

## Current Status of Radiation Oncology Services in Paraguay

### Introduction

The cancer problem is increasing worldwide, with most new cancer cases and related mortality occurring in low- and middle-income countries (LMICs). Paraguay is a LMIC of approximately 7 million inhabitants and does not have official estimates of future radiotherapy needs. According to GLOBOCAN 2018 database, it was estimated 11,244 new cases of cancer and 5,635 cancer deaths in the country. An estimated 50% of new cancer patients should receive radiation therapy and it is also considered that in developing countries 10% will need re-irradiation. It can be concluded that the total number of patients with indication of Radiotherapy in 2018 was 6184 patients. The aim of the study is to establish the current status of Radiation Oncology services in terms of access, human resources, infrastructure, equipment and types and quality of treatments.

### Methodology

The country does not have a population-based cancer registry. Data collection has been carried out in two main centers with multidisciplinary cancer management in the country: the National Cancer Institute (INCAN) and the Social Welfare Institute (IPS).

### Results

INCAN is the only government entity that has radiotherapy and brachytherapy facilities. The Paraguayan health system also includes the Social Welfare Institute (IPS), which provides health coverage to 21% of the population and has a fund to contract radiotherapy services to the private sector. The other 7.7% of the population is covered by other types of private insurance. Overall, 71.3% of the Paraguayan population is absorbed through the public health system.

Only 45% of the estimated radiotherapy demand in Paraguay for 2018 was covered leaving the rest without access. The main reasons are rurality, fragmentation of cancer care and the insufficient Radiotherapy machines. The INCAN has one linear accelerator (linac) and there are 5 linear accelerators in the private sector. Moreover, all radiotherapy services are centralized in the Greater Asuncion, the metropolitan area of the capital city of the country. Nationwide, the implementation of 3-dimensional conformal Radiotherapy as a standard treatment modality was in the year 2017. Few private insurances cover more advanced treatment modalities and most patients must pay out of their pockets.

Regarding human resources, INCAN is training hospital with a residency program in Radiation Oncology and the majority of radiation oncologists were trained in this center. There are no clinical residency programs for medical physicists in Radiotherapy. The IAEA-financed training courses have been of great importance for the development of Radiotherapy in the country. In the public sector, the number of medical physicists is limited and this prevents the expansion of Radiotherapy services. The lack of instruments for dosimetry and quality control also prevents the safe implementation of more advanced techniques.

### Conclusion

There is a high demand for Radiotherapy treatments because the most frequent pathologies in the country are breast, cervical, prostate and lung cancer. Since the public sector absorbs approximately 71.3% of the country's cancer patients, the INCAN should increase to a minimum number of two more linacs in the short-term. The government has acquired one linac with IMRT and VMAT capabilities that should be installed by the end of 2020. The third one is being procured in cooperation with the IAEA under the project PAR6017. Subsequently, the decentralization of Radiotherapy services should be evaluated to improve access to the rest of the Paraguayan population. Regarding the implementation of more advanced techniques that accompanies with acquiring more radiotherapy machines, the following consideration should be taken into account. More technology available will allow the treatment of more patients after meeting a learning curve. Strengthening and increasing human resources remains the main challenge for the country. The importance of acquiring dosimetry equipment and implementing quality assurance programs should be considered a priority when incorporating more advanced treatment modalities.

### Country or Int. Organization

Paraguay

### Affiliation

Instituto Nacional del Cancer

**Primary authors:** ROJAS MARTINEZ, Julio (Instituto Nacional del Cáncer); RIVELLI ZEA, Guisella Raquel (Instituto de Prevision Social)

**Presenter:** ROJAS MARTINEZ, Julio (Instituto Nacional del Cáncer)

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