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Estimating the cost of operating cancer registries: Experience in Colombia

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ABSTRACT

Background: Maintaining population-based registries requires adequate and sustained resources; however, to date there has been no systematic evaluation to identify the resource needs for cancer registration in most countries, including Colombia. A systematic assessment of the costs can quantify the funding required and identify processes to improve efficiency of cancer registries.
Methods: The Centers for Disease Control and Prevention's (CDC's) International Registry Costing Tool (*IntRegCosting Tool)* was tailored specifically for the Colombian registries and was used to collect resource use data from five regional population-based cancer registries: Barranquilla, Bucaramanga, Cali, Manizales, and Pasto. The registries provided cost data for the year 2013 and cancer cases corresponding to the year 2010.
Results: We identified an almost threefold variation in the average cost per case (77,932 to 214,082 Colombian pesos or US $41 to US $113 in 2013) across the registries, but there were also substantial differences in data collection approaches, types of data collected, and activities performed. Cost per inhabitant varied between 95 and 415 Colombian pesos (US $0.05 to US $0.22). Between 20% and 45% of the total cost was due to fixed cost activities.
Conclusions: The detailed economic information presented in this study constitutes a valuable source of activity-based cost data that registries can use to compare operations, assess key factors that lead to differences in cost per case, and identify potential approaches to improve efficiencies. Furthermore, the knowledge gained from studying the Colombian registries can help inform the planning and operations of other registries in the region.

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1. Introduction

1.1. History and current situation of cancer registration in Colombia

Colombia, an upper-middle income country [1], has a long history of cancer registration activities. The Cali population-based cancer registry (PBCR) was the first such cancer registry to be established in South America and has functioned without interruption since 1962. Furthermore, its data have been published in all 10 volumes of *Cancer Incidence in Five Continents* (CI5) [2]. In

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Abbreviations: CI5, Cancer Incidence in Five Continents; CDC, Centers for Disease Control and Prevention; COP, Colombian peso; IARC, International Agency for Research on Cancer; *IntRegCosting Tool*, International Registry Costing Tool; IT, information technology; FTE, full-time equivalent; PBCR, population-based cancer registry; US $, United States dollars.

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the late 1980s, Colombia's National Cancer Institute and the Ministry of Health developed a national cancer registry plan to include cancer registration in additional areas of the country. Four municipal PBCRs were created, and they cover the cities of Barranquilla, Bucaramanga, Manizales, and Pasto (Fig. 1). Together with the Cali registry, these registries cover about 12% of the total population [3]. These registries are in different developmental and quality stages, having been established between 1962 and 2007. Among the registries, the percentage of microscopically verified cases varies between 78.3% and 85.4%, and the percentage of death certificate–only cases varies between 4.2% and 11.5% [4,5]. All of the registries follow the methodology recommended by the International Agency for Research on Cancer (IARC) [6]. Four of the five registries, the ones located in Bucaramanga, Cali, Manizales, and Pasto, have achieved international completeness and quality standards and published their high-quality data in the 10th volume of CI5 [2]. The Colombian National Cancer Institute provides financial support to these municipal registries and believes that the registries' integration with universities is a sustainable model for producing high-quality cancer incidence data. Colombia's National Cancer Institute, which can only provide partial funds to contribute to the registries' sustainability, has decided that the maintenance of a few high-quality PBCRs in representative areas of the country is sufficient to have detailed information on specific regions and to be able to produce national and regional estimates that form a good basis for cancer control purposes. Colombia is a very diverse country, with regions that differ by population density, ethnicity, and culture and dietary habits; the areas with the PBCR largely represent these differences. Based on the data from these selected registries, in combination with mortality statistics, the Colombian National Cancer Institute regularly produces estimates of cancer incidence using the established Globocan methodology [7–9]. In South America, the National Cancer Institute of Brazil and the Ministry of Health of Chile take the same approach and produce national and subnational cancer incidence estimates based on a few representative regional registries [10,11].

Fig. 1. Geographic coverage of Colombian municipal population-based cancer registries.
Note: The dark shaded areas represent the geographic coverage of Colombia's population-based cancer registries.

Until 2010, the reporting of malignant neoplasms was not obligatory in Colombia, except for childhood leukemia. In 2010, because of the associated high economic burden, cancer was declared a national priority public health problem, and several information systems relying on passive mandatory reporting of cancer patients were established at a national level [4]. However, these systems do not align with the methods and definitions for PBCRs and are far from being complete; for example, the cancer registry abstraction form excludes patients diagnosed only postmortem [12]. Therefore, the well-established and rigorous methodology used by the PBCR, which is based on active case finding [6], remains very important as a source of reliable information on cancer burden in Colombia. All PBCRs manage their own databases and send their data to the Colombian National Cancer Institute, which makes national estimates every 5 years. PBCRs have not been provided with access to electronic databases; therefore, the registries must manually enter data instead of linking automatically with the cause-of-death databases or other sources.

1.2. The importance of economic analysis for operating cancer registries in Colombia

In Colombia, the National Cancer Institute receives funds on an annual basis from the national government to support cancer registries, though these funds are not necessarily guaranteed. Cancer registries apply annually to the Colombian National Cancer Institute for these funds and risk discontinuing data collection if they do not receive the funds. A systematic assessment of the costs can justify the required funding and potentially identify processes to improve efficiency. Indeed, it is important to know the costs of setting up, maintaining, and/or extending cancer registry activities for any funding organization. However, currently, the real costs by type of activity and cost per case are unknown. In Colombia, the five municipal PBCRs are based in universities, which frequently provide in-kind contributions, including the use of office space and equipment, which makes determining the real costs of a registry based on received funding and documented expenses very difficult. Moreover, to obtain funding and justify costs, the cancer registries must know their real annual costs. In addition, knowing the costs-per-cancer case registered can help a PBCR compare cost over-time and with other PBCRs. Authorities can use more detailed cost information to estimate the sustainability of the support or to decide on whether to finance the initiation of new registries or the expansion of existing registries under similar circumstances.

2. Materials and methods

A cost data collection tool [13] that was initially developed to evaluate the costs of operating PBCRs in the United States was tailored for use in a non-US setting. Details on the development and testing of the Centers for Disease Control and Prevention's (CDC's) International Registry Costing Tool (*IntRegCosting Tool)* are reported in a separate manuscript [14]. In brief, the *IntRegCosting Tool* is an activity-based tool that can be used to calculate the costs for specific cancer registry activities using the collected data. The tool consists of 10 data collection modules that collect the following information: general registry information; total expenditure by funding source; in-kind contributions; personnel expenditures; personnel activities; consultant expenditures; costs associated with computers, travel, and training; software licensing costs; and administrative costs and information on factors that may affect costs of registry operation and effectiveness. The tool

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