

# Leveling of Radiation Oncology Services in Indonesia

**A. Giselvania**<sup>a,c</sup>

**S. Octavianus**<sup>a</sup>, **Handoko**<sup>a</sup>, **H. Kodrat**<sup>a</sup>, **S.M. Sekarutami**<sup>a</sup>, **S.A. Gondhowiardjo**<sup>a,b</sup>

<sup>a</sup> Department of Radiation Oncology, Faculty of Medicine Universitas Indonesia – Dr. Cipto Mangunkusumo Hospital – Jakarta, Indonesia

<sup>b</sup> President of Indonesian Radiation Oncology Society (IROS) – Jakarta, Indonesia

<sup>c</sup> General Secretary of Indonesian Radiation Oncology Society (IROS) – Jakarta, Indonesia

Email address of Corresponding Author(s): [gondhow@gmail.com](mailto:gondhow@gmail.com)

## BACKGROUND AND OBJECTIVE

Indonesia is the largest archipelago in the world, with the number of islands registered by the UN in 2017 totaling 16,056 islands. Administratively, the territory of Indonesia is divided into 34 provinces, 416 regencies and 98 cities, 7,201 districts, 8,479 subdistricts and 74,957 villages with an estimated population of 265,015,313 people in 2018 [1]. This condition has made health services becoming a great challenge especially the cancer management. Cancer management in Indonesia is usually only available in secondary and tertiary hospitals, therefore most of cancer patients will need to be referred sometimes multiple times to access cancer treatment.

Radiotherapy as one of the main modalities of cancer management plays an essential role. The output of radiotherapy quality is very much dependent on the availability of equipment and human resources [2]. In Indonesia, not all radiotherapy centers are equal. A lot of them still uses conventional technology with Cobalt-60 machine. A mapping of technology availability is done by the Indonesian Radiation Oncology Society to enable a swift proses of referral whenever a more advanced technology is necessary to treat particular patients.

Apart from that, another essential element that need improvement is the availability of high-quality human resources. Education and training for radiation oncology is an important aspect underpinning a good radiotherapy center. Radiation oncology education in Indonesia has to meet a standard of competency and at the same time it has to fulfill the immediate demand of human resources of various radiotherapy centers and capabilities nationwide. Until now, there is only one training and education center, which is situated in the capital, Jakarta under the Faculty of Medicine, Universitas Indonesia. The radiation oncology residency program in Indonesia is a 3.5 to 4 years program [3]. Various knowledge and skills are imparted during the program. Here we presented in brief the mapping of various level radiotherapy centers capability for the purpose of patient referral and radiation oncologists allocation.

## METHODS

The radiotherapy (RT) centers mapping was done by Indonesian Radiation Oncology Society annually. There are three main level of radiotherapy services that differ in its capability. Level 1A is RT facilities that provide RT with 2D technique and Level 1B is RT facilities that is able to provide up to 3D RT; Level II is RT facilities that is able to provide up to Intensity Modulated Radiotherapy (IMRT) or Stereotactic Radiosurgery / Radiotherapy (SRS / SRT); Level III is RT facilities that is able to provide all techniques from 2D, 3D, IMRT, SRS/SRT and Stereotactic Body Radiotherapy (SBRT).

The mapping was done based on the information gathered from all active radiation oncologists working in their own centers nationwide. This mapping became the guide to plan for RT center development, referral of patients, and radiation oncologists allocation. In center with level IA or IB capability, the society advocated and encourage to do technology upgrade. For center with Level III capability, a consultant will be allocated in that particular center.

## RESULTS AND DISCUSSION

There are around 100 active radiation oncologists in Indonesia spread out across 46 centers in Indonesia with different level of capabilities (Figure 1). Most are concentrated in Java and Sumatera island. Some centers, especially in rural Indonesia, has only basic radiotherapy infrastructure, capable of only conventional radiotherapy with Cobalt-60 teletherapy (Level 1). The levelling of radiation oncology services has resulted in better homogeneity in clinical practice, which then it was expected to translate into better patient care. The cancer patient with difficult cases or rare cases can be referred to a higher level of radiotherapy center for treatment whenever applicable. The consultant in level III radiotherapy center is expected to be able to provide a more specialized care as the availability of more advanced RT technology.

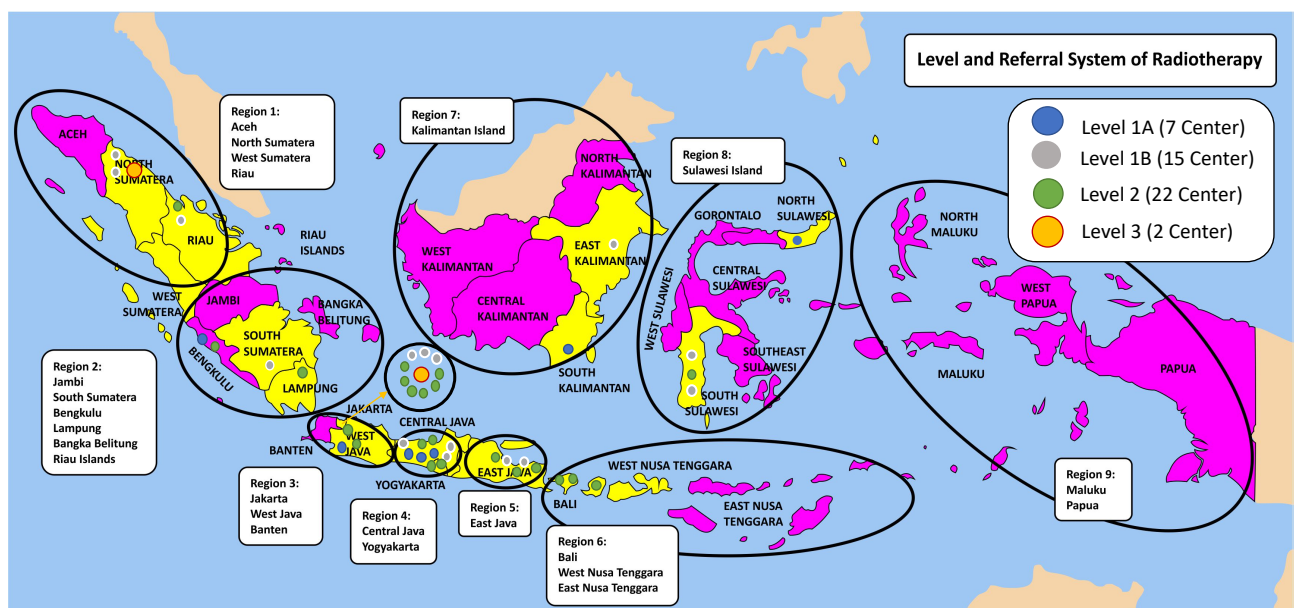


Figure 1. Distribution and Leveling of Radiotherapy Services in Indonesia (year 2020)

## **CONCLUSIONS**

Radiation oncology profession in Indonesia is developing at a quick pace together with the increasing installation of radiotherapy equipment nationwide. An adapted and proper service leveling is required to be able to provide a better RT treatment for patients.

## **ACKNOWLEDGMENTS**

We would like to acknowledge Indonesian Radiation Oncology Society (IROS) for providing the data as the basis of this publication.

## **REFERENCES**

- [1] Ministry of Health Indonesia. Profil Kesehatan Indonesia 2018 [Indonesia Health Profile 2018]. 2019;207. Available from: [http://www.depkes.go.id/resources/download/pusdatin/profil-kesehatan-indonesia/Data-dan-Informasi\\_Profil-Kesehatan-Indonesia-2018.pdf](http://www.depkes.go.id/resources/download/pusdatin/profil-kesehatan-indonesia/Data-dan-Informasi_Profil-Kesehatan-Indonesia-2018.pdf)
- [2] Lievens Y, Borrás JM, Grau C. Provision and use of radiotherapy in Europe. *Mol Oncol.* 2020;14:1461–9.
- [3] Gondhowiardjo S, Sekarutami SM, Giselvanía A, Octavianus S, Assegab MI. Improving access to radiation therapy in Indonesia. *Appl Radiat Oncol.* 2019;8:17–21.