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Incidence of childhood cancer in Latin America and the Caribbean: coverage, patterns, and time trends

Neimar de Paula Silva[1], Murielle Colombet[1], Florencia Moreno[2], Friederike Erdmann[3], Anastasia Dolya[1], Marion Piñeros[1], Charles A Stiller[4], Eva Steliarova-Foucher[1], and the IICC-3 contributors

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ABSTRACT

Objective. To provide a comprehensive overview of geographical patterns (2001–2010) and time trends (1993–2012) of cancer incidence in children aged 0–19 years in Latin America and the Caribbean (LAC) and interpret the findings in the context of global patterns.

Methods. Geographical variations in 2001–2010 and incidence trends over 1993–2012 in the population of LAC younger than 20 years were described using the database of the third volume of the International Incidence of Childhood Cancer study containing comparable data. Age-specific incidence per million person-years (ASR) was calculated for population subgroups and age-standardized (WSR) using the world standard population.

Results. Overall, 36 744 unique cases were included in this study. In 2001–2010 the overall WSR in age 0–14 years was 132.6. The most frequent were leukemia (WSR 48.7), central nervous system neoplasms (WSR 23.0), and lymphoma (WSR 16.6). The overall ASR in age group 15–19 years was 152.3 with lymphoma ranking first (ASR 30.2). Incidence was higher in males than in females, and higher in South America than in Central America and the Caribbean. Compared with global data LAC incidence was lower overall, except for leukemia and lymphoma at age 0–14 years and the other and unspecified tumors at any age. Overall incidence at age 0–19 years increased by 1.0% per year (95% CI [0.6, 1.3]) over 1993–2012. The included registries covered 16% of population aged 0–14 years and 10% of population aged 15–19 years.

Conclusions. The observed patterns provide a baseline to assess the status and evolution of childhood cancer occurrence in the region. Extended and sustained support of cancer registration is required to improve representativeness and timeliness of data for childhood cancer control in LAC.

Keywords Neoplasms; incidence; child health; registries; public health surveillance; Latin America; Caribbean region.

With improved control of communicable diseases, childhood cancer has gained relevance in low- and middle-income countries (LMIC) (1). Childhood cancers differ from those occurring in adults by biology, presentation, response to treatment, and epidemiology. The etiology of childhood cancers is poorly understood, which hampers their prevention. Causal evidence links to certain genetic conditions, high dose ionizing radiation, chemotherapy, and viral infections (2).

Geographical variations of cancer incidence indicate potential etiological clues, implying further targeted studies. Incidence data are generated by population-based cancer registries, but these are sparse in many LMIC, including in Latin America and the Caribbean (LAC) (3). The reported incidence is often lower in the populations of LMIC than in the high-income countries (HIC) (3, 4).

LAC, with its 600 million inhabitants of Amerindian, European, and African descendance, displays huge contrasts in

[1] International Agency for Research on Cancer, Lyon, France ✉ Eva Steliarova-Foucher, SteliarovaE@iarc.who.int
[2] National Cancer Institute, Buenos Aires, Argentina
[3] University Medical Center of the Johannes Gutenberg University Mainz, Mainz, Germany
[4] NHS England, Leeds, United Kingdom

sociodemographic, economic, and epidemiological patterns. In 2010, the size of national population ranged from 49 000 in Saint Kitts and Nevis to almost 200 million in Brazil (5), the gross domestic product (GDP) per capita varied from 2 683 current international dollar (intl$) in Haiti to almost 31 000 intl$ in Puerto Rico, while the life expectancy at birth ranged from 46 years in Haiti to 79 in Costa Rica, and the childhood mortality rate (under 5 years) varied from 6.4 per 1 000 live births in Cuba to 203.6 in Haiti according to the World Bank (databank.worldbank.org). Existing social inequalities are magnified by rapid urbanization, internal and external migration, poverty, corruption, and violence (6), all of which contribute to distortions in decisions that affect cancer control in many LAC countries. Cancer registration is often discontinued due to irregular funding and frequently changing policies (7).

Data generated by population-based cancer registries are vital for understanding of cancer burden and its control, and their production requires sustained commitment and funding (8, 9). Several LAC registries were established long ago and generate high-quality data, including Puerto Rico in 1954, Kingston and St. Andrew, Jamaica in 1958, and Cali, Colombia in 1962. Others were discontinued or were unable to supply comparable data to international studies due to suboptimal data quality (4, 10, 11). Although national cancer registration has developed in few countries, most registries have subnational coverage, meaning a lower informative potential compared with national registries (12). LAC, however, boasts two pediatric population-based cancer registries with national coverage of Argentina since 2000 (13) and Chile since 2007 (14). On the other hand, the regional childhood cancer registry, started in Mexico City in 1996 (15), vanished with the retirement of its founder, due to the lack of sustained support.

Using the most complete and up-to-date study, the International Incidence of Childhood Cancer, volume 3 (IICC-3, iicc.iarc.fr) (3, 11), we provide a unique comprehensive overview of geographical patterns (2001–2010) and time trends (1993–2012) of cancer incidence in children aged 0–19 years in LAC and interpret the findings in the context of global patterns. We also share our views on the need for further development so that the countries in the region could join the WHO Global Initiative for Childhood Cancer (16).

MATERIALS AND METHODS

Data sources and processing

Data were extracted from the database of individual cancer records of the IICC-3 study coordinated by the International Agency for Research on Cancer (3, 11). The LAC populations covered by the registries contributing to the IICC-3 are shown in Supplement, Figure S1.

Each cancer record contained information on sex, age, date of birth, date of incidence, tumor sequence, site, morphology, behavior, laterality, and most valid basis of diagnosis. Cancers, originally coded by the registries according to the International Classification of Diseases for Oncology were first converted to its third edition, first revision (17) and then to the International Classification of Childhood Cancer – third edition, updated in 2017 (ICCC-3) (18). Data included in the IICC-3 database were quality controlled (3, 11). Quality indicators included the proportion of cases with microscopic verification, the proportion of cases retrieved from a death certificate only, the proportion of cases with morphology not otherwise specified, and others. We constructed several datasets to utilize the maximum data available in each analysis.

Constitution of analytical datasets

All registered cancers diagnosed in residents younger than 20 years, obtained from the registries that provided data for each year of the entire decade 2001–2010, were eligible for inclusion in geographical analysis. Eligible pediatric registries covered populations aged 0–14 years. The reference period 2001–2010 contained the largest populations covered within LAC and within the IICC-3 database.

Geographical analyses for the age range 0–14 years were conducted using a *pediatric dataset*, which contained data from eligible pediatric registries, complemented by data from the eligible general registries that covered different, non-overlapping populations. The analyses for the age range 0–19 years and the age group 15–19 years were conducted using a *general dataset*, which included data only from the eligible general registries.

To compare cancer incidence within LAC, we have grouped registries into two subregions, Central America and the Caribbean (CAC) and South America (SA), as per the United Nations (UN) definition of world regions (unstats.un.org/sdgs/indicators/regional-groups).

We also compared incidence observed in LAC with that of North America (NA), as the region representative of incidence patterns in HIC, which hosts a large identifiable Hispanic population with a similar genetic background to the LAC population. LAC incidence was also compared with the global figures (which included LAC data) reported previously (3). Incidence time trends were investigated over two decades, 1993–2012.

We examined the evolution of the coverage of childhood population of LAC by population-based cancer registries as reflected in the three IICC volumes (4, 10, 11) which included four decades of comparable global data.

Statistical analyses

Age-specific rates (ASR) were computed for five age groups (<1, 1–4, 5–9, 10–14, and 15–19 years) by dividing the number of cancer cases by the number of person-years at risk in the corresponding sex and age category. To enable comparisons between countries and world regions we adjusted overall incidence rates for the age ranges of 0–14 and 0–19 years, using the world standard population distribution (19) in five-year age groups, and reported age-standardized rates (WSR). All incidence rates were expressed per million person-years at risk. We computed the 95% confidence intervals (CI) of the incidence rates according to standard methods (20). We assessed the male to female (M/F) sex ratio as the quotient of the rate in males to that in females.

To assess incidence time trends, we fit linear regression models weighted by the ratio of the squares of age-standardized rate and its standard error. The changes were reported as the average annual percentage change (AAPC) and corresponding 95% CI. Changes in trends during the study period were examined using Joinpoint software (21), allowing a maximum of three break points and using the permutation test method (22) to select the final model. In the subsets where at least one

joinpoint was identified, we reported the overall AAPC and the annual percentage change with 95% CI for each time segment.

The population coverage was calculated by dividing the population covered by a registry in each IICC volume by the national population of the same country, year, and age range. For the first two IICC volumes (4, 10) we used the average annual population covered, while for the IICC-3 we used population covered in year 2010 or other closest available year (11). Countries with national cancer registries were assumed to have 100% coverage, using the population data provided by the registries. National populations for the countries with subnational coverage were retrieved from the UN estimates (5) for the calendar years most frequently represented in each volume; i.e., 1975, 1985, and 2010. The UN population estimates for the entire LAC region and its subregions in each reference year were used to calculate the overall coverage.

Unless stated otherwise, statistical analyses were performed using Stata/IC, version 14.2 (StataCorp, stata.com).

RESULTS

Location and characteristics of all registries contributing to IICC-3 (11) are shown in the Supplement (Figure S1, Tables S1 and S2). Overall, 36 744 unique cancer cases, arising in 276 million person-years, excluding geographical and temporal overlap, were included in the analyses of incidence presented below.

Childhood cancer incidence in LAC, 2001–2010

Overall WSR for the age range 0–14 years was 132.6, based on 24 556 cases and 191 million person-years, and it ranged from less than 100 in Martinique and Jamaica to 152.8 in Colombia. Overall WSR per million for the age range 0–19 years was slightly higher (139.0), and it remained at almost the same level as that for children under 15 years in Cuba (128.5) and in Jamaica (81.2) due to their low rates in the 15–19 years age group. The highest rate in the age group 15–19 years was observed in Chile (182.1). The pediatric cancer registries showed intermediate WSR of 130.1 in Argentina and 133.8 in Mexico City (Table 1). Using only data from general cancer registries, the incidence rate for the age range 0–14 years was 135.1 per million (95% CI [132.5, 137.7]), based on 11 099 cases. Incidence for all eligible registries is shown in Supplement, Table S3.

Figure 1 shows the ASR for main diagnostic groups by age, (see also Supplement, Table S4). Leukemia was the most common diagnostic group in age 0–14 years, with the peak ASR at 73.5 in age 1–4 years. Among children younger than 1 year, neuroblastoma (ASR 30.7) was almost as common as leukemia. Incidence of central nervous system (CNS) neoplasms was stable before age 10 years (ASR around 24), after which it declined slightly. Incidence of lymphoma increased with age, from 7.8 at age under 1 year to 30.2 in age 15–19 years, in which it ranked first. The other most common were other carcinomas and melanoma (ASR 30.0), and leukemia (ASR 27.6). Incidence rates for diagnostic groups and selected subgroups are compared in Figure 2 by age (see also Supplement, Tables S5A and S5B and Tables S6A and S6B).

Overall incidence was higher in males than in females (M/F = 1.2). The M/F ratio was 2 or higher for lymphoma in age 0–14 years, for non-Hodgkin & Burkitt lymphoma in age 0–19 years, and for lymphoid leukemia, rhabdomyosarcoma, and gonadal tumors in age group 15–19 years. Conversely, twice as many females than males had thyroid carcinoma before age 15 years and three times as many in age range 0–19 and age group 15–19 years. Females with renal tumors were registered twice as often as males in the 15–19 years age group (Supplement, Figure S2 and Table S7).

Geographical variations in incidence, 2001–2010

Overall incidence for the age range 0–19 years was higher in South America (SA) (WSR 146.8) than in Central America and the Caribbean (CAC) (WSR 131.6), mostly due to rates of lymphoid leukemia, and (gonadal) germ cell tumors in age group 15–19 years (Supplement, Figures S3 and S4, Table S8). In children aged 0–14 years incidence was higher in SA than in CAC for leukemia, CNS neoplasms, retinoblastoma, and rhabdomyosarcoma, while CAC showed higher incidence of non-Hodgkin combined with Burkitt lymphoma and the group of carcinomas and melanoma (Supplement, Figure S4 and Table S8). In each age category, CAC reported higher incidence of unspecified tumors (group XII).

The WSR for main diagnostic groups in the age range 0–14 years were compared between LAC, NA, and the world in Figure 3. LAC had the highest incidence of lymphoma and other and unspecified tumors. In contrast, incidence of CNS neoplasms, neuroblastoma, renal tumors, soft tissue sarcoma, and other carcinomas and melanoma were the lowest. LAC incidence of leukemia was intermediate between the global and the NA rate. Incidence in age range 0–19 and age group 15–19 years was lower in LAC than elsewhere except for other and unspecified tumors (Supplement, Table S9).

Incidence time trends in LAC for age 0–19 years, 1993–2012

Overall incidence increased by 1.0% per year on average with 95% CI (0.6, 1.3) (Figure 4 and Supplement, Table S10). Incidence increased for CNS neoplasms (AAPC = 1.8%), retinoblastoma (1.7), hepatic tumors (4.9), bone tumors (1.4), germ cell tumors (2.0), and the group of carcinomas and melanoma (2.9); some changes were driven by a subpopulation defined by region or sex. For example, the AAPC of 4.3 in females with retinoblastoma in SA influenced the AAPC of 1.7% for the entire LAC. SA and CAC showed opposite trends of other and unspecified tumors, with a sharp decrease of 7.7% (95% CI [–9.6, –5.7]) per year in SA and a strong increase of 4.9% (95% CI [1.5, 8.4]) per year in CAC (Supplement, Table S10). Joinpoint analysis revealed breaks in incidence time trends in some populations. In LAC, the time segments with variable time trends include those for leukemia in males and for other and unspecified tumors in females. Variations were seen among females in CAC for lymphoma, germ cell tumors, and other carcinomas and melanoma and in the group of other and unspecified tumors (Supplement, Figure S5).

Evolution of the registration coverage in LAC

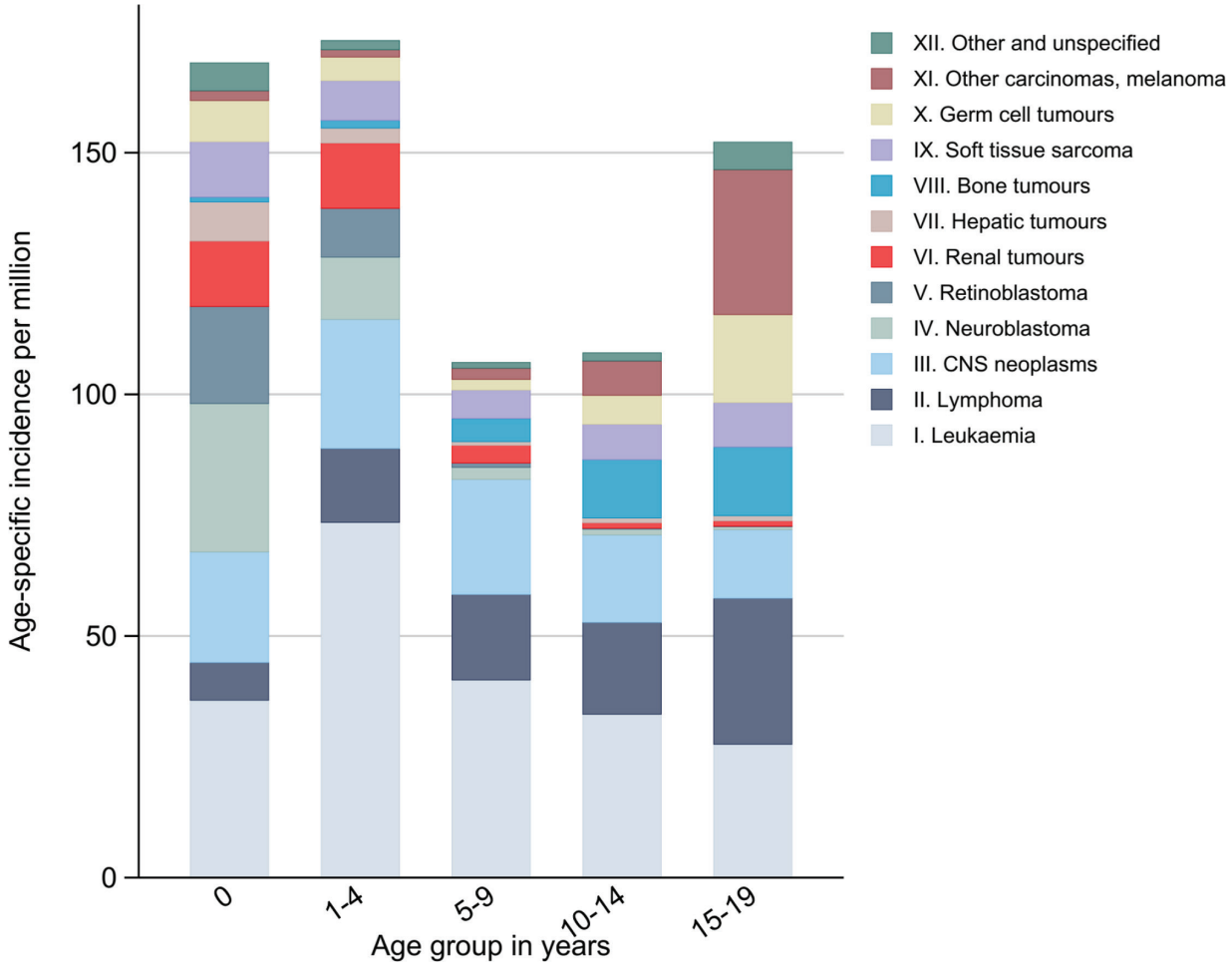
Coverage of the LAC population aged 0–14 years by internationally comparable data included in the three volumes of IICC has improved from 6.5% in 1975 to 16.4% in 2010, with a drop in 1985 (5.6%). The coverage of the population aged 15–19

TABLE 1. Overview of cancer incidence in children diagnosed in Latin America and the Caribbean, 2001–2010

Country, registry	Pediatric dataset				General dataset							
	Age 0–14 years				Age 0–19 years				Age 15–19 years			
	N	Person-years (thousands)	WSR per million	95% CI	*N*	Person-years (thousands)	WSR per million	95% CI	*N*	Person-years (thousands)	ASR per million	95% CI
Overall	24 556	191 186	132.6	130.9, 134.3	15 832	116 078	139.0	136.8, 141.2	4 733	31 070	152.3	148.0, 156.6
ARGENTINA, pediatric	12 941	102 433	130.1	127.8, 132.4	–	–	–	–	–	–	–	–
ARGENTINA, Entre Rios	–	–	–	–	521	4 184	126.2	115.3, 137.1	138	1 029	134.2	111.8, 156.6
BRAZIL, 4 registries	1 413	10 054	145.7	138.0, 153.4	2 098	14 019	151.8	145.2, 158.4	685	3 966	172.7	159.8, 185.6
CHILE, Valdivia	119	932	140.5	114.8, 166.2	182	1 278	149.9	127.5, 172.3	63	346	182.1	137.1, 227.1
COLOMBIA, 3 registries	1 381	9 258	152.8	144.6, 161.0	1 925	12 517	156.0	148.9, 163.1	544	3 259	166.9	152.9, 180.9
COSTA RICA	1 591	11 856	138.0	131.1, 144.9	2 341	16 142	146.3	140.3, 152.3	750	4 286	175.0	162.5, 187.5
CUBA	2 608	21 086	128.6	123.6, 133.6	3 652	29 238	128.5	124.2, 132.8	1 044	8 152	128.1	120.3, 135.9
ECUADOR, 4 registries	1 355	10 285	136.1	128.8, 143.4	1 892	13 829	139.6	133.2, 146.0	537	3 544	151.5	138.7, 164.3
FRANCE, Martinique	80	835	98.2	76.2, 120.2	126	1 138	110.2	90.5, 129.9	46	303	151.6	107.8, 195.4
JAMAICA, Kingston & St. Andrew	139	1 743	82.9	68.9, 96.9	187	2 379	81.2	69.3, 93.1	48	635	75.5	54.1, 96.9
MEXICO, Mexico City, pediatric	899	6 902	133.8	125.0, 142.6	–	–	–	–	–	–	–	–
UNITED STATES, Puerto Rico	988	8 216	124.3	116.4, 132.2	1 453	11 172	131.7	124.8, 138.6	465	2 956	157.3	143.0, 171.6
URUGUAY	1 042	7 588	143.0	134.2, 151.8	1 455	10 181	146.7	139.0, 154.4	413	2 593	159.3	143.9, 174.7

Note: *N*, number of cases; WSR, age-standardized rate (world standard) (19); CI, confidence interval; ASR, age-specific rate; – not applicable.
Source: IICC-3 (11).

FIGURE 1. Age-specific cancer incidence in children diagnosed in 2001–2010 in Latin America and the Caribbean



Note: Diagnostic groups are defined according to the International Classification of Childhood Cancer (ICCC-3) (18).
Source: IICC-3 (11).

years, which was included for the first time in IICC-3, was 9.8% (Supplement, Table S11).

DISCUSSION

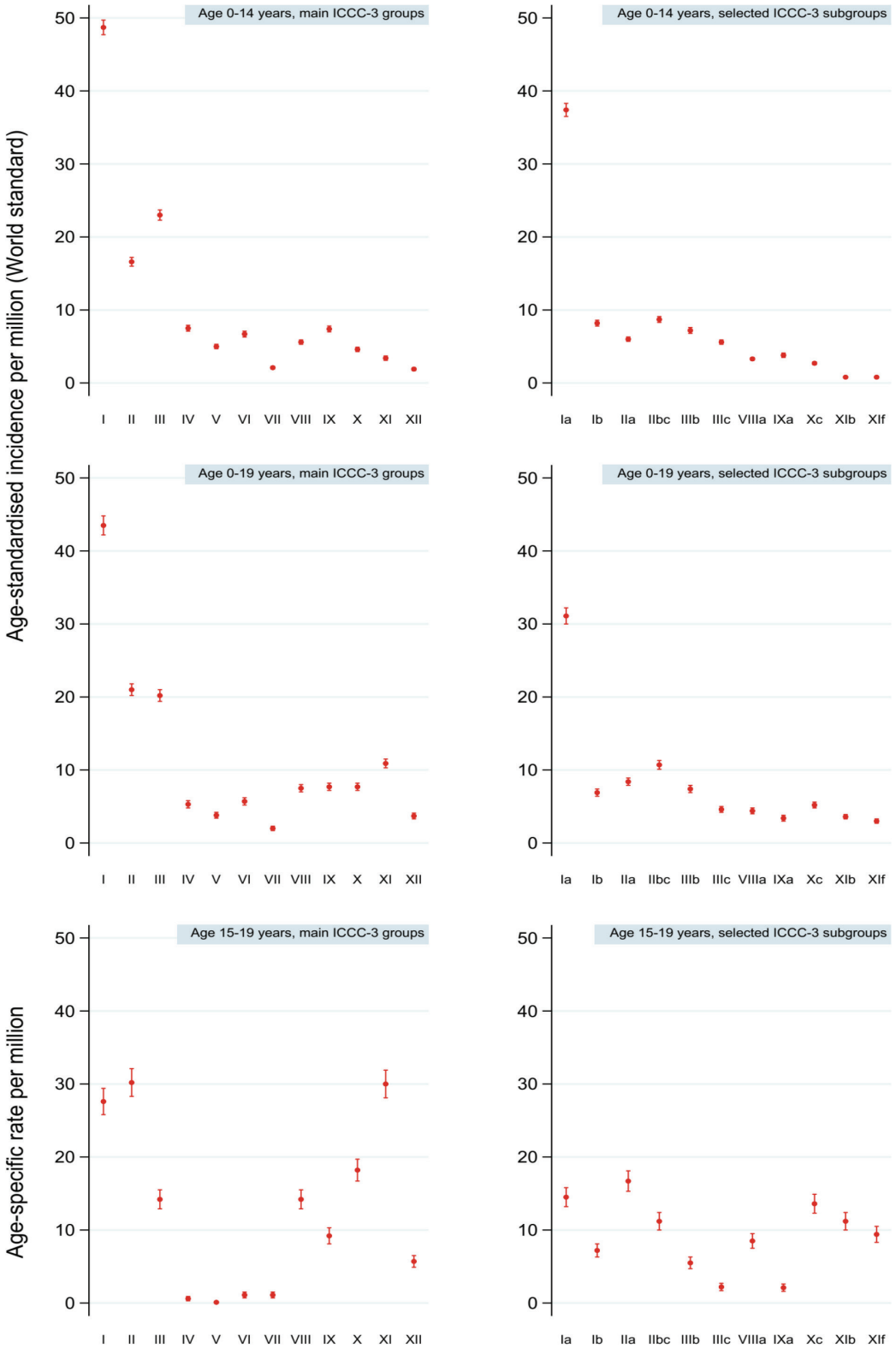
In this comprehensive overview of childhood cancer incidence in LAC, leukemia was the leading diagnostic group, followed by CNS neoplasms and lymphoma in children aged 0–14 years. Compared with the world average, LAC was shown to have a higher incidence of lymphoma and of other and unspecified tumors and intermediate rates of leukemia. In age range 0–19 years, incidence was lower or similar to that in the compared populations for all diagnostic groups except for the unspecified tumors. We documented higher incidence in South America (SA) than in Central America and the Caribbean (CAC), especially in age group 15–19 years. Increasing incidence and the expanding registration coverage mostly reflect the underlying changes in sociopolitical context.

Variations of childhood cancer incidence within LAC

The incidence variations within LAC likely reflect variable socioeconomic development of individual countries and their income level, which has an impact on public health policies, including cancer registration. Low incidence of CNS neoplasms may be linked to inadequate diagnostic technology or access to health care (23), while high rates of thyroid carcinoma in HIC (France, Martinique; and United States of America, Puerto Rico) indicate a high level of medical vigilance, more affordable in affluent societies (24). The incidence variations thus likely reflect disparities in health services, care pathways, outcomes, and information systems, in addition to potential risk factors the role of which needs to be determined. The observed sex ratio variations are consistent with those observed on a global scale (3).

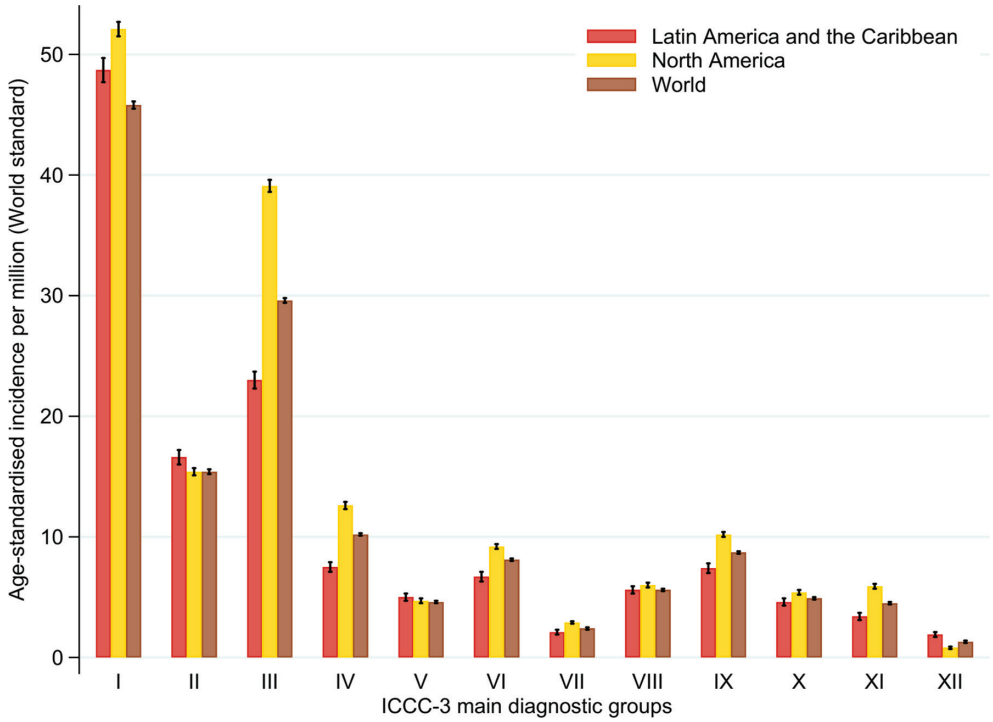
The larger intraregional differences in incidence in the age group 15–19 years compared with age range 0–14 years is influenced by the composition of the analytical datasets. The pediatric dataset covered larger populations and had therefore more stable rates. The rates observed in pediatric cancer registries affected the overall rates in age 0–14 years: the Argentinian national pediatric cancer registry contributed more than a half of the total person-years. Although some underrepresentation of tumors common in older children, noted in pediatric cancer registries (12), may draw down the combined rates, their quasi-complete

FIGURE 2. Childhood cancer incidence estimates and their 95% confidence intervals in Latin America and the Caribbean, 2001–2010



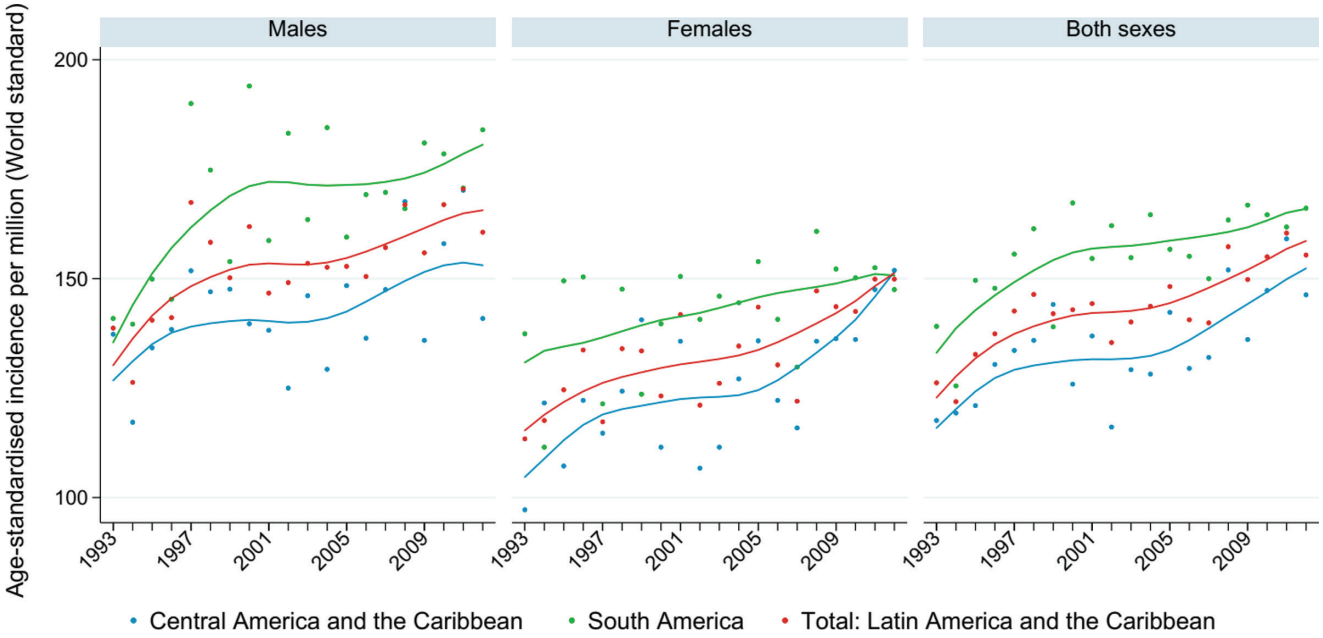
Note: Diagnostic groups are defined according to the International Classification of Childhood Cancer (ICCC-3) (18).
Source: IICC-3 (11).

FIGURE 3. Cancer incidence estimates and their 95% confidence intervals in children aged 0–14 years in populations included in the IICC-3 study, 2001–2010



Note: Diagnostic groups are defined according to the International Classification of Childhood Cancer (ICCC-3) (18). World includes Latin America and the Caribbean.
Source: Source: IICC-3 (11).

FIGURE 4. Cancer incidence trends in children aged 0–19 years in Latin America and the Caribbean, 1993–2012



Note: The dots represent the observed values; the trend curves were obtained from Poisson model.
Source: IICC-3 (11).

registration of cancers characteristic of (early) childhood pulls the overall rate up. National coverage of high quality provides more reliable estimates than regional coverage because higher rates observed in urban areas even out with lower rates in rural areas. National registration is also more effective in using linked data sources, such as death certificates (12).

Comparison of incidence in LAC with other world regions

The low overall LAC incidence reflects the level of socioeconomic development, as both tend to increase simultaneously (25). The low rates of CNS neoplasms, neuroblastoma, renal tumors, soft tissue sarcoma, and epithelial tumors and melanoma may be explained by lagging diagnostic capacity in LAC and will expectedly evolve over time toward those observed in NA. This assumption is further supported by the high proportion of unspecified cases in LAC, likely reflecting a suboptimal capacity to provide precise diagnosis or inability of registries to obtain relevant records, although the absolute difference was smaller than for other tumor groups.

LAC leads the average global incidence of lymphoma in the age range 0–14 years. Lymphoma is the prominent group also in African populations (4, 10, 11). In several LAC countries children are exposed to endemic forms of viral infections by Epstein-Barr virus, Kaposi sarcoma herpesvirus, and human T-lymphotropic virus (HTLV-1), which may increase lymphoma rates in children, including in Amerindian populations (26).

The highest leukemia rates worldwide are observed in Hispanic children in the United States of America (Supplement, Table S12) (3), which may be conditioned by the genome-wide Native American ancestry (27). However, the much lower rate in LAC, where the overwhelming majority are Hispanic, suggests that other environmental and sociodemographic factors may modulate this risk (28). An additional component of the differences in incidence between genetically comparable populations living in different environments may be underdiagnosis or underreporting of childhood leukemia (1) in LAC.

Incidence trends

The observed overall increase in incidence of approximately 1% per year was documented in other studies over several decades, and decelerated recently in high-income settings (29, 30). The modestly growing incidence rates may indicate changes in exposures, such as changing maternal and birth characteristics (31), or environmental risk factors (2). Nevertheless, improvements in the capacity to diagnose childhood cancer may have contributed to the increasing incidence of the CNS neoplasms, as diagnostic computed tomography and magnetic resonance imaging technology was introduced progressively in LAC during the study period (32). Surprisingly, the increasing incidence of CNS neoplasms in CAC was limited to males, which might indicate gender inequity in seeking care, similar to that seen in Indian populations (11) or, potentially, a sex-specific exposure factor. The increase in incidence of leukemia over 1993–1998 in males, revealed in joinpoint analysis, may indicate sex-specific differences in seeking diagnosis (and treatment).

The increasing incidence of retinoblastoma observed in SA may reflect an improved registration by general cancer registries. Retinoblastoma is often diagnosed and treated in specialized (ophthalmology) clinics, which are sometimes missed as data sources. The increase in incidence of hepatic tumors among males has been described; however, the reasons are unclear (33). The considerable increase in the incidence of bone tumors among males in SA may be the result of better diagnosis and would be consistent with the decreasing trend of unspecified tumor types and no increase seen in females, who also undergo growth spurt just before males.

Increase in the germ cell tumors incidence in males suggests environmental exposures, such as pollution or pesticides, which have an anti-androgen effect (34), although the evidence is ambiguous (35). The increasing incidence of other carcinomas and melanoma may be driven by a shift of diagnosis to an earlier age due to improved diagnostics (24) or changing exposures (2). As the available data were sparse, continued surveillance is needed to examine the evolution of these trends.

Finally, the opposed incidence trends of other and unspecified tumors in the two compared LAC regions suggest the need for improved diagnosis or registration techniques, and access to medical records in CAC.

Registration coverage in LAC

Of 91 invited population-based cancer registries, representing 27 LAC countries, 54 submitted data and 38 registries in 14 countries could contribute to IICC-3 (11). Among those included, 21 registries covered the entire decade 2001–2010. Several registries, contributing to the earlier IICC volumes (4, 10), were not included in IICC-3 because they had ceased to exist, did not have resources to submit data, or did not provide comparable data. LAC countries need to expand cancer registration coverage, and strengthen quality of childhood cancer data, in support of a childhood cancer control strategy (8). Sharing data for research and surveillance is the best way to improve data quality (3, 11).

Strengths and limitations

The strength of this study is its large coverage and comprehensive underlying database which contains the most up-to-date internationally comparable and reliable information on childhood cancer incidence in LAC. This data resource would benefit from an update with more recent data, also embedding data on follow-up. Survival is the key outcome measure for the WHO Global Initiative for Childhood Cancer, which aims to achieve 60% survival of children with cancer by 2030 (16). The paucity of quality childhood cancer data in LAC is the limitation that highlights the need to scale up cancer registration.

Conclusion

In this study we showed the importance of international collaboration, which allows standardized data validation, customized data analyses, and context-sensitive interpretation of global data. The LAC incidence rates likely reflect a combination of the status of diagnostic efficacy, completeness of registration, and underlying risk factors. The slightly increasing incidence rates suggest improvement in access to care and cancer registration, as well as changing exposures, as countries pursue their overall socioeconomic development. Coverage of the childhood

population of LAC by cancer registration is inadequate, and a long-term commitment is expected from governments to support production of data, to benefit current and future childhood cancer patients.

IICC-3 contributors. ***Editors*:** E Steliarova-Foucher, M Colombet, LA Gloeckler Ries, F Moreno, A Dolya, HY Shin, P Hesseling, CA Stiller. ***Data providers*:** Argentina: F Moreno (Argentinean Pediatric Oncology Hospital Registry); EA Laura (Bahía Blanca Cancer Registry); MA Duarte (Chaco Tumor Population Registry "Dra Ana H. Rey"); M Alonso (Córdoba Cancer Registry); MA Prince (Entre Ríos Provincial Population Cancer Registry); MC Diumenjo (Provincial Registry of Tumors of Mendoza); N Arias Ondicol (Neuquén Cancer Registry). Brazil: CA Lima (Cancer Registry of Aracaju); GP Mundim Pena (Population-Based Cancer Registry of Belo Horizonte); C Asturian Laporte (Population-Based Cancer Registry of Curitiba); JC de Oliveira (Cancer Registry of Goiânia); JA Pontes de Aquino (Cancer Registry of João Pessoa). Chile: C Vallebuona (National Registry of Childhood Cancer); JC Galaz (Cancer Registry of the Region of Antofagasta); ME Umaña (Population-Based Cancer Registry of the Province of Bío Bío); C Espinoza (Population Cancer Registry of the Province of Concepción); SM Vargas Gallagher (Region de Los Rios Cancer Registry). Colombia: CJ Uribe (Cancer Registry of the Metropolitan Area of Bucaramanga); LE Bravo (Cali Cancer Registry); NE Arias Ortiz (Population-Based Cancer Registry of Manizales); MC Yepez Chamorro (Cancer Registry of Pasto). Costa Rica: G Torres Alvarado (Costa Rica National Tumor Registry). Cuba: YH Galán Alvarez (Cuba National Cancer Registry). Ecuador: FC Martinez Reyes (Cuenca Tumor Registry); J Tanca Campozano (Guayaquil Cancer Registry); JC Castillo Calvas (Loja Cancer Registry); M Mendoza Alava (Manabí cancer registry); P Cueva Ayala (Quito Cancer Registry). France – French Guiana: T Roué (French Guiana Cancer Registry); France – Guadeloupe: J Deloumeaux (General Cancer Registry of Guadeloupe); France – Martinique: C Joachim (Martinique Cancer Registry). Honduras: F Duarte Muñoz (Francisco Morazán Cancer Registry). Jamaica: B Hanchard (Jamaica Cancer Registry, Kingston and St. Andrew). Mexico: A Fajardo-Gutiérrez (Children Cancer Registry of Mexico City). Peru: E Payet (Metropolitan Lima Cancer Registry); PF Albújar (Trujillo Cancer Registry). United States of America – Puerto Rico: DE Zavala Zegarra (Puerto Rico Central Cancer Registry). Uruguay: E Barrios (National Cancer Registry of Uruguay).

Author contributions. FM, FE, and ESF conceived the study. NPS, FM, FE, and ESF designed the study. MC, FM, AD, CAS, and ESF acquired the data. NPS, MC, and ESF analyzed the data. NPS, FM, FE, MP, CAS, and ESF interpreted the data/results. NPS, FE, and ESF drafted the manuscript. NPS, MC, FM, FE, AD, MP, CAS, and ESF critically reviewed the manuscript. All authors approved the final version of the manuscript and agree to be accountable for all aspects of the work. IICC-3 contributors participated in data acquisition, interpretation, and critical review.

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Incidencia del cáncer infantil en América Latina y el Caribe: cobertura de los registros, patrones y tendencias a lo largo del tiempo

RESUMEN

Objetivo. Presentar un panorama integral de los patrones geográficos (2001 a 2010) y las tendencias a lo largo del tiempo (1993 a 2012) de la incidencia de cáncer en la población infantil de 0 a 19 años en América Latina y el Caribe e interpretar los resultados en el contexto de los patrones mundiales.

Métodos. Se describen las diferencias geográficas en el período 2001-2010 y las tendencias de la incidencia entre 1993 y el 2012 correspondientes a la población menor de 20 años de América Latina y el Caribe, mediante el empleo de la base de datos del tercer volumen del estudio de Incidencia Internacional del Cáncer Infantil, (IICC, por su sigla en inglés), que contiene datos comparables. Se calculó la tasa de incidencia específica para la edad (TEE) por millón de años-persona para los diversos subgrupos poblacionales y la tasa de incidencia mundial estandarizada según la edad (TEM) utilizando la población estándar mundial.

Resultados. El estudio incluyó un total de 36 744 casos únicos. En el período del 2001 al 2010, la TEM general en la franja etaria de 0 a 14 años fue de 132,6. Los cánceres más frecuentes fueron la leucemia (TEM 48,7), las neoplasias del sistema nervioso central (TEM 23,0) y el linfoma (TEM 16,6). La TEE general en la franja etaria de 15 a 19 años fue de 152,3, con el linfoma como cáncer más frecuente (TEE 30,2). La incidencia fue mayor en el sexo masculino que en el femenino, y fue más alta en América del Sur que en Centroamérica y el Caribe. En comparación con los datos mundiales, en América Latina y el Caribe la incidencia fue, en general, menor, excepto en el caso de leucemia y el linfoma en la franja etaria de 0–14 años y los cánceres classificados como otros tumores y tumores sin especificar en todas las edades. La incidencia general en la franja etaria de 0-19 años aumentó en un 1,0 % al año (IC del 95 % [0,6, 1,3]) entre 1993 y el 2012. La cobertura de los registros incluidos fue de un 16% de la población de 0 a 14 años y de un 10% de la de 15 a 19 años.

Conclusiones. Los patrones observados proporcionan un valor de referencia para evaluar el estado y la evolución de la incidencia del cáncer infantil en la Región. Es necesario contar con un apoyo mayor y más sostenido para el registro del cáncer a fin de mejorar la representatividad y la oportunidad de los datos relativos al control del cáncer infantil en América Latina y el Caribe.

Palabras clave Neoplasias; incidencia; salud infantil; sistema de registros; vigilancia en salud pública; América Latina; región del Caribe.

Incidência de câncer infantil na América Latina e no Caribe: cobertura, padrões e tendências temporais

RESUMO

Objetivo. Apresentar uma visão abrangente dos padrões geográficos (2001 a 2010) e das tendências temporais (1993 a 2012) da incidência de câncer em crianças e jovens de 0 a 19 anos na América Latina e no Caribe (ALC) e interpretar os resultados no contexto de padrões mundiais.

Métodos. Foram descritas variações geográficas de 2001 a 2010 e tendências de incidência de 1993 a 2012 na população com menos de 20 anos da ALC usando informações comparáveis da base de dados do terceiro volume do estudo *International Incidence of Childhood Cancer*. Foram calculadas taxas de incidência específica por idade por milhão de pessoas-ano (ASR, na sigla em inglês) para subgrupos populacionais e taxas padronizadas por idade usando a população padrão mundial (WSR, na sigla em inglês).

Resultados. No total, foram incluídos 36 744 casos únicos. No período de 2001 a 2010, a WSR para todos os tumores combinados na faixa etária de 0 a 14 anos foi de 132,6. Os diagnósticos mais frequentes foram leucemia (WSR de 48,7), neoplasias do sistema nervoso central (WSR de 23,0) e linfoma (WSR de 16,6). A ASR para todos os tumores combinados na faixa etária de 15 a 19 anos foi de 152,3, e a maior taxa foi a de linfoma (ASR de 30,2). A incidência foi maior no sexo masculino do que no sexo feminino e maior na América do Sul do que na América Central e no Caribe. De modo geral, em comparação com as estimativas mundiais, a incidência na ALC foi menor, exceto para leucemia e linfoma entre 0 e 14 anos e para outros tumores e tumores não especificados em qualquer idade. A taxa de incidência na faixa etária de 0 a 19 anos aumentou em 1,0% ao ano (IC de 95% [0,6, 1,3]) entre 1993 e 2012. Os registros incluídos cobriam 16% da população de 0 a 14 anos e 10% da população de 15 a 19 anos.

Conclusões. Os padrões observados servem de referência para avaliar o status e a evolução da ocorrência de câncer infantil na região. É necessário garantir um apoio ampliado e consistente aos registros de câncer para aprimorar a representatividade e a disponibilidade das informações em tempo adequado para o controle do câncer infantil na ALC.

Palavras-chave Neoplasias; incidência; saúde da criança; sistema de registros; vigilância em saúde pública; América Latina; região do Caribe.