Recent trends in childhood cancer incidence in Canada (2001–2013): a report from the Cancer in Young People in Canada (CYP-C) surveillance program

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Background and purpose

We have documented an increase of 3.4% per year for childhood cancer incidence from 1992 to 2010. Similar increases have also been observed in the other countries. The factors contributing to increasing incidence are not well understood. Surveillance of childhood cancer incidence trends can inform etiologic research, policy and programs. This study offers a population-based basis for comparison to the Canadian Cancer Registry (CCR) by examining demographic and geographic variations in childhood cancer incidence trends in the CCR from 2001–2013 using a newly created data source, the Cancer in Young People in Canada (CYP-C) surveillance system.

Methods

A total of 11385 incidence primary childhood cancers diagnosed among Canadian children under age 15 years were captured between 2001 and 2013. The data came from the CYP-C surveillance system which collects data in 17 pediatric oncology hospitals across the country from 2001 onward.

Analysis methods

Annual or average annual age-specific rates were calculated by period, sex, age, and geographical region for the 12 main diagnostic groups of the International Classification of Childhood Cancer (ICCC). Age-standardized incidence rates (ASIRs) per million children were calculated for each period. The rates were standardized to the 2011 Canadian population to obtain age-standardized incidence rates (ASIRs) per million children. Temporal trend were examined by annual percent changes (APCs) with 95% confidence intervals (CIs) using zeroth-order regression and compared with trends observed in the CCR. The overall ASIRs were not shown for the Territories because of small numbers of new cases.

Results

The most common cancers were leukemia, central nervous system tumors, neuroblastoma, and soft tissue sarcomas. From 2001 to 2013, childhood cancer was diagnosed at a rate of 163 new cases per million children. The average annual ASIRs of all cancers per million children in Canada were highest in Ontario, followed by Quebec and then the Prairies. The overall ASIRs of all cancers combined tended to increase in British Columbia, Ontario, Quebec, Atlantic region, and the country as a whole over the three periods.

CNS tumors increased in Ontario and Alberta, while leukemia incidence increased 1.5% annually, driven mainly by the increase in females (2.3%). An increase in leukemias was also observed in children aged 10-14 (APC=3.5, CI=1.4-4.5, data not shown). Leukemia incidence increased 1.5% annually, driven mainly by the increase in females (2.3%). An increase in leukemias was also observed in children aged 10-14 (APC=3.5, CI=1.4-4.5, data not shown). CNS tumors had an equal increase of 1.2% for both sexes but was not significant for females alone. The overall rates increased the most in Ontario and Quebec. CNS tumors increased in Ontario, but decreased in Atlantic region from the highest rate in the country during 2001–2005 down to the lowest since 2007. Though lower, greater increases were observed in males. Similar increasing trends in incidence rates for all cancers, leukemias and CNS tumors were observed using CCR data with age-related differences related to location of care.

Conclusions

Our study suggests that increasing incidence trends for all cancers and selected malignancies in Canadian children continue. Differences in temporal trends were registered by sex, age, and geographic area. Increases in childhood cancer incidence may reflect the changes in demographics and/or etiological exposures, and artefacts of changes in cancer coding, detection, diagnosis and reporting. Increasing radiation, certain genetic disorders, high birth weight, parental age, parental smoking, and urbanization may be potential risk factors. Leukemia incidence increased 1.5% annually, driven mainly by the increase in females (2.3%). An increase in leukemias was also observed in children aged 10-14 (APC=3.5, CI=1.4-4.5, data not shown). Leukemia incidence increased 1.5% annually, driven mainly by the increase in females (2.3%). An increase in leukemias was also observed in children aged 10-14 (APC=3.5, CI=1.4-4.5, data not shown). CNS tumors had an equal increase of 1.2% for both sexes but was not significant for females alone.

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References


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