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incart
INSTITUTO NACIONAL DEL CÁNCER
ROSA EMILIA SÁNCHEZ PÉREZ DE TAVARES

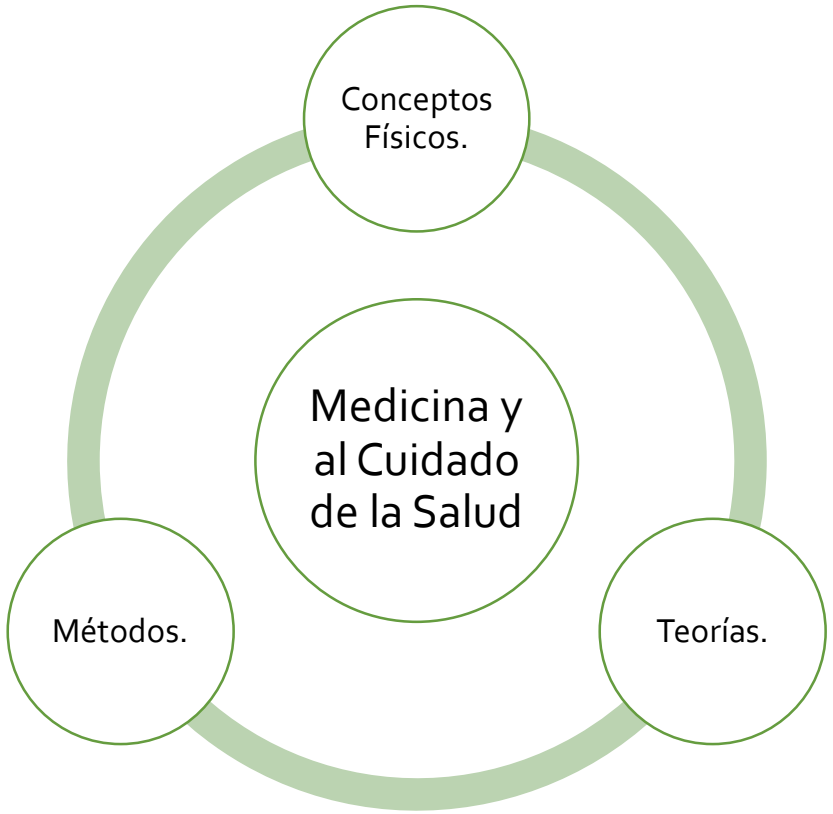
Física Médica. Generalidades.

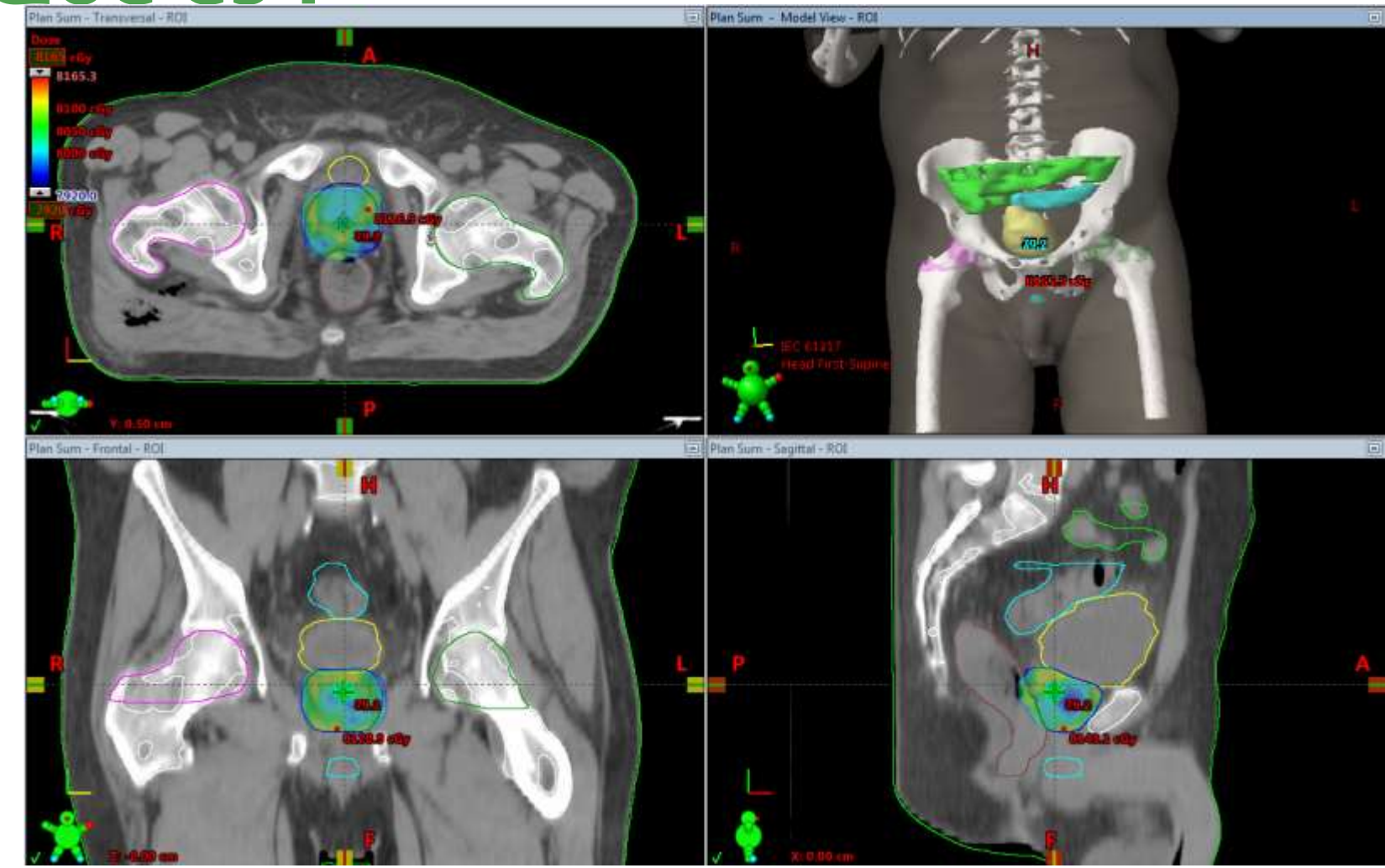
Jacksson Sánchez, MSc., Ed.D, Dr(C)

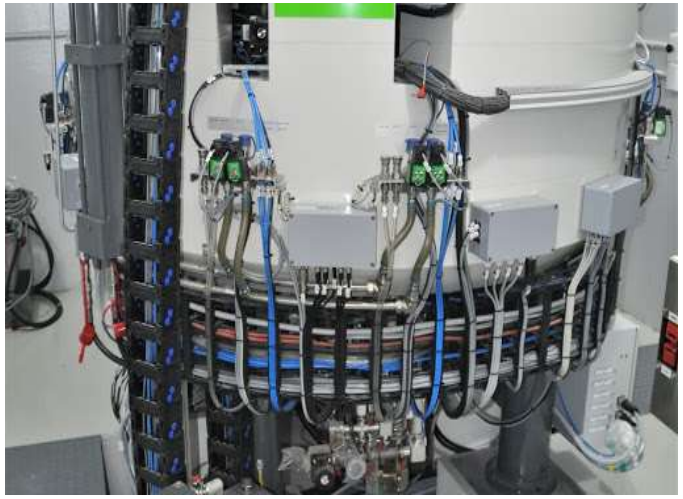
Contenido

- Física Médica, ¿Qué es ?
- Física Médica en la República Dominicana.
- Física Médica, Investigación en RD. Oportunidades.

Física Médica, ¿Qué es ?








SIEMENS

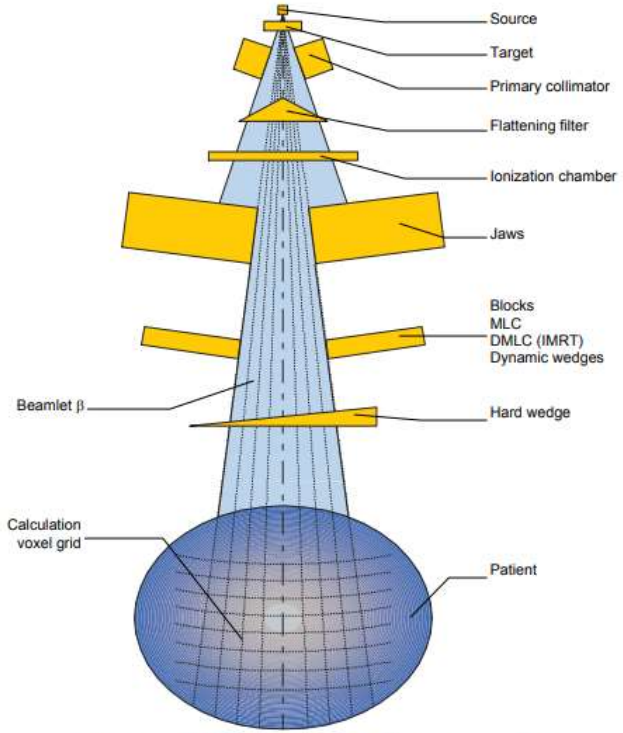
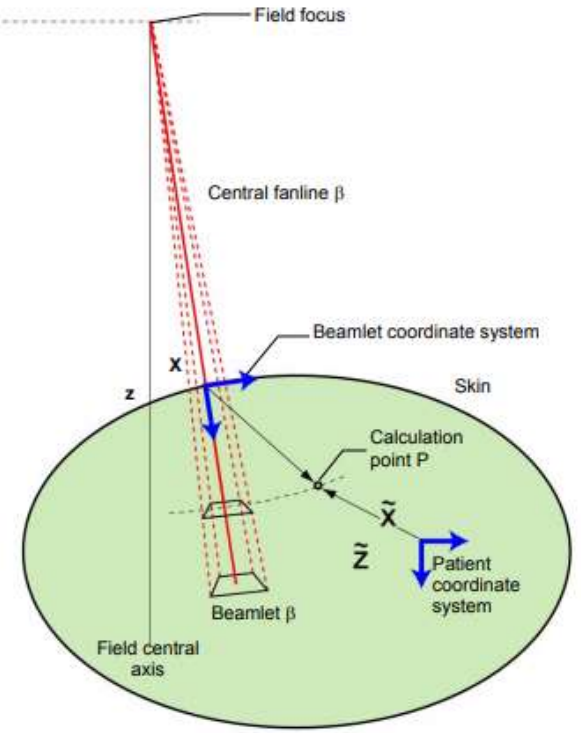


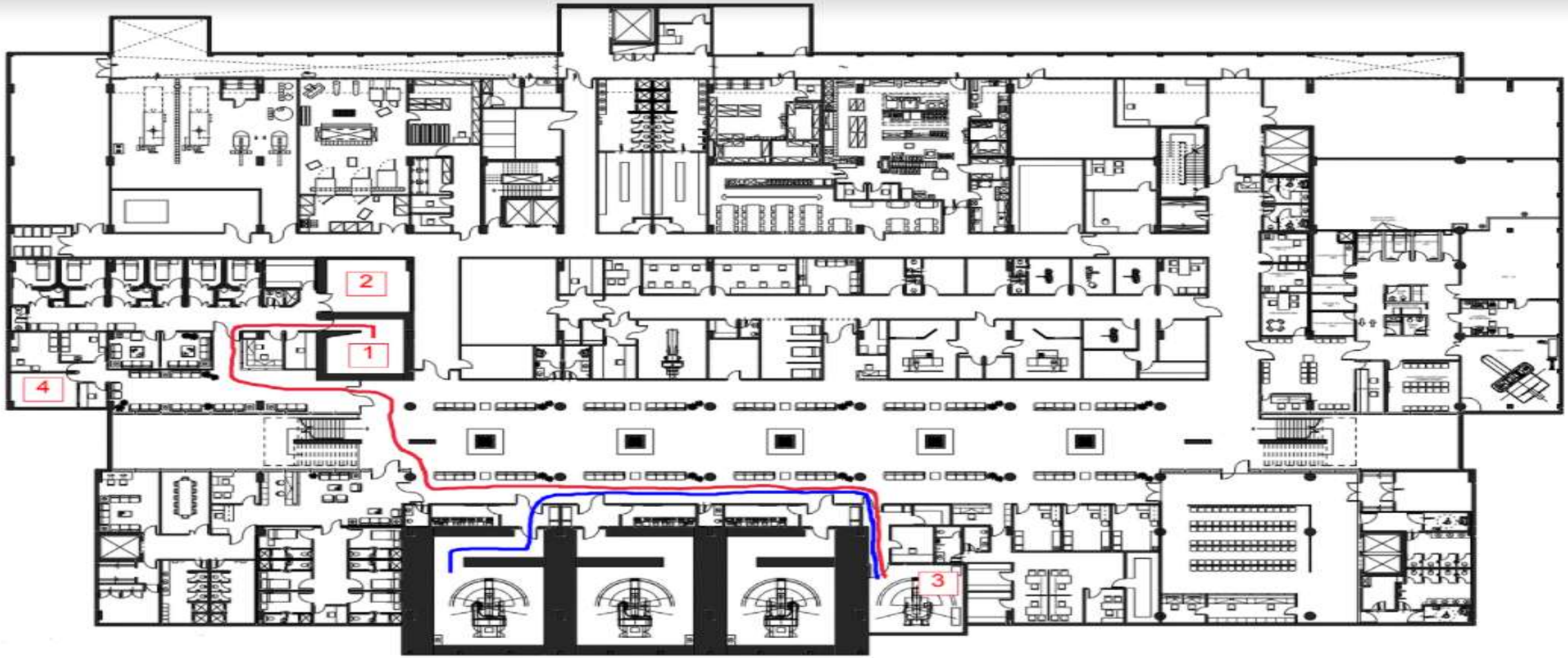
Figure 1: Treatment unit components, broad beam division.



$$E_{ph,\beta}(\tilde{X}, \tilde{Y}, \tilde{Z}) = \Phi_\beta \times I_\beta(z, \rho) \times \iint_{(u,v)\in Area(\beta)} K_\beta(u - x, v - y, z, \rho)\,du\,dv$$

AREAS

- Radioterapia
- Diagnóstico por Imagen
- Medicina Nuclear
- Protección Radiológica.



INSTITUTO NACIONAL DEL CANCER
ROSA EMILIA SANCHEZ PEREZ DE TAVARES

Descubrimiento de la Radiación

1895

1896

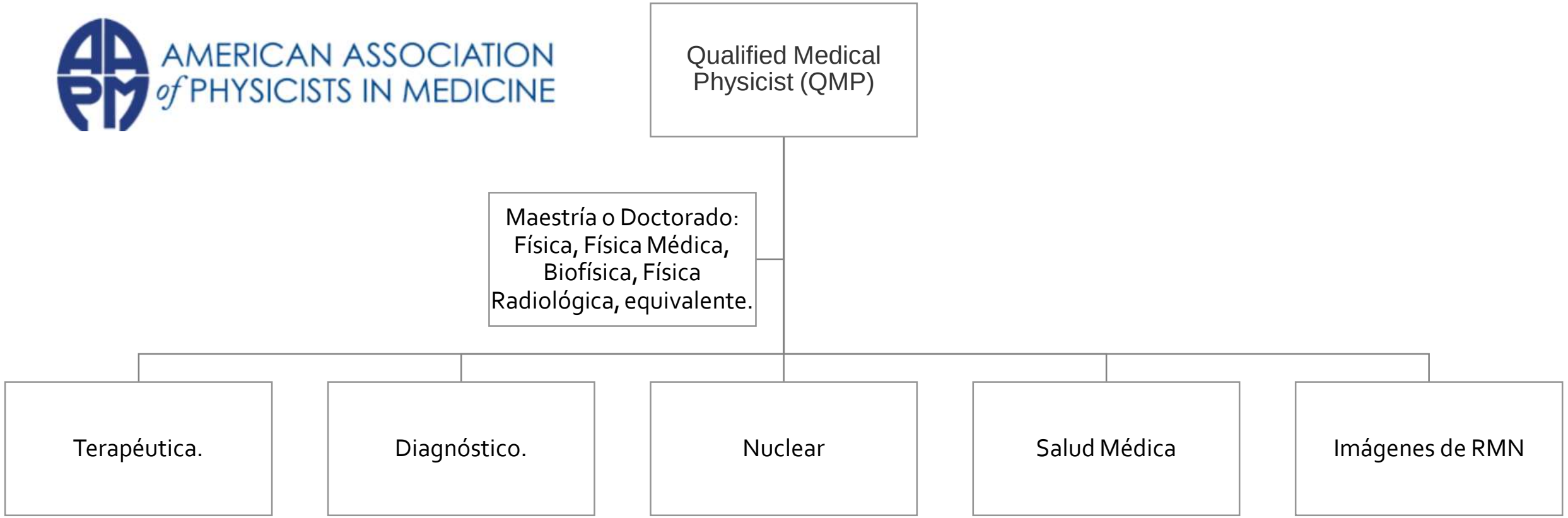
1901

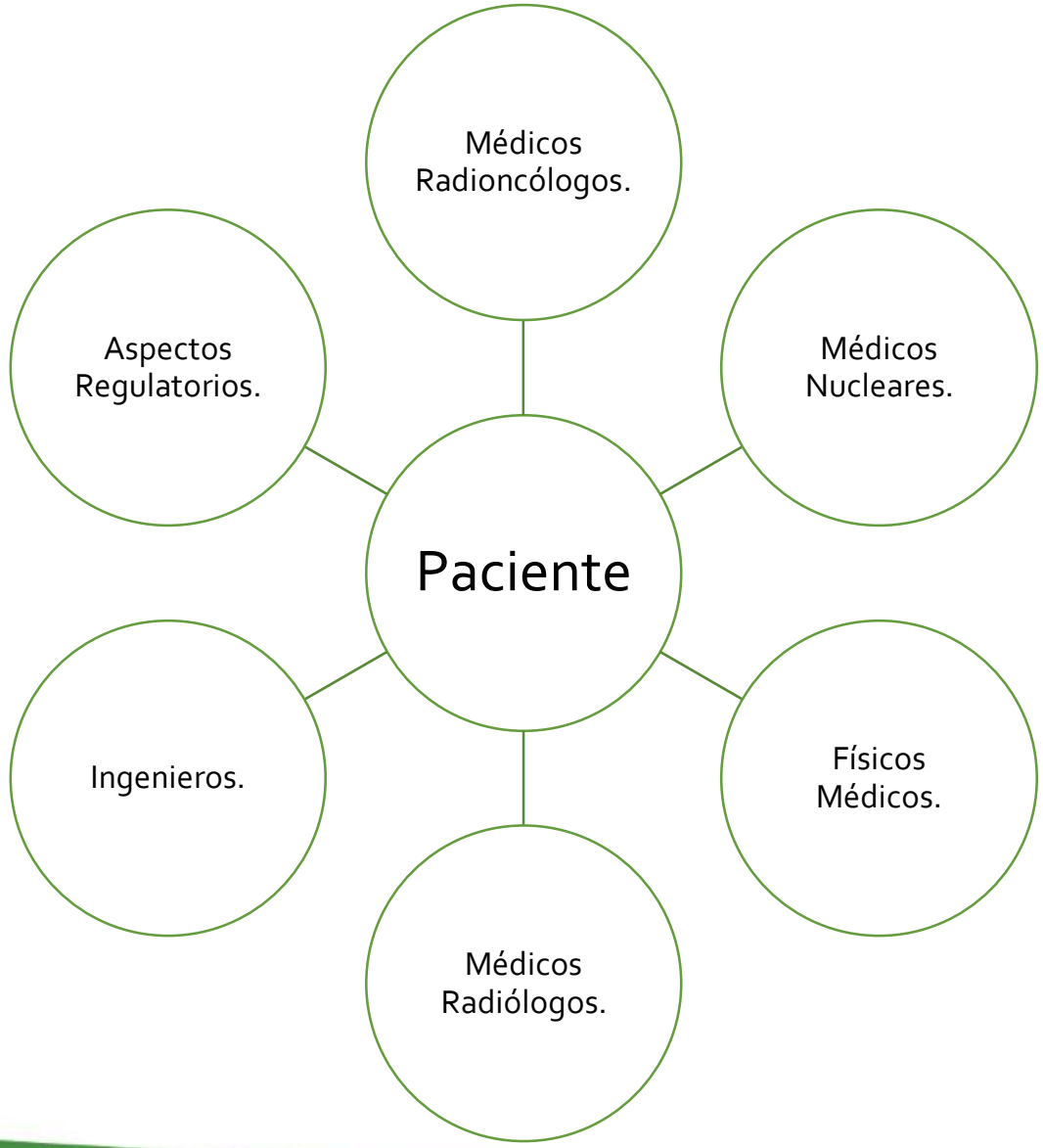
1899

1913

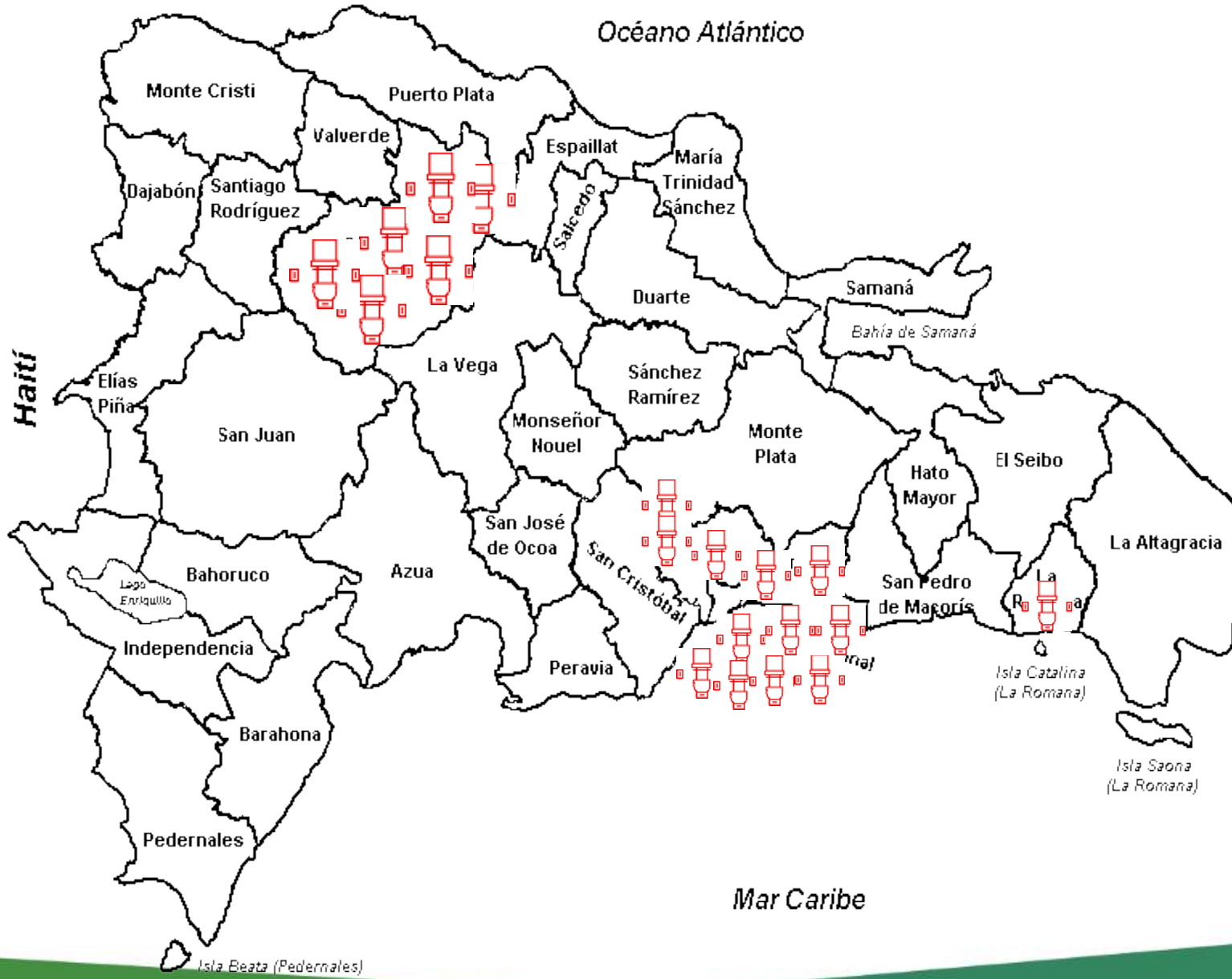
Física Médica. Personal Involucrado

AMERICAN ASSOCIATION of PHYSICISTS IN MEDICINE




Médicos Radioncólogos.
Aspectos Regulatorios.
Médicos Nucleares.
Paciente
Ingenieros.
Físicos Médicos.
Médicos Radiólogos.

Física Médica



Física Médica, Investigación en RD.

Can Dynamic Conformal arc be an Option in Epidermoid Cervical Cancer Treatment?

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Abstract

Historically locally advanced cancer of the cervix has been treated with radiotherapy and brachytherapy and it was not until 1999 that the use of concurrent chemotherapy was formalized due to excellent results in terms of rate of overall and disease-free survival. Box technique in radiotherapy is the most widely known providing excellent results, with some variations as oblique fields, but greatly increasing irradiation potentially healthy tissue, leading to the higher proportion of own side effects of each treatment. Therefore present a radiant treatment planning mode Dynamic Conformal Arc for cervical carcinoma.Treatment with dynamic conformal arc achieves better conformation of tumor and area to be treated, avoiding unnecessary doses to organs at risk (OAR), compared to conventional four fields irradiation technique (box technique), further significantly reduces the treatment time.Dynamic Conformal Arc (DAT) technique in the pelvis reduces irradiation dose in the organs at risk, making a good coverage of the clinical area to be treated, further decreasing the side effects. It could be considered as an alternative to conventional treatment of 4 fields or to the impossibility of intensity modulated radiation therapy (IMRT).

Keywords: Dynamic; Conformal; Arc; Cérvix; Box; Technique, INCART, DAT

Introduction

Worldwide, cervical cancer is the fourth most common female malignancy in both incidence and mortality, resulting in approximately 527,600 new cases and 265,700 deaths annually [1,2]. Currently among the female population of Dominican Republic, cervical and breast cancer disputed the first and second place, statistics that resemble those seen in other developing countries in Latin America and the Caribbean. The a high proportion of positive margins and high risk factors for recurrence. External beam radiation therapy with chemotherapy plus brachytherapy has been, so far, the treatment of choice for patients with locally advanced cervical cancer [8-11].

Methods and Materials

Patient

Female patient 68 years old with a history of hypertension,

Brachial Plexus Neurofibroma Treated with Volumetrically Modulated Arc Therapy (VMAT): A Case Report.

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Abstract

Neurofibromatosis was first described in 1882 by Friedrich Daniel von Reckling hausen, a German pathologist. Neurofibroma is a benign peripheral nerve sheath tumor that consists of Schwann cells, associated or unassociated with axons, perineural cells, and fibroblasts. Whenever possible, the treatment of choice should be surgical, but the management depends on the location and growth pattern. We present the case of a patient with left axillary neurofibroma without neurofibromatosis (NF) in whom surgery was delayed due to involvement of the brachial plexus, so was sent to radiotherapy, planned and treated with volumetrically modulated arc therapy (VMAT).

Keywords: Neurofibroma; VMAT; Radiotherapy; Axillary Tumor; INCART

Abbreviations: NF: Neurofibromatosis; VMAT: Volumetrically Modulated Arc Therapy; CRO: Radiation Oncology Center; INCART: Institute Rosa Emilia Sánchez Pérez de Tavares; CW: Clockwise; NTO: Normal Tissue Objective; OAR: Organ at Risk

A Dynamic Quantum Clustering Approach to Brain Tumor Segmentation

Jacksson Sánchez[1] and Miguel Martín-Landrove[2]

***Abstract*— Data clustering has been widely used in data analysis and classification. In the present work, a method based on dynamic quantum clustering is proposed for the segmentation and analysis of brain tumor MRI. The results open the possibility of applications to multi modality medical imaging.**

I. INTRODUCTION

Clustering of data is, in general, an ill-defined problem. Nonetheless it is a very important one in many scientific and technological fields of study. Given a set of data-points one looks for possible structures by sorting out which points are close to each other and, therefore, in some sense belong together. This is a preliminary stage taken before investigating what properties are common to these subsets of the data. Dynamic quantum clustering [1][2] has been proposed for the analysis of Big data [3] and machine learning [4] in an effort to understand relationships among data subsets. The sensitivity of the method to detect the appropriate number of classes within the data has been used on previous applications to medical images [5][6]. In the present work a full use of the dynamic quantum

Low Grade Glioma (TCGA-LGG) data collection [8], the Repository of Molecular Brain Neoplasia Data (REMBRANDT) [9] for astrocytomas and oligodendrogliomas of grades 2 and 3, and The Cancer Genome Atlas Glioblastoma Multiforme [TCGA-GBM] collection [10] for glioblastoma multiforme. For benign brain tumors, local image datasets were used. Among these collections, T1-weighted images, either contrast enhanced or not, were selected and further reviewed. Tumor lesions selected for image processing were clearly identified as such and separated from anatomical structures.

B. Dynamic Quantum Clustering Algorithm and image space

1) General: The Dynamic Quantum Clustering Algorithm, DQCA, assumes that data are described by a set of points, each one defined with some uncertainty, σ and the distribution for all points in data space is given by a Parzen estimator, φ, which satisfies the time independent Schrödinger equation for its ground state [1][2],


Physics in
Medicine &
Biology

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Gracias...