

Childhood Cancer Fact Library

All statistics below are for U.S. children from birth through 19 years old unless stated otherwise. This summary relies on the most recent published data with respect to its contents, some of which dates back one or more years.

Diagnosis

- The incidence of childhood cancer is on the increase, averaging 0.6% increase per year since mid 1970's through 2009 and 0.8% per year during 2010-2014, resulting in an overall increase of 24% over the last 40 years ^(1,7F)
- 1 in 285 children was diagnosed with cancer in 2014 ⁽¹⁾
- 43 children per day or 15,780 children per year are expected to be diagnosed in with cancer (10,450 ages 0 to 14, and 5,330 ages 15 to 19) ⁽¹⁾
- The average age at diagnosis is 8 overall (ages 0 to 19), 5 years old for children (aged 0 to 14), and 17 years old for adolescents (aged 15 to 19) ⁽⁹⁾, while adults' average age for cancer diagnosis is 65 ^(7a)
- Childhood cancer is not one disease - there are more than 12 major types of pediatric cancers and over 100 subtypes.⁽¹⁾

Long Term Health-Effects Associated with Treatments & Survival

- More than 95% of childhood cancer survivors will have a significant health related issue by the time they are 45 years of age ⁽²⁾; these health related issues are side-effects of either the cancer or more commonly, the result of its treatment. 1/3rd will suffer severe and chronic side effects; 1/3rd will suffer moderate to severe health problems; and 1/3rd will suffer slight to moderate side effects. ⁽²⁾

Mortality

- Cancer is the number one cause of death by disease among children. ⁽⁴⁾
- About thirty five percent of children diagnosed with cancer will die within 30 years of diagnosis. ⁽⁸⁾
- On average, about 17% of children die within 5 years of diagnosis. Among those children that survive to five years from diagnosis, 18% will die within 30 years of diagnosis. ⁽⁸⁾
- The overall cancer death rate for children ages 0-14 years decreased an average of 1.5 percent per year during 2011-2015. ^(7F)
- Those that survive the five years have an eight times greater mortality rate due to the increased risk of liver and heart disease and increased risk for reoccurrence of the original cancer or of a secondary cancer. ⁽⁸⁾
- There are 70 potential life years lost on average when a child dies of cancer compared to 15 potential life years lost for adults. ^(7B)
- Brain cancer is 29.9% of total childhood cancer deaths while leukemia accounts for 24.9%.^(7E)

Treatment, Research, Funding

Since 1980, only four drugs have been approved in the first instance for use in children. Three, teniposide (1980), clofarabine (2004), and tisagenlecleucel (2017) are used in the treatment of ALL. The third, dinutuximab was approved in 2015 for use in high-risk neuroblastoma. From 1980 to early 2017, 11 total drugs, consisting of the four above and a few others first approved for use by adults (most recently pembrolizumab and avelumab, along with others such as imatinib, daunorubicin, methotrexate, PEG-formulated asparaginase, and binotumomab have been approved for use in children with cancer – compared with hundreds of drugs that have been developed specifically for adults only. Equally important, for many of the childhood cancers, the same treatments that existed in the 1970's continue with few, if any, changes ⁽⁷⁾

- The average cost of a stay in a hospital for a child with cancer is \$40,000 per stay. ⁽⁵⁾
- On average, pediatric hospitalizations for cancer cost almost five times as much as hospitalizations for other pediatric conditions. ⁽⁵⁾
- From 2007 through 2016, the National Cancer Institute (NCI) spent an average of 3.94% of its research funding on pediatric cancers research. ^(7C)
- Prostate cancer (patient average age at diagnosis, 66 years) ^(7A), receives more research funding from NCI than all childhood cancers combined (patient average age at diagnosis, 8 years). ⁽⁹⁾

NCI Pediatric Cancers Research Investment

Year	Pediatric Cancer Funding		Total NCI Funding
	%	\$ Millions	\$ Billions
2007	3.60%	\$172.7M	\$4.79B
2008	3.93%	\$189.8M	\$4.83B
2009	3.87%	\$192.8M	\$4.97B
2010	3.86%	\$197.1M	\$5.10B
2011	3.86%	\$195.5M	\$5.04B
2012	4.10%	\$208.1M	\$5.07B
2013	3.86%	\$185.1M	\$4.79B
2014	4.13%	\$203.7M	\$4.93B
2015	4.14%	\$205.0M	\$4.95B
2016	3.97%	\$206.8M	\$5.21B

Average funding for pediatric cancers for 10 year period is 3.94% ^(7 D)

Survival

Pediatric Cancer 5-Year Observed Survival Rates for 2 Time Periods, Ages Birth to 19 Years ⁴The table below contrasts the estimated 5-year survival rates for various types of childhood cancers for the 1975-1979 and 2003-2009 time periods. It should be noted the survival rates listed below reflect general rates and in no way are a representation of an anticipated actual survival outcome for any individual child.

	YEAR OF DIAGNOSIS	
	1975-1979, %	2003-2009,* %
All ICCC sites	63%	83%
Leukemia	48%	84%
Acute lymphocytic leukemia	57%	90%
Acute myeloid leukemia	21%	64%
Lymphomas and reticuloendothelial neoplasms	72%	91%
Hodgkin lymphoma	87%	97%
Non-Hodgkin lymphoma	47%	85%
Brain and CNS	59%	75%
Ependymoma	37%	81%
Astrocytoma	69%	85%
Medulloblastoma	47%	70%
Neuroblastoma and ganglioneuroblastoma	54%	79%
Retinoblastoma	92%	99%
Wilms tumor	75%	90%
Hepatic tumors	25%	74%
Bone tumors	49%	73%
Osteosarcoma	45%	71%
Ewing sarcoma	42%	72%
Rhabdomyosarcoma	49%	64%
Testicular germ cell tumors	74%	96%
Ovarian germ cell tumors	75%	94%
Thyroid carcinoma	99%	98%
Melanoma	83%	95%

CNS indicates central nervous system; ICCC, International Classification of Childhood Cancers.

*Cases were followed through 2010.

Note: Does not include benign and borderline brain tumors.

Source: National Cancer Institute Surveillance, Epidemiology, and End Results (SEER) program, 9 SEER registries.

- The average 5-year survival rate for childhood cancers when considered as a whole is 83%.^(1,3)
- Cancer survival rates vary not only depending upon the type of cancer, but also upon individual factors attributable to each child.⁽⁶⁾
- Survival rates can range from almost 0% for cancers such as DIPG, a type of brain cancer, to as high as 90% for the most common type of childhood cancer known as Acute Lymphoma Leukemia (ALL).⁽¹⁾
- The average 5-year survival rate, not including children with ALL, is 80%.⁽¹⁾
- In 2013 there were nearly 390,000 childhood cancer survivors in the United States. This number is projected to grow to more than 500,000 by 2020.⁽²⁷⁾
- Approximately 1 in 530 young adults between the ages of 20 and 39 is a survivor of childhood cancer.⁽⁶⁾

Psychosocial Care⁽²⁰⁾

- Childhood cancer threatens every aspect of the family's life and the possibility of a future, which is why optimal cancer treatment must include psychosocial care.¹¹
- The provision of psychosocial care has been shown to yield better management of common disease-related symptoms and adverse effects of treatment such as pain and fatigue.¹²
- Depression and other psychosocial concerns can affect adherence to treatment regimens by impairing cognition, weakening motivation, and decreasing coping abilities.¹³
- For children and families, treating the pain, symptoms, and stress of cancer enhances quality of life and is as important as treating the disease.¹⁴
- Childhood cancer survivors reported higher rates of pain, fatigue and sleep difficulties compared with siblings and peers, all of which are associated with poorer quality of life.¹⁵
- Changes in routines disrupt day-to-day functioning of siblings.¹⁶ Siblings of children with cancer are at risk for emotional and behavioral difficulties, such as anxiety, depression, and post traumatic stress disorder.¹⁷
- Symptoms of post traumatic stress disorder are well documented for parents whose children have completed cancer treatment.¹⁸

- Chronic grief has been associated with many psychological (e.g., depression and anxiety) and somatic symptoms (e.g., loss of appetite, sleep disturbances, fatigue), including increased mortality risk.¹⁹
- Cancer survivors in the United States reported medication use for anxiety and depression at rates nearly two times those reported by the general public, likely a reflection of greater emotional and physical burdens from cancer or its treatment.²¹
- Financial hardship during childhood cancer has been found to affect a significant proportion of the population and to negatively impact family wellbeing.²²
- Adolescents with cancer experienced significantly more Health Related Hindrance (HRH) of personal goals than healthy peers, and their HRH was significantly associated with poorer health-related quality of life, negative affect, and depressive symptoms.²³
- Peer relationships of siblings of children with cancer are similar to classmates, though they experience small reductions in activity participation and school performance.²⁴
- Chronic health conditions resulting from childhood cancer therapies contribute to emotional distress in adult survivors.²⁵
- Parents have been found to report significant worsening of all their own health behaviors, including poorer diet and nutrition, decreased physical activity, and less time spent engaged in enjoyable activities 6 to 18 months following their child's diagnosis.²⁶

Endnotes

- ¹ American Cancer Society, Childhood and Adolescent Cancer Statistics, 2014
<https://www.cancer.org/content/dam/cancer-org/research/cancer-facts-and-statistics/annual-cancer-facts-and-figures/2014/special-section-cancer-in-children-and-adolescents-cancer-facts-and-figures-2014.pdf>
- ² St. Jude Children's Research Hospital, (JAMA. 2013;309 [22]: 2371-2381)
<http://jama.jamanetwork.com/article.aspx?articleid=1696100>
- ³ National Center Biotechnology Information, Declining Childhood & Adolescent Cancer Mortality, Cancer 2014
<http://www.ncbi.nlm.nih.gov/pubmed/24853691>
- ⁴ National Vital Statistics Report, vol. 62.6, December 20, 2013
<http://www.cancer.gov/types/childhood-cancers/child-adolescent-cancers-fact-sheet>
- ⁵ Healthcare Cost and Utilization Project (HCUP), Statistical Brief #132, Pediatric Cancer Hospitalizations 2009
<https://www.hcup-us.ahrq.gov/reports/statbriefs/sb132.pdf1>
- ⁶ American Society of Clinical Oncology
<http://jco.ascopubs.org/content/28/15/2625.short>
- ⁷ National Cancer Institute, <http://www.cancer.gov/research/areas/childhood>
 tisagenlecleucel <https://www.fda.gov/NewsEvents/Newsroom/PressAnnouncements/ucm574058.htm>
 Seven drugs noted above also approved for use in adults:
 teniposide, daunorubicin, methotrexate, PEG-formulated asparaginase,
 Hirschfeld et al., 2003 (Journal of Clinical Oncology, 2196), p. 1066-1073.)
 blinatumomab, Imatinib, pembrolizumab, avelumab:
<http://www.centerwatch.com/drug-information/fda-approved-drugs/>
- ^{7A} National Cancer Institute, SEER Median Age of Diagnosis 2008-2012, Table 1.12
http://seer.cancer.gov/csr/1975_2012/results_merged/topic_med_age.pdf
- ^{7B} National Cancer Institute, SEER Cancer Statistics Review 1973-1997 (NCI 2000)
<http://jnci.oxfordjournals.org/content/93/5/341.full>
- ^{7C} National Cancer Institute, NIH/NCI Budget
<https://www.hhs.gov/about/budget/budget-in-brief/nih/index.html>
- ^{7D} National Cancer Institute, NIH/NCI Budget
<https://fundedresearch.cancer.gov/nciprotfolio/search/SearchForm?formType=simple>
- ^{7E} Centers for Disease Control and Prevention, <https://www.cdc.gov/nchs/products/databriefs/db257.htm>
- ^{7F} National Cancer Institute, SEER Cancer Statistics. Annual Report to the Nation 2018
https://seer.cancer.gov/report_to_nation/statistics.html

⁸ Journal of the National Cancer Institute “Cause-Specific Late Mortality Among 5 Year Survivors”
<http://jnci.oxfordjournals.org/content/100/19/1368.full>

⁹ NCI, SEER Age-Specific Rates and Counts for Cancer Sites by Single Year of Age at Diagnosis, Table 28.13
http://seer.cancer.gov/csr/1975_2012/results_single/sect_28_table.13_2pgs.pdf

¹⁰ Additional information in this statement was obtained from several reliable and authoritative sources

¹¹ Institute of Medicine, 2008 - Cancer Care for the Whole Patient

¹² Jacobsen et al., 2012 (Journal of Clinical Oncology, 30 (11), p.1151-1153)

¹³ Institute of Medicine, 2008

¹⁴ Institute of Medicine 2015 - Comprehensive Care for Children with Cancer and Their Families

¹⁵ Children's Oncology Group Long Term Follow-Up Guidelines, 2013

¹⁶ Alderfer et al., 2010 (Psycho-oncology, 19 (8), p. 789-805)

¹⁷ Alderfer et al., 2003 (Journal of Pediatric Psychology, 28 (4), p. 281-286)

¹⁸ Kazak et al., 2004 (Journal of Pediatric Psychology, 29 (3), p. 211-219)

¹⁹ Alam et al., 2012 (Death Studies, 36 (1), p. 1-22)

²⁰ Psychosocial care addresses the effects that cancer treatment has on the mental health and emotional wellbeing of patients, their family members, and their professional caregivers. Psychosocial care is not provided by a single profession alone: Instead, every patient-healthcare provider interaction provides an opportunity to assess the stressors and concerns of children and their family members.

²¹ Hawkins et al., 2017 (Journal of Clinical Oncology, 5 (1), 78-87)

²² Bona et al., 2014 (Journal of Pain Symptom Management, 47 (3), 594-600)

²³ Schwartz & Brumley, 2017 (Journal of Adolescent & Young Adult Oncology, 6 (1), 142-149)

²⁴ Alderfer et al., 2015 (Journal of Pediatric Psychology, 40 (3) 309-319)

²⁵ Vuotto et al., 2017 (Cancer, 123 (3), 521-528)

²⁶ Wiener et al., 2016 (Journal of Pediatric Oncology Nursing, 33(5), 378-386)

²⁷ Robison LL, Hudson MM. Survivors of childhood and adolescent cancer: life long risks and responsibilities. Nat Rev Cancer 2014; 14: 61-70

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