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Assessment of the Radiation Therapy Model in the Dominican Republic and Its Impact on the Caribbean Islands

Shefali R. Gajjar, MD,* Eric A. Mellon, MD, PhD,* Serguei A. Castaneda, MD,† Sigfredo Romero Zoghbi, MD,‡ Ricardo Llorente, MD,* Vincent DeGennaro, MD, MPH,§,‖ Surbhi Grover, MD, MPH,¶ and Nalia Cruz Ventura, MD#,**

**Department of Radiation Oncology, University of Miami Sylvester Comprehensive Cancer Center, Miami, Florida; †Department of Radiation Oncology, Hahnemann University Hospital and Drexel University College of Medicine, Philadelphia, Pennsylvania; ‡Department of Radiation Oncology, Oncoserv Santo Domingo, Santo Domingo, Dominican Republic; §Department of Internal Medicine, University of Florida, Gainesville, Florida; ‖Innovating Health International, Port-au-Prince, Haiti; ¶Department of Radiation Oncology, Perelman School of Medicine, University of Pennsylvania, Philadelphia, Pennsylvania; #Department of Radiation Oncology, Instituto Oncológico Regional del Cibao, Santiago de los Caballeros, Dominican Republic; and **Department of Radiation Oncology, Centro de Radioterapia del Cibao, Santiago de los Caballeros, Dominican Republic*

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The Dominican Republic (DR) is an upper-middle-income country that has taken several strides to address cancer care at the national level (1). The International Atomic Energy Agency (IAEA) performed an analysis of the radiation therapy resources in 2004 and noted 3 radiation therapy centers with deficiencies in equipment as there were only 3 cobalt (^{60}Co) teletherapy units and 1 linear accelerator (2). Afterward, an effort was undertaken to characterize the resources available for cancer care by the Fundación Plenitud, though only the resources of 2 radiation therapy centers were analyzed (3). Since 2010 there has been a dramatic expansion of radiation therapy services in the DR, warranting further characterization.

There is limited information on radiation therapy practices in Latin America and the Caribbean (LAC) (2, 4-8). Delivering high-quality radiation therapy in settings where resources are limited can be challenging, and understanding the intricacies of different practice settings is crucial in improving and further expanding services. This article analyzes the current DR radiation therapy model and examines the impact of the country's radiation therapy resources within the Caribbean.

Background

Political, population, and economic characteristics

The island of Hispaniola comprises 2 countries, including the DR, which occupies the eastern two-thirds, and Haiti, which occupies the western one-third (9). In 1492 the island was colonized by the Spanish. In 1697 the French

Reprint requests to: Shefali R. Gajjar, MD, University of Miami Sylvester Comprehensive Cancer Center, Department of Radiation Oncology, 1475 NW 12th Ave, Miami, FL 33136. Tel: (305) 243-4337; E-mail: shefaligajjar18@gmail.com

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conquered the western portion of the island, later renamed Haiti in 1804. The Haitians ruled all of Hispaniola for 22 years. The DR gained independence in 1844 from Haiti and independence from Spain in 1865. Since the 1960s, constitutional democracy has prevailed (10).

In 2016 the population of the DR was estimated to be 10.7 million (11). Much of the population resides in the southern coastal plains and the Cibao Valley (10). Santo Domingo, the capital, is the largest city in the DR; other major cities include Santiago and La Romana. The DR is expected to have rapid population growth in the next 2 decades, and by 2030 the population is anticipated to reach 12.1 million, with a significant proportion composed of the elderly (11).

Previously the economy was driven by the exportation of coffee, sugar, and tobacco, though in recent years the service sector has become the largest employer (10). In 2014 the gross domestic product (GDP) was US $138.5 billion, with 2.3% allocated for health care; an increase in allocation of the GDP by 5% for health care is in process (12, 13). Additionally, significant income inequality persists, and the poorest half of the population makes less than one-fifth of the GDP, whereas the richest 10% make almost 40% of the GDP (10).

Health system and health insurance schema

The public sector is composed of the Ministry of Public Health and Social Welfare, the National Health Council, the Social Security Treasurer, and the national health insurance plan. The private health sector is composed of health risk administrators, private insurance and service providers, and nongovernmental organizations (14). There is a stark difference in the services available within the public and private sectors. Hospitals in the public sector serve many patients and frequently lack the resources for optimal care. In contrast, the private sector offers services that are on par with the services available in developed countries. Basic public health issues are still a significant challenge, yet simultaneously, the DR is internationally known as a medical tourism destination because patients from affluent countries seek elective medical procedures in the DR at decreased costs (12).

In 2001 the government approved an extensive health financial reform. Implementation of these reforms began at the end of 2007. Before the reforms the health system was fragmented, and a majority of the population was covered by an open public system funded by general taxation (15, 16). Public hospitals provided basic services to low-income patients for early-stage cancers, and most insurance plans provided limited coverage for cancer care, resulting in high out-of-pocket expenses (17). The inherent deficiencies gave rise to the private sector that accepted direct payments for services (15, 16).

With the health reforms, the Seguro Familiar Salud (SFS), a publicly financed health insurance scheme, was created (15). The public plans did not consider cancer and other noncommunicable diseases a priority until 2009, when the Ministry of Public Health created the National Chronic, Noncommunicable Disease Prevention Program (12, 18). The SFS contains contributory and subsidized components, and the scheme aimed to cover the entire population of the DR within a 10-year period (15, 18, 19). As of March 2017, approximately 65% of the population is covered under the SFS; the remaining 35% is either covered by the private sector or is uninsured. The SFS offers different levels of coverage based on income, and at times additional family members may not be covered. In addition, patients of Haitian nationality residing in the DR are also not offered coverage under the SFS (19).

The SFS covers a significant portion of the costs for cancer care, and thus access to costly cancer therapies has increased. Particularly for radiation therapy, the SFS coverage has helped cover the costs of machine maintenance, allowing for the development of several successful radiation therapy centers.

Cancer statistics and prevention policies

Deaths from communicable diseases have substantially decreased, by 50%, from 2000 to 2007 (14). Life expectancy has steadily increased, from 65.3 years in 1990 to 78.1 years in 2016, which will likely contribute to an increasing burden of noncommunicable diseases (10, 14). In 2012, cancer was the third leading cause of death and contributed to 16% of all deaths in the DR, with approximately 14,680 new cases of cancer and 9046 cancer deaths (20). In men, the 5 most common types of cancer in order of decreasing incidence include prostate, lung, colorectum, liver, and stomach and for women include included breast, cervix, colorectum, lung, and liver (20).

Public cancer screening programs are available for breast, cervical, and colorectal cancers. The government has created programs for control and prevention of tobacco use, obesity, physical inactivity, and alcohol use. National vaccination programs are available for human papillomavirus and hepatitis B prevention (21).

Relationship with Haiti

In contrast to the DR, the neighboring country of Haiti is a low-income country with a population of nearly 10.5 million in 2016. The relationship between the DR and Haiti is tumultuous. Haiti is the poorest country in the Western Hemisphere and has a long history of political instability. The political and economic situation gives rise to a tenuous health care system. Limited resources are available for cancer care in Haiti. There are presently no radiation treatment centers in Haiti, and at times patients are referred to the DR to receive radiation therapy (22).