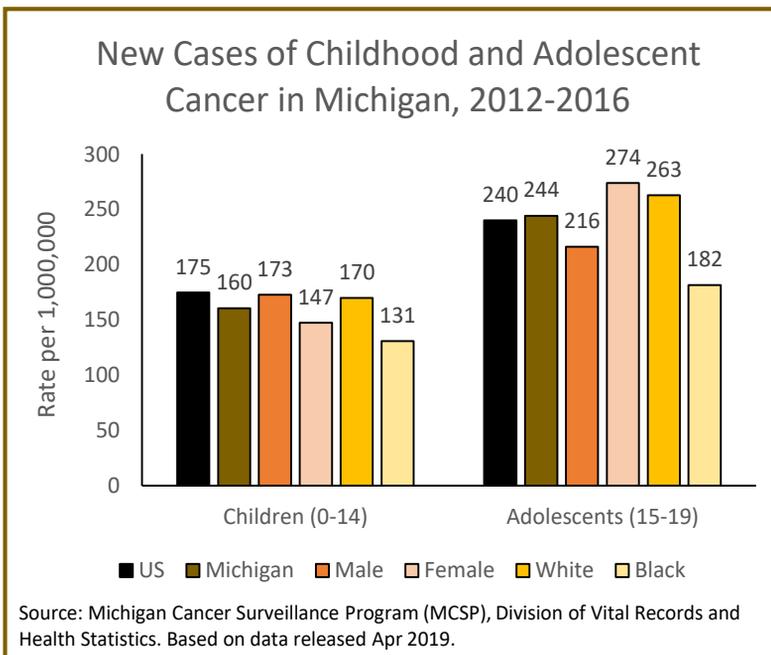
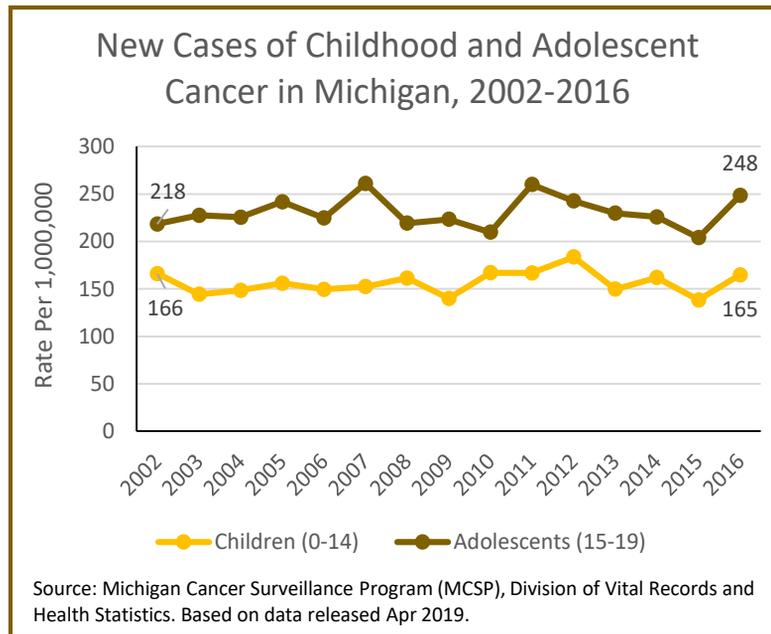


- After accidents, cancer is the **second leading** cause of death in children ages 1 to 14. <sup>1</sup>
- In 2019, it is estimated that there will be **10,590 new cases** and **1,190 deaths** from cancer among children and adolescents in the United States. <sup>2</sup>
- **Unlike many adult cancers, childhood and adolescent cancers are not strongly linked to lifestyle or environmental risk factors.** <sup>1</sup>
- Causes of child and adolescent cancer are mostly unknown. Certain chromosomes, genetic syndromes, and ionizing radiation exposure has been linked to a small percentage of cases. <sup>1</sup>

## New Cases of Childhood and Adolescent Cancer

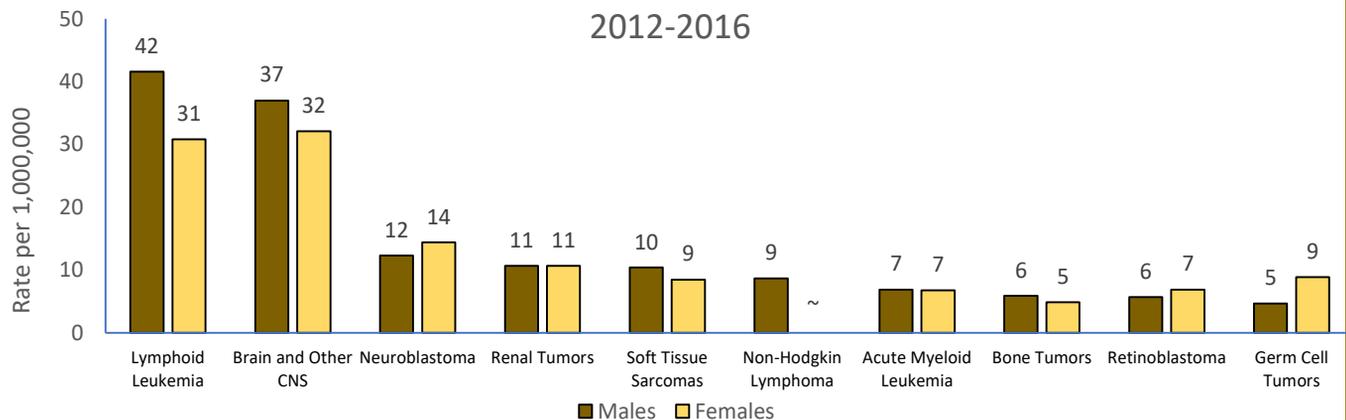
- Childhood cancer is defined as being diagnosed between ages zero and 14. Adolescent cancer is defined as being diagnosed between ages 15 and 19. <sup>3</sup>
- One in 408 children will be diagnosed with cancer before the age of 15 and one in 285 children will be diagnosed with cancer before the age of 20. <sup>3</sup>
- Cancer rates among adolescents are higher compared to rates among children. <sup>4</sup>
- Both childhood and adolescent cancer have had stable rates over the last 15 years. <sup>4</sup>
- In 2016, there were 165 cancer cases per 1,000,000 children and 248 cancer cases per 1,000,000 adolescents in Michigan.
- In Michigan, male children have a higher rate of cancer compared to females (173 per 1,000,000 vs 147 per 1,000,000); however, this difference is not statistically significant. <sup>4</sup>
- Female adolescents have a higher rate compared to males ( 274 per 1,000,000 vs 216 per 1,000,000); however, this difference is not statistically significant. <sup>4</sup>
- Diagnosis of cancer among White children and adolescents have a higher diagnosis rate compared to Black children and adolescents. These differences are not statistically significant. <sup>4</sup>



### Cancer Types among Children and Adolescents <sup>3</sup>

- The type of cancers that develop in children differ from that in adults.
- Adult cancers are classified by site, whereas cancer in children and adolescents are classified by tissue type into 12 major groups using the International Classification of Childhood Cancers (ICCC).

Cancer Diagnosis by Type among Michigan Children (Ages 0-14), 2012-2016

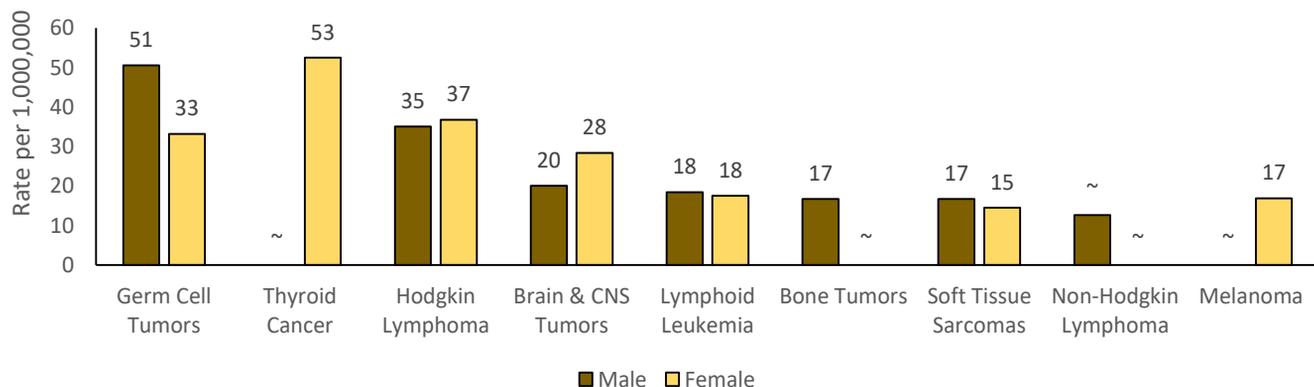


~ Suppressed due to less than 20 cases

Source: Michigan Cancer Surveillance Program (MCSP), Division of Vital Records and Health Statistics. Based on data released Apr 2019.

- **Lymphoid leukemia** was the most common cancer diagnosed among **male children** (42 per 1,000,000) and made up 24% of all cancer diagnoses among male children. <sup>4</sup>
- **Brain and other parts of the central nervous system (CNS)** was the most common cancer diagnosed among **female children** (32 per 1,000,000) and made up 22% of all cancer diagnoses among female children. <sup>4</sup>

Cancer Diagnosis by Type among Michigan Adolescents (Ages 15-19), 2012-2016



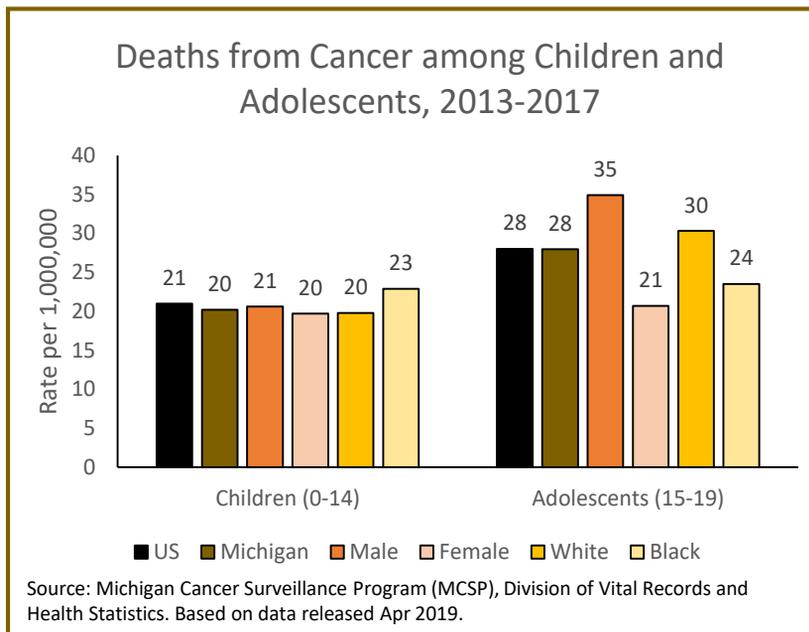
~ Suppressed due to less than 20 cases

Source: Michigan Cancer Surveillance Program (MCSP), Division of Vital Records and Health Statistics. Based on data released Jan 2019.

- **Germ cell tumors** were the most common cancer diagnosed among **male adolescents** (51 per 1,000,000) and made up 22% of all cancer diagnoses among male adolescents. <sup>4</sup>
- **Thyroid cancer** was the most common cancer diagnosed among **female adolescents** (53 per 1,000,000) and made up 20% of all cancer diagnoses among female adolescents in Michigan. This is significantly higher than the U.S. rate for thyroid cancer among adolescents (32 per 1,000,000). <sup>4</sup>

## Michigan Cancer Deaths among Children and Adolescents <sup>4</sup>

- From 2002 to 2016, deaths from cancer have **decreased 53% among children and 27% among adolescents.** (data not shown)
- Black children die from cancer at a higher rate compared to White children (23 per 1,000,000 vs 20 per 1,000,000); however, this difference is not statistically significant.
- Male adolescents die from cancer at a higher rate compared to female adolescents (35 per 1,000,000 vs 21 per 1,000,000); however this difference is not statistically significant.
- White adolescents die from cancer at a higher rate compared to Black adolescents (30 per 1,000,000 vs 24 per 1,000,000); however this difference is not statistically significant.
- **Brain cancer** caused 35% of cancer-related deaths among **male children** and **leukemia** caused 28% of cancer-related deaths among **female children**.
- **Bone cancer** caused 35% and 38% of cancer-related deaths among **male and female adolescents** respectively.



## Survival and Late Effects

- Survival rates have improved over the last 50 years. In 2008-2014, **83% of children and 85% of adolescents diagnosed with cancer survived at least five years.** <sup>5</sup>
- As of 2015 it is estimated that there are 429,000 survivors of childhood or adolescent cancer in the U.S. <sup>5</sup>
- The Children's Oncology Group (COG) long-term follow-up guidelines can serve as a resource for providers: <http://www.survivorshipguidelines.org/>. <sup>6</sup>
- Survivors are at an increased risk for health problems throughout their lifetime and includes a heightened risk for a second cancer later in life. <sup>5</sup>
- Other late effects can include problems with: reproduction, growth, memory, cardiovascular disease, breathing, digestion, hearing, and seeing. <sup>5</sup>
- These individuals may also experience long term financial burden due to life-long medical care. <sup>7</sup>

## Clinical Trials

- Over 90% of children and adolescents diagnosed with cancer are treated at a cancer center that is affiliated with the National Cancer Institute-supported Children's Oncology Group. <sup>5</sup>
- Over 4,000 children diagnosed with cancer in the U.S. enroll in a COG sponsored clinical trial per year. <sup>6</sup>
- There are seven COG locations in Michigan. A complete directory of COG locations can be found here: [www.childrensoncologygroup.org](http://www.childrensoncologygroup.org).
- To learn more about children's cancer centers that belong to COG call: 1-800-4-CANCER.

References: 1) American Cancer Society. Cancer in Children. Retrieved at <https://www.cancer.org/cancer/cancer-in-children/types-of-childhood-cancers.html>  
 2) American Cancer Society. Cancer Statistics Center: Childhood and adolescent cancer. Retrieved at: <https://cancerstatisticscenter.cancer.org/#/childhood-cancer>.  
 3) American Cancer Society. Cancer Facts and Figures 2018. Retrieved at <https://www.cancer.org/content/dam/cancer-org/research/cancer-facts-and-statistics/annual-cancer-facts-and-figures/2018/cancer-facts-and-figures-2018.pdf>  
 4) Michigan Resident Cancer Incidence File. Updated with cases processed through April 2019. Division for Vital Records & Health Statistics, Michigan Department of Health & Human Services. Retrieved at: <http://www.mdch.state.mi.us/pha/osr/Cancer/Stateinc.asp?CDxID=IncTrendsBreast>.  
 5) National Cancer Institute. Cancer in Children and Adolescents. Retrieved at: <https://www.cancer.gov/types/childhood-cancers/child-adolescent-cancers-fact-sheet>  
 6) Children's Oncology Group (COG). Accessed at <https://www.childrensoncologygroup.org/>  
 7) Nipp, RD. Financial Burden in Survivors of Childhood Cancer. J Clin Oncol. 2017. <https://www.ncbi.nlm.nih.gov/pubmed/28817372>