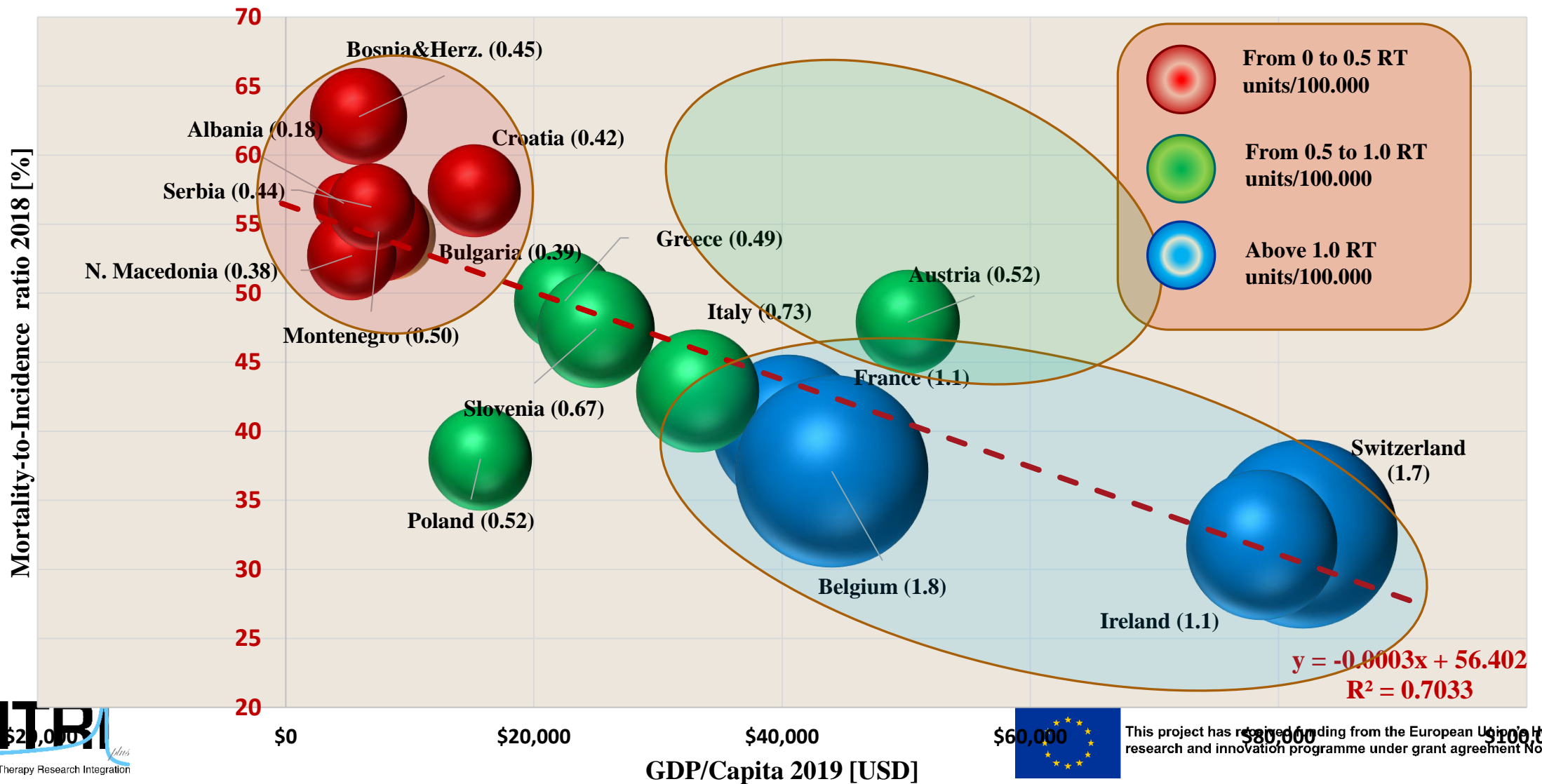
## Linac/100.000 ONCO vs REG



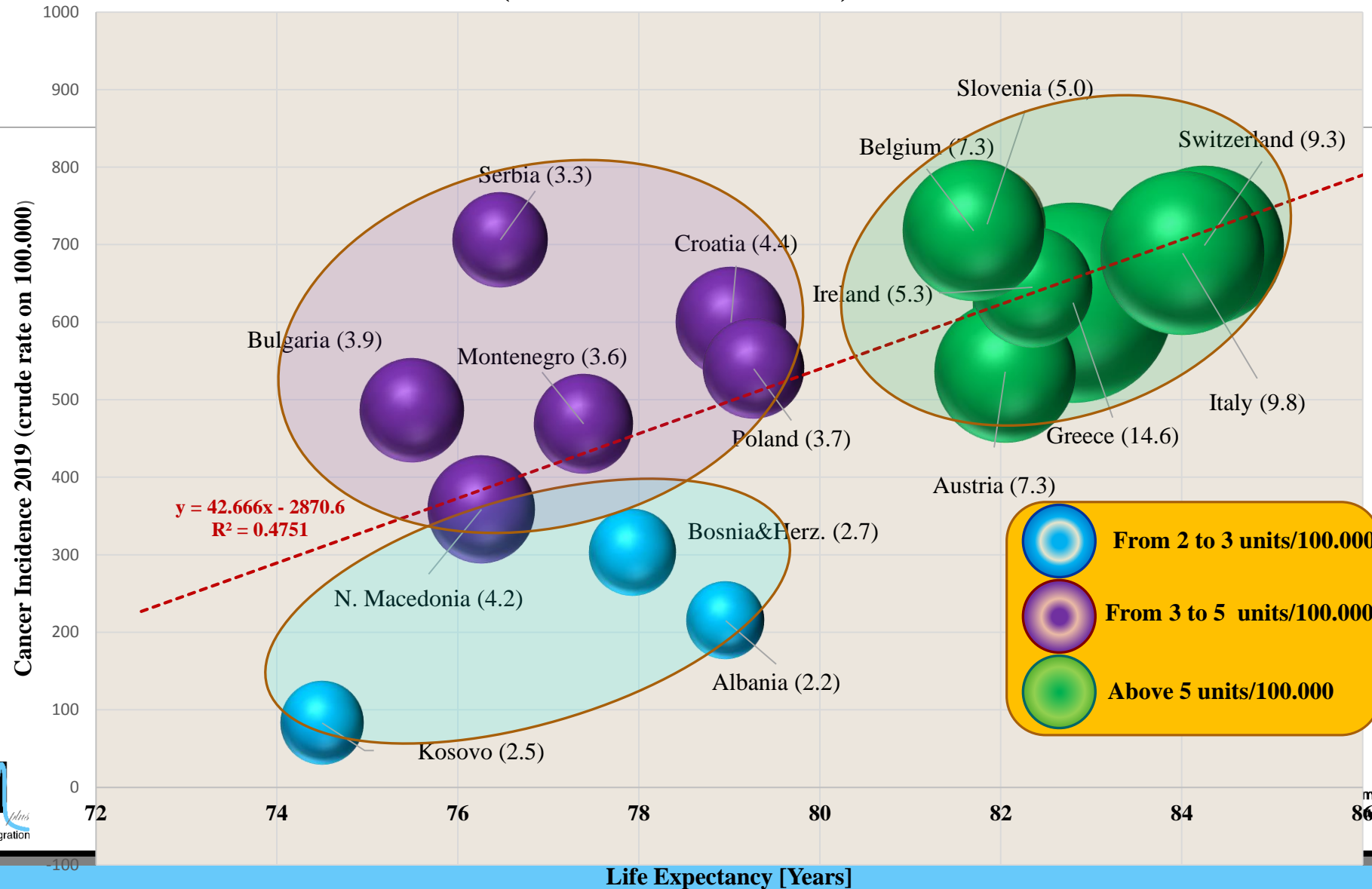
## Cobalt/100.000 ONCO vs REG



# Mortality-to-Incidence ratio dependence on GDP/capita and number of RT equipment (Linac, Cobalt, Brachytherapy, Orthovoltage) /100.000 population



# Cancer Incidence vs Life Expectancy vs Diagnostics Equipment (CT+MRI+Mammo)





# To draw some conclusions

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## In order to combat cancer more successfully the SEE region should:

- ❖ Organize functional national cancer registry in each country within the SEE region, as the first step in establishing a SEE regional cancer database.
- ❖ In parallel, it will be necessary to upgrade the national strategies for early-stage cancer diagnosis and treatment in the SEE countries.
- ❖ Leverage the economic development of the LMICs of SEE, and bring the culture of collaboration beyond borders....

# Credits to

**Manjit Dosanjh (CERN)**  
**Vesna Gersan (University in Skopje)**  
**Petya Georgieva (SEEIIST)**

**and to the network of about 30 experts from the SEE countries who have contributed with cancer related data**

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