LEUKEMIA & LYMPHOMA SOCIETY®

FACTS 2020-2021

UPDATED DATA ON BLOOD CANCERS

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Executive Summary

Facts 2020-2021 is an update of data available for blood cancers (leukemia, lymphoma, myeloma, myelodysplastic syndromes and myeloproliferative neoplasms). Blood cancers are diseases that can affect the bone marrow, the blood cells, the lymph nodes and other parts of the lymphatic system.

Facts 2020-2021 provides updates from the American Cancer Society's *Cancer Facts & Figures 2021* (published online in 2021, https://www.cancer.org/research/cancer-facts-statistics.html) for estimated numbers of new blood cancer cases and estimated numbers of deaths due to blood cancers. The incidence rates, prevalence and mortality data in *Facts 2020-2021* reflect the statistics from the National Cancer Institute's Surveillance, Epidemiology and End Results (SEER) Program, *Cancer Statistics Review (CSR)* 1975-2017 (published online in April 2020, www.seer.cancer.gov). National incidence counts are generated from the United States Cancer Statistics (USCS) Public Use Database for 2001-2017 (www.cdc.gov/cancer/uscs/public-use/). Incidence rates by state are provided by the North American Association of Central Cancer Registries (NAACCR), *Cancer in North America: 2013-2017* (published online in May 2020, www.naaccr.org).

Throughout this publication, "cases" and "counts" are used interchangeably.

About Blood Cancers

Leukemia, lymphoma, myeloma, myelodysplastic syndromes (MDS) and myeloproliferative neoplasms (MPNs) are types of blood cancer that can affect the bone marrow, the blood cells, the lymph nodes and other parts of the lymphatic system. These diseases may result from acquired mutations to the DNA of a single lymph- or blood-forming stem cell. With blood cancers, abnormal cells multiply and survive without the usual controls that are in place for healthy cells. The accumulation of these cells in the marrow, blood and/or lymphatic tissue interferes with production and functioning of red blood cells, white blood cells and platelets. The disease process can lead to severe anemia, bleeding, an impaired ability to fight infection and/or death.

Highlights from *Facts 2020-2021*

Prevalence

Prevalence is the estimated number of people alive on a certain date in a population who previously had a diagnosis of the disease.

An estimated 1,519,907 people in the United States (US) are living with or in remission from leukemia, lymphoma, myeloma, myelodysplastic syndromes (MDS) or myeloproliferative neoplasms (MPNs) (see Table 1).

Approximate US Prevalence of the Six Major Types of Blood Cancers as of January 1, 2017

Type	Prevalence
Leukemia^	397,501
Non-Hodgkin Lymphoma^	672,980
Hodgkin Lymphoma^	152,671
Myeloma^	138,415
Myelodysplastic Syndromes (MDS)*	58,471
Myeloproliferative Neoplasms (MPNs)*	99,869

Table 1. Source: *SEER (Surveillance, Epidemiology, and End Results) Cancer Statistics Review, 1975-2017.* National Cancer Institute; 2020.

^ 25-year limited-duration prevalence.

* 16-year limited-duration prevalence. Shorter duration prevalence required due to fewer years of reportability for these cancers.

New Cases

Approximately every 3 minutes, one person in the US is diagnosed with leukemia, lymphoma or myeloma.

- An estimated combined total of 186,400 people in the US are expected to be diagnosed with leukemia, lymphoma or myeloma in 2021 (see Figure 1).
- New cases of leukemia, lymphoma and myeloma are expected to account for 9.8 percent of the estimated 1,898,160 new cancer cases that will be diagnosed in the US in 2021.

Estimated New Cases (%) of Leukemia, Lymphoma and Myeloma, 2021

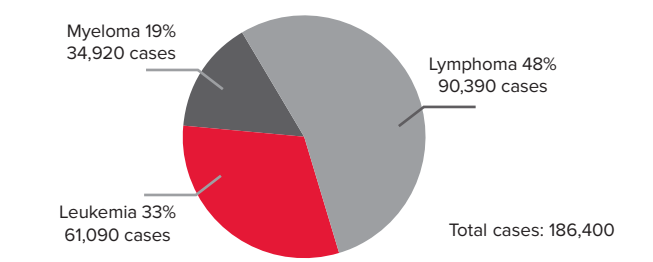

Figure 1. Source: *Cancer Facts & Figures 2021.* American Cancer Society; 2021.

Incidence

Incidence rates are the number of new cases that occur in a given year, not counting the preexisting cases. Incidence rates are usually presented as a specific number per 100,000 population. For large age groups, age-adjusted rates provide more reliable rates for comparison because they reduce the bias of age in the makeup of the populations that are being compared.

Overall age-adjusted incidence rates per 100,000 population reported in 2020 for leukemia, lymphoma and myeloma are close to data reported in 2019: leukemia 14.1 in 2020 and 2019; non-Hodgkin lymphoma (NHL) 19.6 in 2020 and 2019; Hodgkin lymphoma (HL) 2.6 in 2020 vs 2.7 in 2019; myeloma 7.0 in 2020 vs 6.9 in 2019.

Survival

Relative survival compares the survival rate of a person diagnosed with a disease to that of a person without the disease. The most recent survival data available may not fully represent the impact of all current therapies and, as a result, may underestimate current survival. Figure 2 shows 5-year relative survival rates.

Five-Year Relative Survival Rates by Year of Diagnosis

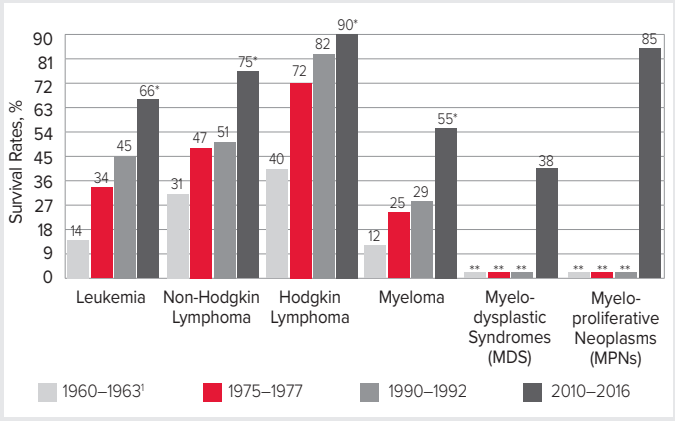

Figure 2. Source: *SEER (Surveillance, Epidemiology, and End Results) Cancer Statistics Review, 1975-2017*. National Cancer Institute; 2020.

* The difference in rates between 1975-1977 and 2010-2016 is statistically significant (P<.05).

** Due to shorter reportabliity period, long-term survival statistics are not available.

[1] Survival rate among whites.

Deaths

Approximately every 9 minutes, someone in the US dies from a blood cancer.* This statistic represents approximately 158 people each day or more than six people every hour.

- Leukemia, lymphoma and myeloma are expected to cause the deaths of an estimated 57,750 people in the US in 2021.
- These diseases are expected to account for 9.5 percent of the deaths from cancer in 2021, based on the estimated total of 608,570 cancer deaths.
- Overall, the likelihood of dying from blood cancer* decreased from 2000 to 2017 (the most recent data available). During this time, the mortality rate of leukemia decreased by 19.5 percent, lymphoma by 35.5 percent and myeloma by 17.5 percent.

Leukemia

- An estimated 397,501 people are living with or in remission from leukemia in the US.
- In 2021, 61,090 people are expected to be diagnosed with leukemia.
- In 2021, 23,660 people are expected to die from leukemia.
- Approximately 36.5 percent more males than females are living with leukemia. More males than females are diagnosed with leukemia and die of leukemia.
- Leukemia is the eleventh most common cancer in the US, and the age-adjusted incidence rate increased by 8.4 percent from 1975 (12.81 per 100,000) to 2017 (13.89 per 100,000).

Hodgkin and Non-Hodgkin Lymphoma

- An estimated 825,651 people are living with or in remission from lymphoma in the US.
- An estimated 152,671 people are living with or in remission from HL.
- An estimated 672,980 people are living with or in remission from NHL.
- In 2021, 90,390 new cases of lymphoma are expected to be diagnosed in the US (8,830 cases of HL, 81,560 cases of NHL).
- In 2021, 21,680 people are expected to die from lymphoma (960 from HL, 20,720 from NHL).
- NHL is the seventh most common cancer in the US, and the age-adjusted incidence rate increased by 74.1 percent from 1975 (11.06 per 100,000 population) to 2017 (19.26 per 100,000 population).

Myeloma

- An estimated 138,415 people are living with or in remission from myeloma in the US.
- In 2021, 34,920 people are expected to be diagnosed with myeloma.
- In 2021, approximately 12,410 people are expected to die from myeloma.
- The age-adjusted incidence rate of myeloma increased by 38.5 percent from 1975 (4.91 per 100,000) to 2017 (6.80 per 100,000).
- The age-adjusted incidence rate of myeloma in Black males and females (13.8 per 100,000) was 116 percent greater than that of white males and females (6.4 per 100,000) from 2013 to 2017.

Myelodysplastic Syndromes

- An estimated 58,471 people in the US are living with or in remission from MDS.
- An average of 15,099 new cases of MDS were diagnosed in the US each year from 2013 to 2017.
- The estimated overall age-adjusted incidence rate of MDS is 4.3 cases per 100,000 population. White males have the highest rate (6.3 per 100,000 population).

Myeloproliferative Neoplasms

- An estimated 99,869 people in the US are living with or in remission from MPNs.
- An average of 12,314 new cases of MPNs were diagnosed in the US each year from 2013 to 2017.
- The estimated overall age-adjusted incidence rate of MPNs is 3.3 cases per 100,000 population. White males have the highest rate (3.5 per 100,000 population).

**Data specified for "blood cancer" include leukemia, lymphoma and myeloma, and do not include data for myelodysplastic syndromes (MDS) or myeloproliferative neoplasms (MPNs).*

Childhood and Adolescent Blood Cancers

- An estimated 54,025 children and adolescents younger than 20 years in the US are living with or in remission from leukemia, lymphoma, myeloma, myelodysplastic syndromes (MDS) or myeloproliferative neoplasms (MPNs) (see Table 2).
- Leukemia is the most common cancer diagnosed in children and adolescents younger than 20 years and accounts for 25.1 percent of all cancer cases in this age-group.
- From 2013 to 2017, the most recent 5 years for which data are available, leukemia and lymphoma accounted for 39.0 percent of all cancer types in children and adolescents younger than 20 years.
- The most common types of cancer in children and adolescents younger than 20 years are leukemia (25.1 percent), cancers of the brain and other nervous tissue (17.1 percent), NHL (7.5 percent), HL (6.4 percent), and soft tissue (5.9 percent).
- The age-adjusted incidence rate of leukemia and lymphoma in children and adolescents younger than 20 years is 7.3 per 100,000 (leukemia, 4.7 and lymphoma, 2.6).
- Leukemia is the second leading cause of cancer deaths (after cancers of the brain and other nervous tissue) among children and adolescents younger than 20 years. This accounts for 26.1 percent of all cancer-related deaths among this age-group.
- From 2013-2017, 4.7 percent of all leukemia and lymphoma cases were diagnosed in children and adolescents younger than 20 years.
- From 2013-2017, 3.4 percent of all blood cancers (leukemia, lymphoma, myeloma, MDS and MPNs*) were diagnosed in children and adolescents younger than 20 years.

** Myeloma, MDS and MPNs are not commonly diagnosed in children and adolescents younger than 20 years.*

Approximate US Prevalence of the Six Major Types of Blood Cancers in Children and Adolescents Younger than 20 years as of January 1, 2017

Type	Prevalence
Leukemia^	41,080
Non-Hodgkin Lymphoma^	7,441
Hodgkin Lymphoma^	4,434
Myeloma^	37
Myelodysplastic Syndromes (MDS)*	545
Myeloproliferative Neoplasms (MPNs)*	488

Table 2. Source: SEER*Explorer: An interactive website for SEER cancer statistics [Internet]. Surveillance Research Program, National Cancer Institute. [Cited 2020 Sep 14]. Available from https://seer.cancer.gov/explorer/.

^ 25-year limited-duration prevalence.

* 16-year limited-duration prevalence. Shorter duration prevalence required due to fewer years of reportability for these cancers.

Young Adult Blood Cancers

- An estimated 163,878 adolescents and young adults (ages 15-39 years*) in the US are living with or in remission from leukemia, lymphoma, myeloma, myelodysplastic syndromes (MDS) or myeloproliferative neoplasms (MPNs) (see Table 3).
- Approximately 11 percent of all people living with blood cancers in the US are ages 15-39 years.
- From 2013-2017, 7.5 percent of all blood cancers (leukemia, lymphoma, myeloma, MDS and MPNs^) were diagnosed in adolescents and young adults ages 15-39 years.
- Lymphoma is the most common blood cancer diagnosed in adolescents and young adults ages 15-39 years and accounts for 62.1 percent of all blood cancer cases in this age group.
- In adolescents and young adults ages 15-39 years, lymphoma (HL and NHL combined) is the fourth most frequently occurring type of cancer in all races and ethnicities.
  - NHL is seventh most frequently occurring
  - HL is ninth most frequently occurring
- In adolescents and young adults ages 15-39 years, leukemia is the tenth most frequently occurring type of cancer in all races and ethnicities.
- From 2013 to 2017, the most recent 5 years for which data are available, leukemia and lymphoma accounted for 14.8 percent of all cancer types in adolescents and young adults ages 15-39 years.
  - Lymphoma accounted for 10.2 percent of all cancer cases in adolescents and young adults ages 15-39 years (NHL, 5.6 percent; HL, 4.6 percent).
  - Leukemia accounted for 4.6 percent of all cancer cases in adolescents and young adults ages 15-39 years.
- Leukemia is the fourth leading cause of cancer deaths among adolescents and young adults ages 15-39 years. This accounts for 10.4 percent of all cancer-related deaths among this age-group.
- NHL is the ninth leading cause of cancer deaths among adolescents and young adults ages 15-39 years. This accounts for 4.4 percent of all cancer-related deaths among this age-group.

** The reporting of adolescent and young adult cancer in this publication includes ages 15 through 39 years, in keeping with other major reporting sources. This grouping intentionally overlaps with the reporting of childhood cancers for ages under 20 years, accounting for a transitional phase between childhood and adult cancer.*

^ Myeloma, MDS and MPNs are not commonly diagnosed in adolescents and young adults ages 15-39 years.

Approximate US Prevalence of the Six Major Types of Blood Cancers in Adolescents and Young Adults Ages 15-39 as of January 1, 2017

Type	Prevalence
Leukemia^	62,526
Non-Hodgkin Lymphoma^	40,132
Hodgkin Lymphoma^	53,790
Myeloma^	1,336
Myelodysplastic Syndromes (MDS)*	1,346
Myeloproliferative Neoplasms (MPNs)*	4,748

Table 3. Source: SEER*Explorer: An interactive website for SEER cancer statistics [Internet]. Surveillance Research Program, National Cancer Institute. [Cited 2020 Sep 14]. Available from https://seer.cancer.gov/explorer/.

^ 25-year limited-duration prevalence.

* 16-year limited-duration prevalence. Shorter duration prevalence required due to fewer years of reportability for these cancers.

Race and Ethnicity

- An estimated 1,323,438 whites, 145,361 Blacks, 133,023 Hispanics,* 45,296 Asian/Pacific Islanders, and 4,798 American Indians/Alaska Natives are living with or in remission from blood cancers.
- From 2013-2017, of all blood cancer cases diagnosed, 84.1 percent were diagnosed in whites, 10.3 percent in Blacks, 9.3 percent in Hispanics,* 3.1 percent in Asian/Pacific Islanders, and 0.5 percent in American Indians/Alaska Natives.
- The age-adjusted incidence rates of all blood cancers combined are higher in whites than any other race or ethnicity. The age-adjusted incidence rate of myeloma is highest in Blacks (13.8 per 100,000), and was 116 percent greater than that of whites (6.4 per 100,000).
- From 2013-2017, of all deaths attributed to blood cancers, 86.5 percent were in whites, 10.3 percent in Blacks, 7.4 percent in Hispanics,* 2.7 percent in Asian/Pacific Islanders, and 0.3 percent in American Indians/Alaska Natives.
- From 2013-2017, 5-year relative survival rates were as follows: 66.5 percent in whites, 65.5 percent in Hispanics,* 64.3 percent in Blacks, 63.6 percent in American Indians/Alaska Natives, and 61.7 percent in Asian/Pacific Islanders.

** Hispanics are not mutually exclusive from whites, Blacks, Asian/Pacific Islanders, and American Indians/Alaska Natives. Incidence data for Hispanics are based on NAACCR Hispanic Identification Algorithm (NHIA) and exclude cases from the Alaska Native Registry*

See Tables 22-27 on pages 20–22.

Leukemia

"Leukemia" is the term used to describe the four major types of leukemia (see Table 4). Visit www.LLS.org/booklets to download or order copies of free booklets about leukemia.

The Four Major Types of Leukemia	
Acute Lymphoblastic Leukemia (ALL)	Chronic Lymphocytic Leukemia (CLL)
Acute Myeloid Leukemia (AML)	Chronic Myeloid Leukemia (CML)

Table 4. Source: The Leukemia & Lymphoma Society.

The terms "myeloid" or "myelogenous" and "lymphoid," "lymphocytic" or "lymphoblastic" denote the cell types involved. In general, leukemia is characterized by the uncontrolled accumulation of blood cells. However, the natural history of each type, and the therapies used to treat people with each type, are different.

Prevalence

An estimated 397,501 people in the United States (US) are living with or in remission from leukemia (see Table 5). Thirty-seven percent more males than females are living with leukemia.

Approximate US Prevalence of the Four Major Types of Leukemia as of January 1, 2017	
Type	Prevalence
Acute Lymphoblastic Leukemia	74,301
Chronic Lymphocytic Leukemia	181,666
Acute Myeloid Leukemia	55,548
Chronic Myeloid Leukemia	55,164

Table 5. Source: Surveillance, Epidemiology, and End Results (SEER) Program (www.seer.cancer.gov). Prevalence database: "US Estimated 25-Year L-D Prevalence Counts on 1/1/2017." National Cancer Institute, DCCPS, Surveillance Research Program, Data Modeling Branch, released April 2020, based on the November 2019 SEER data submission.

Acute lymphoblastic leukemia (ALL) and acute myeloid leukemia (AML) are diseases that progress rapidly without treatment. They result in the accumulation of immature, nonfunctional cells in the marrow and blood. The marrow often stops producing enough normal platelets, red blood cells and white blood cells. Anemia, a deficiency of red blood cells, develops in virtually everybody who has acute leukemia. The lack of normal white blood cells impairs the body's ability to fight infections. A shortage of platelets results in bruising and easy bleeding.

The progression of chronic lymphocytic leukemia (CLL) and chronic myeloid leukemia (CML) is usually slower than that of acute types of leukemia. The slower disease progression of chronic leukemia allows greater numbers of more mature, functional cells to be made.

New Cases

An estimated 61,090 new cases of leukemia are expected to be diagnosed in the US in 2021 (see Figure 3 and Table 6 below). Chronic leukemia is expected to account for 17.1 percent more cases than those of acute leukemia.

- Most cases of leukemia occur in older adults; the median age at diagnosis is 67 years.
- From 2013 to 2017, approximately 12 times as many adults over age 19 years (an average of 46,194 each year) were diagnosed with leukemia as children and adolescents younger than 20 years (an average of 3,715 each year).
- The most common types of leukemia in adults older than 19 years are CLL (39.9% of all new leukemia cases from 2013 to 2017) and AML (31.2% of all new leukemia cases from 2013 to 2017). CML accounted for 14.4 percent of new leukemia cases and ALL accounted for 5.5 percent of new leukemia cases in this age-group from 2013 to 2017.
- Most cases of CML occur in adults. From 2013 to 2017, approximately 97.9 percent of all cases of CML occurred in adults age 20 years and older.

Estimated Proportion of New Cases (%) in 2021 for Types of Leukemia, Adults and Children

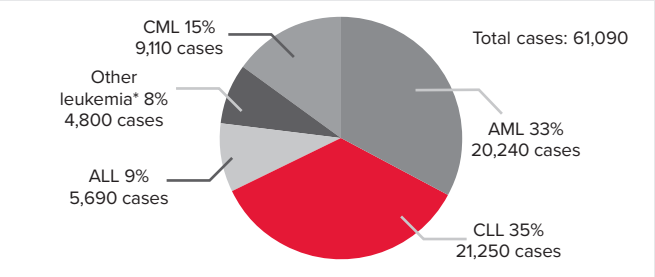

Figure 3. Source: *Cancer Facts & Figures 2021.* American Cancer Society; 2021.

Estimated New Cases of Leukemia, by Sex, 2021			
Type	Total	Male	Female
Acute Lymphoblastic Leukemia	5,690	3,000	2,690
Chronic Lymphocytic Leukemia	21,250	13,040	8,210
Acute Myeloid Leukemia	20,240	11,230	9,010
Chronic Myeloid Leukemia	9,110	5,150	3,960
Other Leukemia*	4,800	3,110	1,690
Total	**61,090**	**35,530**	**25,560**

Table 6. Source: *Cancer Facts & Figures 2021.* American Cancer Society; 2021.

* *There are other rare subtypes of leukemia, beyond the four main subtypes, which comprise "Other Leukemia."*

Incidence

Since 1975, the incidence of leukemia has increased slightly. In 1975 the incidence rate was 12.8 per 100,000 population and in 2017, it was 13.9 per 100,000 population. See Figure 4 below for age-specific rates.

Sex. In 2021, approximately 58 percent of the new cases of leukemia are expected to occur in males. Incidence rates for all types of leukemia are higher among males than among females:

- ALL – 2.0 per 100,000 for males, 1.5 per 100,000 for females
- AML – 5.2 per 100,000 for males, 3.6 per 100,000 for females
- CLL – 6.8 per 100,000 for males, 3.5 per 100,000 for females
- CML – 2.5 per 100,000 for males, 1.5 per 100,000 for females.

Race and Ethnicity. Leukemia is the eleventh most frequently occurring type of cancer in all races and ethnicities.

- Age-adjusted incidence of leukemia is highest among non-Hispanic whites (15.4 per 100,000 population); it is lowest among Asian and Pacific Islander populations (8.0 per 100,000 population) and American Indian and Alaska Native populations (8.1 per 100,000 population).
- Leukemia is the tenth most common cancer in whites, eleventh most common cancer in Blacks, and twelfth most common cancer in Hispanics.
- In children and adolescents younger than 20 years, leukemia incidence rates are highest among Hispanics (6.2 per 100,000 population) and lowest among Blacks (3.2 per 100,000 population). The incidence rate in whites is 5.3 per 100,000 population.

Children and Adolescents. From 2013 to 2017, leukemia represented 25.1 percent of all types of cancer occurring among children and adolescents younger than 20 years.

- In 2021, about 2,940 children and adolescents younger than 15 years are expected to be diagnosed with leukemia throughout the US.
- About 31.0 percent of cancer cases in children and adolescents younger than 15 years are leukemia.
- An average of 3,715 children and adolescents younger than 20 years were diagnosed with leukemia each year (including 2,751 diagnosed with ALL) in the US from 2013 to 2017.
- ALL is the most common cancer in children and adolescents younger than 20 years, accounting for 18.7 percent of all cancer cases in this age-group.
- ALL is the most common type of leukemia in children and adolescents younger than 20 years, accounting for 74.5 percent of all types of new leukemia cases in this age-group from 2013 to 2017.
- From 1975 to 2017, incidence rates increased for childhood, adolescent and young adult ALL (1.9 in 1975 vs 3.4 in 2017) and AML (0.6 in 1975 vs 1.0 in 2017).
- The highest incidence rates for ALL are seen in children and adolescents younger than 15 years (see Figure 5 on page 8.) Within this group, the highest rate is in children ages 1–4 years (7.6 per 100,000 population).
- The incidence of ALL in children ages 1–4 years (7.6 per 100,000 population) is approximately 11 times greater than the rate for young adults ages 30–34 years (0.7 per 100,000 population).
- In children and adolescents younger than 20 years, AML incidence is highest in children under 1 year (1.6 per 100,000 population) and lowest in children ages 5–9 years (0.4 per 100,000 population) (see Figure 6 on page 8).
- From 2013 to 2017, among children ages 5–9 years, ALL incidence was nine times greater than that of AML (3.6 per 100,000 for ALL and 0.4 per 100,000 for AML).
- In young adults ages 25–29 years, AML incidence was 50 percent greater than that of ALL (1.2 per 100,000 for AML and 0.8 per 100,000 for ALL).

Adults. AML, CLL and CML are most prevalent in the sixth through ninth decades of life. Incidence rates begin to increase notably among people with

- AML – at age 60 years and older (see Figure 6 on page 8)
- CLL – at age 50 years and older (see Figure 7 on page 8)
- CML – at age 60 years and older (see Figure 8 on page 9).

Age-Specific Incidence Rates for Leukemia, 2013-2017

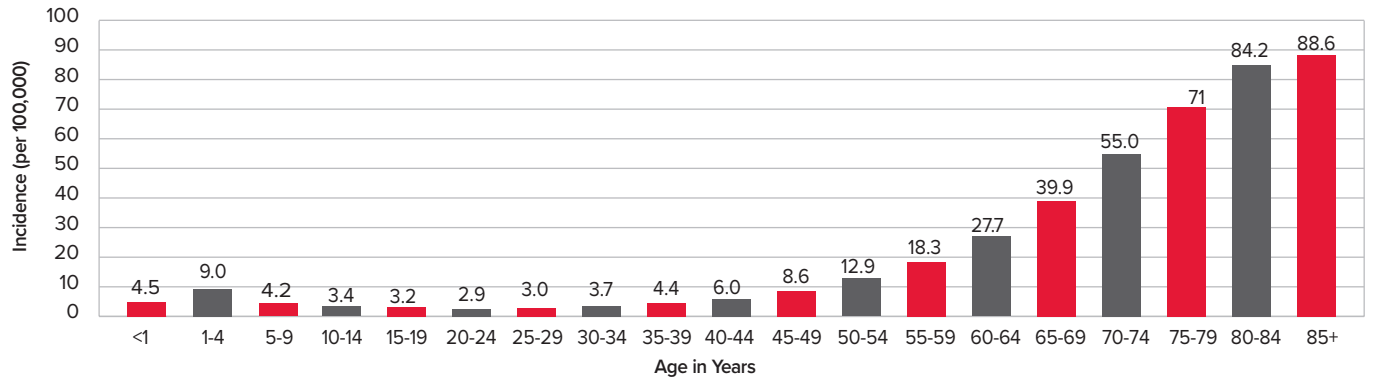

Figure 4. Source: *SEER (Surveillance, Epidemiology, and End Results) Cancer Statistics Review, 1975-2017.* National Cancer Institute; 2020.

Age-Specific Incidence Rates for Acute Lymphoblastic Leukemia (ALL), 2013-2017

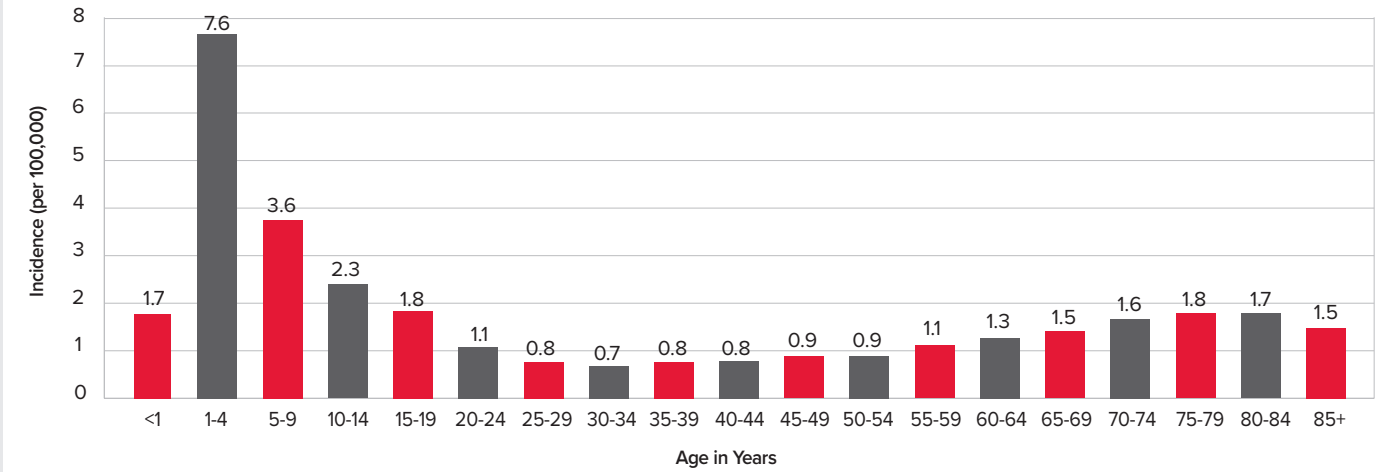

Figure 5. Source: *SEER (Surveillance, Epidemiology, and End Results) Cancer Statistics Review, 1975-2017.* National Cancer Institute; 2020.

Age-Specific Incidence Rates for Acute Myeloid Leukemia (AML), 2013-2017

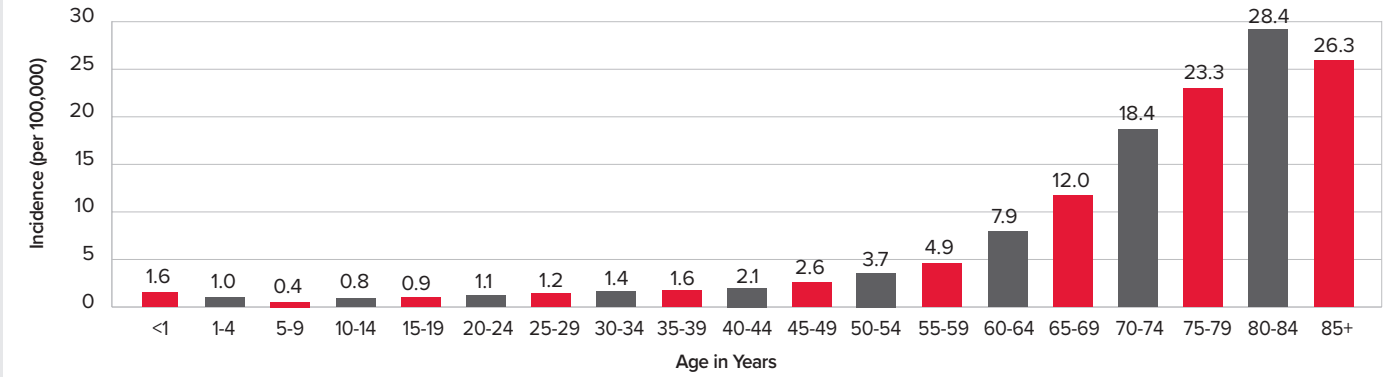

Figure 6. Source: *SEER (Surveillance, Epidemiology, and End Results) Cancer Statistics Review, 1975-2017.* National Cancer Institute; 2020.

Age-Specific Incidence Rates for Chronic Lymphocytic Leukemia (CLL), 2013-2017

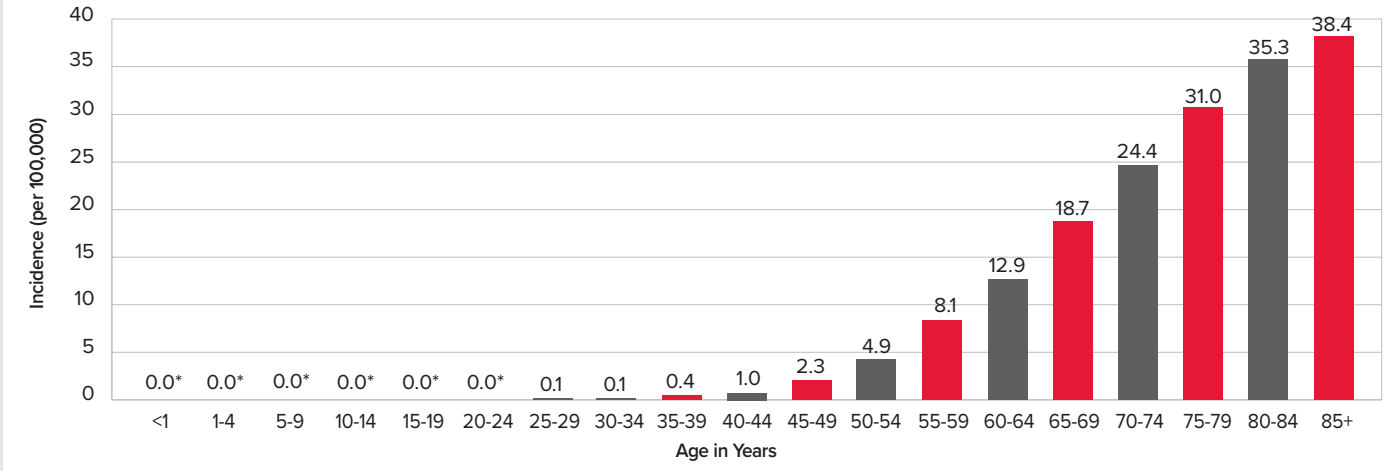

Figure 7. Source: *SEER (Surveillance, Epidemiology, and End Results) Cancer Statistics Review, 1975-2017.* National Cancer Institute; 2020.
* < 16 cases for each age and time interval, SEER 21 areas

Age-Specific Incidence Rates for Chronic Myeloid Leukemia (CML), 2013-2017

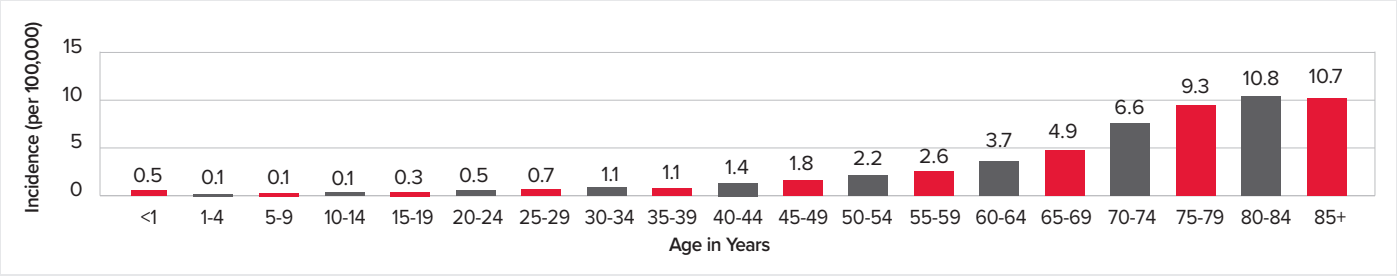

Figure 8. Source: *SEER (Surveillance, Epidemiology, and End Results) Cancer Statistics Review, 1975-2017.* National Cancer Institute; 2020.

Signs and Symptoms

Signs and symptoms of acute leukemia may include easy bruising or bleeding (because of platelet deficiency), paleness or easy fatigue (because of anemia), and/or recurrent minor infections or poor healing of minor cuts (because of a low white blood cell count). These signs and symptoms are not unique to leukemia and may be caused by other, more common conditions. Nonetheless, they do justify medical evaluation. The diagnosis of leukemia requires specific blood tests, including an examination of cells in the blood and bone marrow. People who have chronic leukemia may not have major signs or symptoms; they may be diagnosed as a result of a periodic physical examination and testing.

Possible Causes

The cause of most cases of leukemia is not known. Extraordinary doses of radiation and certain cancer therapies are possible causes. Repeated exposure to the chemical benzene may cause acute myeloid leukemia (AML). Automobile exhaust and industrial emissions account for about 20 percent of the total national benzene exposure. About half of the benzene exposure in the US population results from tobacco smoking or from exposure to tobacco smoke. The average smoker is exposed to about 10 times the daily intake of benzene compared to nonsmokers.

Treatment

The goal of leukemia treatment is to bring about a complete remission. Patients with acute myeloid leukemia (AML) and acute lymphoblastic leukemia (ALL) need to start treatment soon after diagnosis. Treatment may include chemotherapy, targeted therapies, monoclonal antibody therapy, immunotherapy and stem cell transplantation. Patients diagnosed with chronic myeloid leukemia (CML) are usually treated with tyrosine kinase inhibitors, oral drugs that may need to be taken indefinitely to keep CML under control. Some patients diagnosed with chronic lymphocytic leukemia (CLL) do not need treatment for a long period of time after diagnosis; this period is sometimes called "watch-and-wait." Patients who need treatment may receive chemotherapy, targeted therapy, monoclonal antibody therapy or treatments in combination. All patients should consider new approaches under study (clinical trials).

Survival

Relative survival rates vary according to a person's age at diagnosis, sex, race and type of leukemia. The 5-year relative survival rate for leukemia has more than quadrupled, from 14 percent in whites from 1960 to 1963 (the only data available) to 66.4 percent for all races from 2010 to 2016 (see Table 7 below; percentages in Table 7 are rounded to the nearest integer).

From 2010 to 2016, the 5-year relative survival rates overall were

- ALL – 72.1 percent overall, 92.5 percent for children and adolescents younger than 15 years, and 94.4 percent for children younger than 5 years
- AML – 29.8 percent overall and 70.6 percent for children and adolescents younger than 15 years
- CLL – 88.6 percent
- CML – 71.7 percent.*

** The survival rate of CML in clinical trials is higher than the survival rate reported here, based on SEER data. It is speculated that close clinical monitoring and better medication adherence in clinical trials are associated with a lower risk of disease progression and higher rates of survival.*

Sex. From 2010 to 2016, 5-year relative survival for leukemia was 67.6 percent for males and 64.8 percent for females.

Race and Ethnicity. Table 7 shows the 5-year survival rates, rounded to the nearest integer, spanning 4 decades.

Trends in Five-Year Relative Survival Rates for Leukemia, by Subtype, Race and Year of Diagnosis

Leukemia	1975-1977	1984-1986	1996-1998	2010-2016
All Races	34%	41%	48%	66%*
Whites	35%	42%	50%	67%*
Blacks	33%	33%	39%	63%*
ALL	**1975-1977**	**1984-1986**	**1996-1998**	**2010-2016**
All Races	41%	52%	66%	72%*
Whites	41%	53%	66%	72%*
Blacks	34%	36%	56%	66%*
AML	**1975-1977**	**1984-1986**	**1996-1998**	**2010-2016**
All Races	6%	11%	17%	30%*
Whites	6%	10%	16%	29%*
Blacks	10%	10%	22%	31%*
CLL	**1975-1977**	**1984-1986**	**1996-1998**	**2010-2016**
All Races	67%	72%	76%	89%*
Whites	68%	73%	77%	89%*
Blacks	57%	67%	58%	81%*
CML	**1975-1977**	**1984-1986**	**1996-1998**	**2010-2016**
All Races	22%	23%	37%	72%*
Whites	21%	23%	38%	71%*
Blacks	28%	21%	31%	78%*

Table 7. Source: *SEER (Surveillance, Epidemiology, and End Results) Cancer Statistics Review, 1975-2017.* National Cancer Institute; 2020.

* The difference between 1975-1977 and 2010-2016 is statistically significant (P < .05).

Children and Adolescents. Figure 9 shows that childhood ALL 5-year relative survival rates have improved significantly over the past 5 decades. Most children and adolescents younger than 20 years who have ALL are expected to become 5-year survivors of the disease. However, significant treatment-related long-term morbidity and mortality for childhood cancer have been well established by several studies. Long-term treatment-related effects among ALL and other childhood cancer survivors may include cognitive impairment, subsequent cancer, cardiac disease, pulmonary disease or other diseases.

Five-Year Relative Survival Rates for Acute Lymphoblastic Leukemia in Children Under 15, Diagnosed 1964-2016

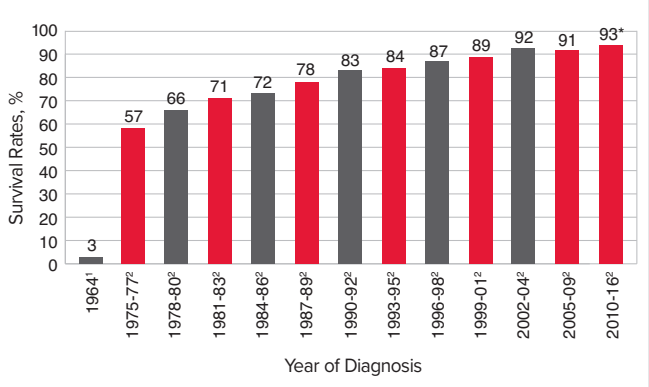

Figure 9. Sources: 1. Zuelzer WW. Implications of long-term survivals in acute stem cell leukemia of childhood treated with composite cyclic therapy. *Blood.* 1964:24:477-494. 2. *SEER (Surveillance, Epidemiology, and End Results) Cancer Statistics Review, 1975-2017*. National Cancer Institute; 2020.

* The difference in rates between 1975-1977 and 2010-2016 is statistically significant (P<.05).

Deaths

Approximately 23,660 deaths (13,900 males and 9,760 females) in the US are expected to be attributed to leukemia in 2021. Estimated deaths for the four major types of leukemia in 2021 are

- ALL – 1,580 deaths
- AML – 11,400 deaths
- CLL – 4,320 deaths
- CML – 1,220 deaths
- Other leukemia* – 5,140 deaths.

In general, mortality rates for leukemia decreased from 1975 (8.1 per 100,000) to 2017 (6.2 per 100,000).

Sex. From 2013 to 2017, leukemia was the sixth most common cause of cancer deaths in males and the seventh most common cause of cancer deaths in females in the US. In 2021, the estimated number of deaths expected to be attributed to leukemia in the US is 42.4 percent higher for males than it is for females. Expected deaths from leukemia in 2021, according to sex, are shown in Table 8.

Estimated Deaths from Leukemia, by Sex, 2021

Type	Total	Male	Female
Acute Lymphoblastic Leukemia	1,580	900	680
Chronic Lymphocytic Leukemia	4,320	2,620	1,700
Acute Myeloid Leukemia	11,400	6,620	4,780
Chronic Myeloid Leukemia	1,220	680	540
Other Leukemia*	5,140	3,080	2,060
Total	**23,660**	**13,900**	**9,760**

Table 8. Source: *Cancer Facts & Figures* **2021**. American Cancer Society; 2021.

Race and Ethnicity. For leukemia, the highest age-adjusted rates of death from 2013 to 2017 were in non-Hispanic whites at 6.8 per 100,000 population, followed by Blacks at 5.4 per 100,000 population and Hispanic whites at 4.9 per 100,000 population.

- Leukemia is the sixth most common cause of cancer deaths in both white males and white females.
- Leukemia is the eighth most common cause of cancer deaths in Black males and the ninth most common in Black females.
- From 2013 to 2017, Blacks between the ages of 30 and 64 years had a higher death rate from leukemia than whites.

Children and Adolescents. The leukemia age-adjusted death rate for children and adolescents younger than 20 years in the US has declined by 78.6 percent from 2.8 per 100,000 population in 1969 to 0.6 per 100,000 population in 2017. Despite this decline, leukemia is the second leading cause of cancer death among children and adolescents younger than 20 years, accounting for 26.1 percent of all cancer deaths in this age-group.

* *There are other rare subtypes of leukemia, beyond the four main subtypes, which comprise "Other Leukemia."*

Hodgkin and Non-Hodgkin Lymphoma

"Lymphoma" is a general term for many blood cancers that originate in the lymphatic system. Visit www.LLS.org/booklets to download or order copies of free booklets about lymphoma.

Lymphoma results when a lymphocyte (a type of white blood cell) undergoes a malignant change and multiplies out of control. Eventually, healthy cells are crowded out and malignant lymphocytes amass in the lymph nodes, liver, spleen and/or other sites in the body.

Hodgkin Lymphoma (HL). This disease has characteristics that distinguish it from other diseases classified as lymphoma, including the presence of Reed-Sternberg cells, which are large, abnormal B lymphocytes found in a tissue sample.

Non-Hodgkin Lymphoma (NHL). This disease comprises a diverse group of diseases (subtypes) that are distinguished by the characteristics of the cancer cells associated with each disease type. The designations "indolent" and "aggressive" are often applied to types of NHL. Each type is associated with factors that categorize the prognosis as either more or less favorable.

Prevalence

An estimated total of 825,651 people in the United States (US) are living with or in remission from lymphoma.

- There are 152,671 people living with or in remission from Hodgkin lymphoma.
- There are 672,980 people living with or in remission from non-Hodgkin lymphoma.

New Cases

About 90,390 people in the United States (US) are expected to be diagnosed with lymphoma in 2021 (8,830 cases of HL and 81,560 cases of NHL). NHL represents 90.2 percent of all types of lymphoma expected to be diagnosed in 2021. HL represents 9.8 percent of all types of lymphoma expected to be diagnosed in 2021.

The incidence of HL is consistently and considerably lower than that of NHL. Table 9 shows estimated new cases of lymphoma in 2021, by sex.

Estimated New Cases of Lymphoma, by Sex, 2021

Type	Total	Male	Female
Hodgkin Lymphoma	8,830	4,830	4,000
Non-Hodgkin Lymphoma	81,560	45,630	35,930
Total	90,390	50,460	39,930

Table 9. Source: *Cancer Facts & Figures 2021.* American Cancer Society; 2021.

Incidence

From 2013 to 2017, the age-adjusted incidence rate for lymphoma was 22.2 per 100,000. See Figure 10 (on page 12) for age-specific rates.

- The age-adjusted incidence rate for HL was 2.6 per 100,000.
- The age-adjusted incidence rate for NHL was 19.6 per 100,000.

The age-adjusted incidence rate of HL declined by 25.9 percent from 1975 (3.09 per 100,000) to 2017 (2.29 per 100,000), an annual percentage decrease of 0.6 percent. The age-adjusted incidence rate of NHL rose by 74.1 percent from 1975 (11.06 per 100,000) to 2017 (19.26 per 100,000), an average annual percentage increase of 1.8 percent.

Sex. Age-adjusted incidence rates for HL and NHL are higher among males than among females.

- HL – 2.9 per 100,000 for males; 2.3 per 100,000 for females
- NHL – 23.8 per 100,000 for males; 16.2 per 100,000 for females

In 2021, it is expected that 20.8 percent more males than females will be diagnosed with HL and about 27.0 percent more males than females will be diagnosed with NHL.

NHL is the sixth most common cancer in males and the seventh most common cancer in females in the US.

Race and Ethnicity. The highest age-adjusted incidence rate of lymphoma is in non-Hispanic whites (24.0 per 100,000), followed by Hispanic whites (20.9 per 100,000) and Blacks (17.4 per 100,000).

- The highest age-adjusted incidence rate of HL is in non-Hispanic whites (3.0 per 100,000), followed by Blacks (2.7 per 100,000) and Hispanic whites (2.4 per 100,000).
- The highest age-adjusted incidence rate of NHL is in non-Hispanic whites (21.0 per 100,000), followed by Hispanic whites (18.5 per 100,000) and Blacks (14.7 per 100,000).

Blacks, from their early-20s to their late-40s, have higher incidence rates of NHL than whites. However, beginning at age 50 years, whites generally have considerably higher incidence rates of NHL than Blacks.

Children and Adolescents. Lymphoma (HL, 6.4 percent; NHL, 7.5 percent) is the third most common cancer in children and adolescents younger than 20 years.

- In 2021, an estimated 945 new cases of lymphoma are expected to be diagnosed in children and adolescents younger than 15 years in the US. This will account for 9 percent of all cancers expected to be diagnosed in this age-group.
- In children younger than 15 years, the age-adjusted incidence rate for NHL (1.1 per 100,000) is higher than for HL (0.6 per 100,000).
- In adolescents and young adults ages 15–29, the age-adjusted incidence rate for HL (3.8 per 100,000) is higher than it is for NHL (2.7 per 100,000).
- In young adults ages 30–34, NHL incidence (4.9 per 100,000) is higher than HL incidence (3.5 per 100,000).

The following data are based on age-adjusted incidence rates for children and adolescents younger than 20 years:

- Lymphoma is most commonly diagnosed in non-Hispanic whites (3.0 per 100,000 population), followed by Blacks (2.3 per 100,000 population).
- Lymphoma is least commonly diagnosed among American Indians and Alaska Natives (1.2 per 100,000 population).

Adults. HL incidence rates are higher in adolescents and young adults ages 15–34 years than in adults ages 35–64 years. Incidence is highest at ages 20–24 and at ages 75–79 years (see Figure 11).

In contrast, the incidence rates of NHL increase with age (see Figure 12 on page 13).

- From ages 20–24 years, the incidence rate of NHL is 2.7 cases per 100,000 population.
- From ages 60–64 years, the incidence rate increases 16 times to 44.3 cases per 100,000 population.
- From ages 80–84 years, the incidence rate increases 44 times to 118.8 cases per 100,000 population.

Age-Specific Incidence Rates for Lymphoma, 2013-2017

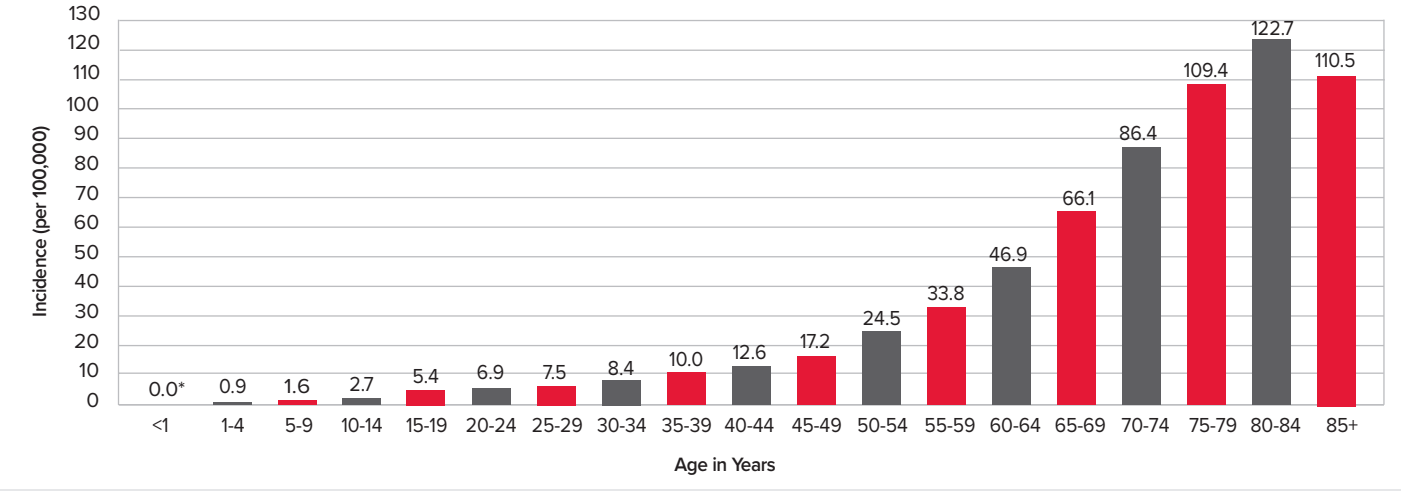

Figure 10. Source: *Surveillance, Epidemiology, and End Results (SEER)* Program (www.seer.cancer.gov) SEER* Stat Database: Incidence - SEER Research Limited-Field Data, 21 Registries, Nov 2019 Sub (2000-2017) - Linked To County Attributes - Time Dependent (1990-2017) Income/Rurality, 1969-2018 Counties, National Cancer Institute, DCCPS, Surveillance Research Program, released April 2020, based on the November 2019 submission.

* <16 cases for each age and time interval, SEER 21 areas

Age-Specific Incidence Rates for Hodgkin Lymphoma (HL), 2013-2017

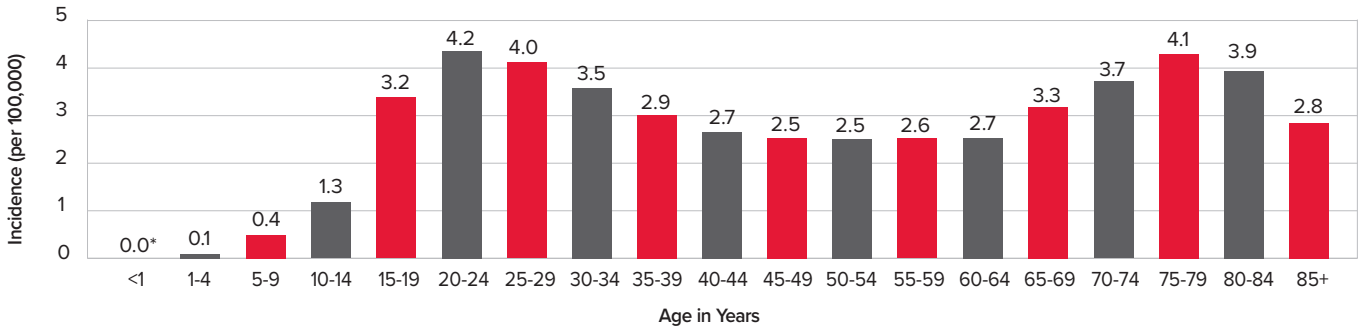

Figure 11. Source: *SEER (Surveillance, Epidemiology, and End Results) Cancer Statistics Review, 1975-2017.* National Cancer Institute; 2020.

* <16 cases for each age and time interval, SEER 21 areas

Age-Specific Incidence Rates for Non-Hodgkin Lymphoma (NHL), 2013-2017

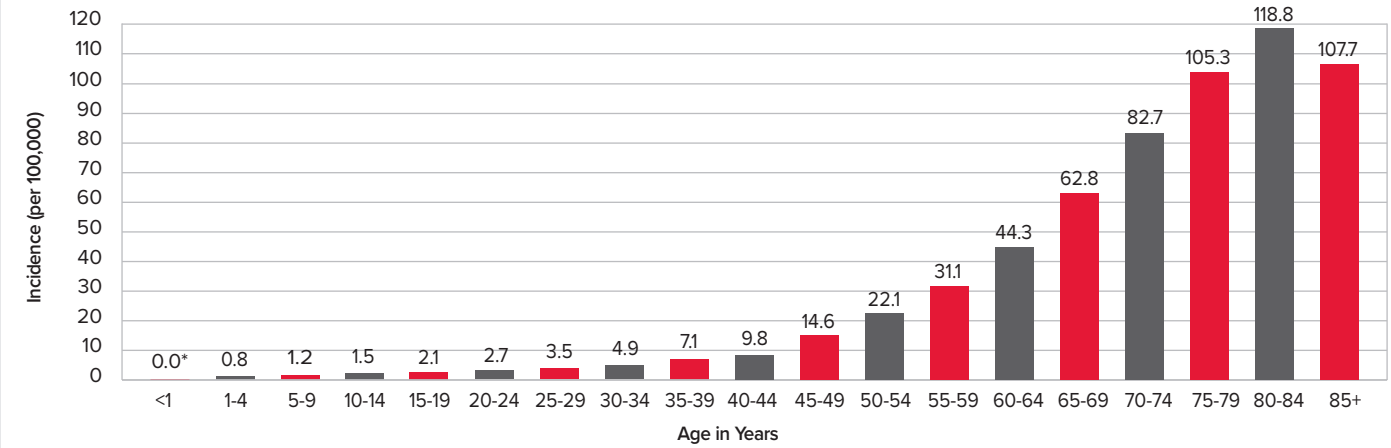

Figure 12. Source: *SEER (Surveillance, Epidemiology, and End Results) Cancer Statistics Review, 1975-2017.* National Cancer Institute; 2020.
* < 16 cases for each age and time interval, SEER 21 areas

Signs and Symptoms

A common early sign of HL or NHL is a painless enlargement of one or more lymph nodes. Enlarged lymph nodes may also be the result of inflammation in the body and are not necessarily a sign of cancer.

Other HL signs and symptoms may include recurrent high fever, persistent cough and shortness of breath, drenching night sweats of the whole body, itching and weight loss.

Other signs and symptoms of NHL may include bone pain, cough, chest pain, abdominal pain, rash, fever, night sweats, enlarged spleen, unexplained fatigue or weight loss. Some individuals may have no signs or symptoms, and a diagnosis of NHL is made as a result of a periodic physical examination and testing.

Possible Causes

The results of certain studies about causes of HL have not been definitive—many studies of links between HL and environmental exposures have been conducted, with unclear results. Although Epstein-Barr virus (EBV) has been associated with nearly half of HL cases, EBV has not been conclusively established as a cause. People infected with human immunodeficiency virus (HIV) have increased probability of developing HL.

The reasons for the development of NHL are not known. Immune suppression plays a role in some cases. People infected with HIV have a higher risk of developing NHL. Studies suggest that specific ingredients in herbicides and pesticides may be linked to NHL. Exposure to certain viruses, such as EBV and human T-lymphotropic virus (HTLV), are also associated with NHL.

The bacterium *Helicobacter pylori* causes ulcers in the stomach, and it is associated with the development of mucosa-associated lymphoid tissue (MALT) lymphoma in the stomach wall. About a dozen uncommon, inherited syndromes can predispose individuals to develop NHL. These risk factors explain only a small proportion of cases.

Treatment

The goal of treatment for HL is to cure the disease. Chemotherapy, either alone or combined with an antibody-drug conjugate or modality therapy (chemotherapy and radiation), is a commonly administered treatment approach for HL. Involved site radiation therapy (ISRT) is the most common type of radiotherapy used to treat HL. The radiation targets primarily the lymph node regions involved by disease. Chemotherapy is used to kill neighboring lymphoma cells.

In general, the goal of treatment for NHL is to destroy as many lymphoma cells as possible and to induce a complete remission. Treatment protocols vary according to the subtype of disease. Chemotherapy and radiation therapy are the two principal forms of treatment. Although radiation therapy is often neither the sole nor the principal curative therapy, it is an important additional treatment in some cases. Immunotherapy is indicated to treat individuals with specific types of NHL. Stem cell transplantation and a watch-and-wait strategy are also used to treat some NHL subtypes.

Survival

HL is now considered to be one of the most curable forms of cancer.

- The 5-year relative survival rate for people with HL has more than doubled, from 40 percent in whites from 1960 to 1963 (the only data available) to 89.6 percent for all races from 2010 to 2016.
- The 5-year relative survival rate is 95.1 percent for all people with HL who were younger than 45 years at diagnosis.

The 5-year relative survival rate for people with NHL has risen from 31 percent in whites from 1960 to 1963 (the only data available) to 75.1 percent for all races from 2010 to 2016.

- The 5-year relative survival rate is 84.7 percent for all people with NHL who were younger than 45 years at diagnosis.

Sex. From 2010 to 2016, 5-year relative survival rates were

- HL – 88.3 per 100,000 for males and 91.3 per 100,000 for females
- NHL – 74.3 per 100,000 for males and 76.1 per 100,000 for females.

Race and Ethnicity. Table 10 shows the 5-year relative survival rates, rounded to the nearest integer, spanning 4 decades.

Children and Adolescents. Five-year relative survival is 98.2 percent for HL in children and adolescents younger than 20 years.

In children and adolescents younger than 20 years, 5-year relative survival for NHL is 89.5 percent. This represents a significant improvement in the rate of survival.

As recently as the mid-1970s, most children and adolescents with NHL did not survive 5 years after they were diagnosed (44.6 percent from 1975-1977).

Trends in Five-Year Relative Survival Rates for Lymphoma, by Subtype, Race and Year of Diagnosis

Lymphoma	1975-1977	1984-1986	1996-1998	2010-2016
All Races	53%	57%	63%	77%*
Whites	53%	57%	63%	78%*
Blacks	56%	53%	60%	74%*
Hodgkin Lymphoma	**1975-1977**	**1984-1986**	**1996-1998**	**2010-2016**
All Races	72%	78%	85%	90%*
Whites	72%	79%	86%	90%*
Blacks	70%	75%	81%	87%*
Non-Hodgkin Lymphoma	**1975-1977**	**1984-1986**	**1996-1998**	**2010-2016**
All Races	47%	52%	59%	75%*
Whites	47%	52%	59%	76%*
Blacks	49%	47%	55%	72%*

Table 10. Source: *SEER (Surveillance, Epidemiology, and End Results) Cancer Statistics Review, 1975-2017*. National Cancer Institute; 2020.
* The difference between 1975-1977 and 2010-2016 is statistically significant (P < .05).

Deaths

In 2021, an estimated 21,680 members of the US population are expected to die from lymphoma (960 HL and 20,720 NHL), as shown in Table 11.

Estimated Deaths from Lymphoma, by Sex, 2021

Type	Total	Male	Female
Hodgkin Lymphoma	960	570	390
Non-Hodgkin Lymphoma	20,720	12,170	8,550
Total	**21,680**	**12,740**	**8,940**

Table 11. Source: *Cancer Facts & Figures 2021*. American Cancer Society; 2021.

Sex. NHL is the eighth most common cause of cancer death in males and females in the US. Death rates for HL are much lower than those for NHL for both males and females.

- Males – 0.4 per 100,000 for HL; 7.1 per 100,000 for NHL
- Females – 0.2 per 100,000 for HL; 4.2 per 100,000 for NHL

Race and Ethnicity. For NHL, the highest age-adjusted rates of death from 2013 to 2017 were in non-Hispanic whites at 5.8 per 100,000 population, followed by Hispanic whites at 5.0 per 100,000 population.

Children and Adolescents. For children and adolescents under 20 years, age-adjusted death rates for HL and NHL per 100,000 population declined from 1975 to 2017.

- For HL, the rate was 0.1 in 1975 vs 0.0* in 2017.
- For NHL, the rate was 0.4 in 1975 vs 0.1 in 2017.

** Statistic is not reported due to fewer than 16 deaths.*

Myeloma

Myeloma is a cancer of the plasma cells (a type of white blood cell). Plasma cells are found primarily in the bone marrow. Visit www.LLS.org/booklets to download or order copies of free booklets about myeloma.

About 90 percent of people with myeloma have disease involving multiple sites at the time of diagnosis (multiple myeloma). Some individuals have myeloma that progresses very slowly (sometimes referred to as "smoldering" or "indolent" myeloma).

In myeloma, a B lymphocyte (the cell type that forms plasma cells) becomes malignant. Eventually, malignant plasma cells (myeloma cells) amass in the marrow and sometimes in other sites in the body. The myeloma cells disrupt normal blood production, destroy normal bone tissue and cause pain. Healthy plasma cells produce immunoglobulins (antibodies) that protect the body against certain types of infection. The onset of myeloma interferes with antibody production, making people with myeloma susceptible to infection and other serious complications.

Prevalence

An estimated 138,415 people in the United States (US) are living with or in remission from myeloma.

New Cases

An estimated 34,920 new cases of myeloma (19,320 males and 15,600 females) are expected to be diagnosed in the US in 2021 (see Table 12).

The median age at diagnosis is 69 years; myeloma is seldom diagnosed in people younger than 40 years.

Estimated New Cases of Myeloma, by Sex, 2021

Cancer Type	Total	Male	Female
Myeloma	34,920	19,320	15,600

Table 12. Source: *Cancer Facts & Figures 2021.* American Cancer Society; 2021.

Incidence

For the years 2013 to 2017, the age-adjusted incidence rate for myeloma was 7.0 per 100,000.

Sex. The age-adjusted incidence rate for the years 2013 to 2017 was 54.4 percent higher in males (8.8 per 100,000 population) than it was in females (5.7 per 100,000 population).

Race and Ethnicity. From 2013 to 2017, myeloma was the ninth most commonly diagnosed cancer among Black males and females.

- The median age at diagnosis is 66 years for Blacks and 70 years for whites.
- Blacks have more than twice the age-adjusted incidence rate (13.8 per 100,000 population) of myeloma than whites (6.4 per 100,000 population).
- Black males have a higher age-adjusted myeloma incidence rate (16.5 per 100,000) than males or females of any other race or ethnicity.
- The highest incidence rate is found in Black males who are ages 80–84 (115.3 per 100,000 population).

Age. Figure 13 shows the age-specific incidence rates for myeloma for the years 2013 to 2017.

Age-Specific Incidence Rates for Myeloma, 2013-2017

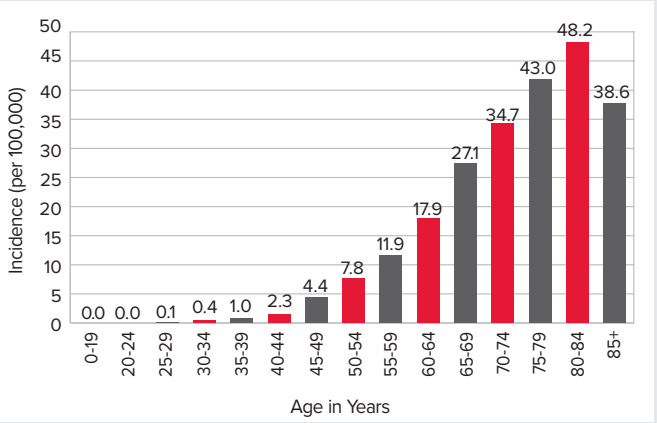

Figure 13. Source: *SEER (Surveillance, Epidemiology, and End Results) Cancer Statistics Review, 1975-2017.* National Cancer Institute; 2020.

Signs and Symptoms

The first symptom of myeloma is often bone pain from the effects that myeloma cells are having on the marrow. Fractures may occur because of the weakened bones. Anemia, recurrent infections, or numbness or pain in the hands and/or feet (caused by a condition called "peripheral neuropathy") can also be early signs and symptoms of the disease. People with myeloma may also tire more easily and feel weak, or they may have no signs or symptoms.

Possible Causes

The cause of myeloma is unknown in most cases. Long-term exposure to certain chemicals seems to increase the risk of developing myeloma, but most people who have myeloma do not have any history of such exposure, indicating that other factors must play a major role. Most people diagnosed with myeloma are older than 50 years and Blacks are more likely to develop myeloma than whites. Research suggests that obese people have a higher incidence of myeloma. Some studies indicate that firefighters are at a higher risk for many types of cancer, including myeloma. There are presently clinical trials going on to look at possible causes and precursors of myeloma. Contact an LLS Information Specialist at (800) 955-4572 for more information.

Treatment

The goals of treatment for people with myeloma are to reduce symptoms, to slow disease progression and to provide prolonged remission. There have been significant treatment advances in recent years. The approach for treating each person is customized, based on the extent of disease and the rate of disease progression. People who have a slow-growing myeloma and no symptoms may not need treatment immediately. Some people need only supportive care to reduce symptoms of anemia, high blood calcium levels, infections and/or bone damage or osteoporosis. Patients who require myeloma-specific therapies may receive combination drug therapy, high-dose chemotherapy with stem cell transplantation (autologous, allogeneic or reduced-intensity allogeneic), radiation therapy for local disease and/or new and emerging drug therapies as part of clinical trials.

Survival

Current statistical databases show that overall 5-year relative survival in people with myeloma has improved significantly since the 1960s. Table 13 shows the 5-year relative survival rates, rounded to the nearest integer, spanning 4 decades.

- Five-year relative survival increased from 12 percent from 1960 to 1963 (for whites, the only data available) to 55.1 percent from 2010 to 2016 (for all races and ethnicities).
- The 3-year survival rate as of January 1, 2017, was 69.1 percent (for all races and ethnicities).
- The 5-year survival rate is 76.8 percent for people with myeloma who were younger than 45 years at diagnosis.

Trends in Five-Year Relative Survival Rates for Myeloma, by Race and Year of Diagnosis

Myeloma	1975-1977	1984-1986	1996-1998	2010-2016
All Races	25%	27%	33%	55%*
Whites	24%	26%	32%	55%*
Blacks	29%	32%	32%	57%*

Table 13. Source: *SEER (Surveillance, Epidemiology, and End Results) Cancer Statistics Review, 1975-2017*. National Cancer Institute; 2020.

* The difference between 1975-1977 and 2010-2016 is statistically significant (P < .05).

Sex. From 2010 to 2016, 5-year relative survival was 55.9 percent for males and 54.2 percent for females.

Race and Ethnicity. Five-year survival from 2010 to 2016 is highest for Black males (57.1 percent) compared to 56.6 percent for Black females, 55.5 percent for white males and 53.1 percent for white females.

Deaths

Approximately 12,410 deaths from myeloma are expected in 2021 (see Table 14).

Estimated Deaths from Myeloma, by Sex, 2021

Cancer Type	Total	Male	Female
Myeloma	12,410	6,840	5,570

Table 14. Source: *Cancer Facts & Figures 2021*. American Cancer Society; 2021.

Sex. Myeloma was the seventh most common cause of cancer death for Black females and the twelfth most common cause of cancer death for white females from 2013 to 2017.

Myeloma was the seventh leading cause of cancer death for Black males and the thirteenth most common cause of cancer death for white males from 2013 to 2017.

Race and Ethnicity. As reported in *Cancer Facts & Figures for African Americans 2019-2021*, the American Cancer Society estimated that approximately 3 percent of all cancer-related deaths among Blacks are expected to be caused by myeloma.

- The age-adjusted mortality rate for myeloma from 2013 to 2017 for Black males was nearly double the rate for white males (7.5 per 100,000 population vs 3.9 per 100,000 population).
- For Black females, the age-adjusted mortality rate from myeloma was more than twice the rate for white females (5.3 per 100,000 population vs 2.4 per 100,000 population).
- The US median age at death from myeloma is 75 years. It is 76 years for whites, 72 years for Blacks and 72 years for Hispanics.

Myelodysplastic Syndromes

Myelodysplastic syndromes (MDS) comprise a group of diseases of the blood and marrow, with varying degrees of severity and life expectancy. Visit www.LLS.org/booklets to download or order copies of free booklets about myelodysplastic syndromes (MDS).

A myelodysplastic syndrome begins with a change to a normal stem cell in the marrow. The marrow becomes filled with an increased number of developing blood cells. However, the blood is usually deficient in cell numbers because the cells in the marrow die before they can be released into the blood. Normally, immature cells known as "blasts" make up less than 5 percent of all cells in the marrow. In a person with MDS, blasts often constitute more than 5 percent of the cells, and in a person with acute myeloid leukemia (AML), blasts constitute more than 20 percent of the cells in the marrow. MDS has been known as "smoldering leukemia" or "preleukemia." These terms may be misleading because they imply that MDS is only serious and problematic if it evolves into AML; this is not the case.

The most common MDS subtypes are

- Refractory anemia with excess blasts, 16.3 percent
- Refractory cytopenia with multilineage dysplasia, 7.7 percent.

People diagnosed with MDS, not otherwise specified (MDS NOS), constitute 61.8 percent of all MDS cases.

Prevalence

An estimated 58,471 people in the United States (US) are living with or in remission from MDS.

New Cases

For the 5-year period from 2013 to 2017, there were 75,497 new cases of MDS throughout the United States (US), averaging 15,099 cases per year.

Incidence

The overall age-adjusted incidence rate of MDS is 4.3 cases per 100,000 population (see Table 15).

Sex. In the US, for the 5-year period from 2013 to 2017, 43,866 MDS cases were diagnosed in males (averaging 8,773 per year) and 31,631 MDS cases were diagnosed in females (averaging 6,326 per year). The overall age-adjusted incidence rates of MDS by sex are 6.0 per 100,000 in males and 3.2 per 100,000 in females.

Race and Ethnicity. White males have the highest age-adjusted incidence rates (6.3 per 100,000 population), while the lowest occur among American Indian and Alaska Native females (1.5 per 100,000 population).

Age. The age-adjusted incidence rate for MDS is highest for males ages 80 years and older (81.1 per 100,000) and lowest for both males and females younger than 40 years (0.1 per 100,000).

Myelodysplastic Syndromes Age-Adjusted Incidence Rates, per 100,000 Population, 2013-2017

By Race/Ethnicity	Rate
All Races	4.3
White	4.6
Black	3.5
Asian/Pacific Islander	2.9
American Indian/Alaska Native*	2.4
Hispanic (any race)**	3.1
By Age	**Rate**
Ages <40	0.1
Ages 40-49	0.7
Ages 50-59	2.0
Ages 60-69	8.1
Ages 70-79	26.3
Ages 80+	54.2

Table 15. Source: *SEER (Surveillance, Epidemiology, and End Results) Cancer Statistics Review, 1975-2017.* National Cancer Institute; 2020.

* Incidence data for American Indian/Alaska Native are based on the PRCDA (Purchased/Referred Care Delivery Areas) counties.

** Hispanics are not mutually exclusive from whites, Blacks, Asian/Pacific Islanders, and American Indians/Alaska Natives. Incidence data for Hispanics are based on NAACCR Hispanic Identification Algorithm (NHIA) and exclude cases from the Alsaka Native Registry.

Signs and Symptoms

Most often, people diagnosed with MDS first seek medical attention because they are experiencing fatigue and shortness of breath (from anemia). Some individuals have no signs or symptoms, and a diagnosis of MDS is made because of a periodic physical examination and testing.

Possible Causes

Most people with MDS have "primary MDS," for which there is usually no clear-cut triggering event. A possible cause of MDS is repeated exposure to the chemical benzene. Automobile exhaust and industrial emissions account for about 20 percent of the total national exposure to benzene. About half of the benzene exposure in the US population results from smoking tobacco or from exposure to tobacco smoke. The average smoker is exposed to about 10 times the daily intake of benzene compared to nonsmokers. Secondary MDS is caused by previous cancer treatments, such as chemotherapy or radiation.

Treatment

The goal of therapy for a person with lower-risk MDS is to manage the disease by reducing transfusion needs and infection risk. Currently, the only potentially curative therapy is high-dose chemotherapy with allogeneic stem cell transplantation. This may be a practical option for certain younger people with higher-risk MDS (individuals whose life expectancy without successful treatment warrants the risk associated with transplantation).

Other general approaches to treatment (either used alone or in combination) include a watch-and-wait strategy; transfusion; administration of blood cell growth factors; drug therapy with newer agents; chemotherapy used to treat AML; and emerging drug therapies as part of clinical trials.

Survival

For 2010-2016, the 5-year relative survival rate for MDS was 38.3 percent.

Sex. From 2010 to 2016, 5-year relative survival was 36.1 percent for males and 41.2 percent for females.

Race and Ethnicity. Five-year survival from 2010 to 2016 was highest for Black females (50.6 percent), followed by American Indian and Alaska Native males (47.5 percent) and Black males (45.7 percent). See Table 16.

Deaths

The SEER report reflects mortality data from the National Cancer for Health Statistics (NCHS) database, in which MDS is not included as a cause of death. Therefore, mortality statistics were not reported in 2021 at the time of this publication.

Myelodysplastic Syndromes 5-Year Relative Survival Rates, by Race/Ethnicity and Sex, 2010-2016

Type	Both Sexes	Male	Female
All Races	38.3	36.1	41.2
White	37.1	35.1	39.8
Black	48.3	45.7	50.6
Asian/Pacific Islander	35.7	34.0	37.8
American Indian/Alaska Native*	47.0	47.5	43.5
Hispanic (any race)**	39.2	37.8	40.5

Table 16. Source: SEER*Explorer: An interactive website for SEER cancer statistics [Internet]. Surveillance Research Program, National Cancer Institute. [Cited 2020 Sep 14]. Available from https://seer.cancer.gov/explorer/.

* Rates for American Indian/Alaska Native are based on the PRCDA (Purchased/Referred Care Delivery Areas) counties.

** Hispanics are not mutually exclusive from whites, Blacks, Asian/Pacific Islanders, and American Indians/Alaska Natives. Incidence data for Hispanics are based on NAACCR Hispanic Identification Algorithm (NHIA) and exclude cases from the Alsaka Native Registry.

Myeloproliferative Neoplasms

Myeloproliferative neoplasms (MPNs) make up a group of blood cancers characterized by the overproduction of one or more types of blood cells—red blood cells, white blood cells and/or platelets. MPNs usually develop slowly over time, and different MPNs affect different blood cells. Visit www.LLS.org/booklets to download or order copies of free booklets about myeloproliferative neoplasms (MPNs).

There are several types of MPNs. The following three classic types are traditionally grouped together because of their overlapping features:

- Essential thrombocythemia (ET), which accounted for 46.7 percent of MPNs from 2013 to 2017
- Polycythemia vera (PV), which accounted for 41.0 percent of MPNs from 2013 to 2017
- Myelofibrosis (MF), which accounted for 11.2 percent of MPNs from 2013 to 2017.

Prevalence

An estimated 99,869 people in the United States (US) are living with or in remission from MPNs.

New Cases

For the 5-year period from 2013 to 2017, there were 61,572 new cases of MPNs throughout the United States (US), averaging 12,314 cases per year.

Incidence

The overall age-adjusted incidence rate of MPNs is 3.3 cases per 100,000 population (see Table 17).

Myeloproliferative Neoplasms Age-Adjusted Incidence Rates, per 100,000 Population, 2013-2017

By Race/Ethnicity	Rate
All Races	3.3
White	3.4
Black	3.1
Asian/Pacific Islander	1.9
American Indian/Alaska Native*	1.6
Hispanic (any race)**	2.0
By Age	**Rate**
Ages <40	0.5
Ages 40-49	2.4
Ages 50-59	4.3
Ages 60-69	8.6
Ages 70-79	14.8
Ages 80+	19.3

Table 17. Source: *SEER (Surveillance, Epidemiology, and End Results) Cancer Statistics Review, 1975-2017.*, National Cancer Institute; 2020.

* Incidence data for American Indian/Alaska Native are based on the PRCDA (Purchased/Referred Care Delivery Areas) counties.

** Hispanics are not mutually exclusive from whites, Blacks, Asian/Pacific Islanders, and American Indians/Alaska Natives. Incidence data for Hispanics are based on NAACCR Hispanic Identification Algorithm (NHIA) and exclude cases from the Alsaka Native Registry.

Sex. In the US, for the 5-year period from 2013 to 2017, 29,629 MPN cases were diagnosed in males (averaging 5,926 per year) and 31,943 MPN cases were diagnosed in females (averaging 6,389 per year). The overall age-adjusted incidence rates of MPNs by sex are 3.4 per 100,000 in males and 3.1 per 100,000 in females.

Race and Ethnicity. White males have the highest age-adjusted incidence rates of MPNs (3.5 per 100,000 population), while the lowest occur among American Indian and Alaska Native females (1.5 per 100,000 population).

Age. The age-adjusted incidence rate for MPNs is highest for males ages 80 years and older (20.2 per 100,000 population) and lowest for both males and females younger than 40 years (0.5 per 100,000 population).

Signs and Symptoms

Many people with MPNs experience few or no signs or symptoms for extended periods of time with proper monitoring and treatment. Each type of MPN may show different signs and symptoms.

Essential thrombocythemia (ET) is often detected during a routine blood test before an individual has any signs or symptoms. One of the first indications of ET may be the development of a blood clot (thrombus). In a small subset of patients, ET may cause bleeding in individuals with an extremely high platelet count.

Polycythemia vera (PV) develops slowly, and it may not cause signs or symptoms for many years. The condition is often diagnosed during a routine blood test before severe signs or symptoms occur.

Myelofibrosis (MF) usually develops slowly. Often, MF does not cause early signs or symptoms and it may be found during a routine blood test. However, as disruption of normal blood cell production increases, people may experience signs or symptoms such as fatigue, weakness, shortness of breath or pale skin.

Possible Causes

MPNs are considered "clonal disorders." Clonal disorders begin with one or more changes to the DNA of a single stem cell in the bone marrow.

In most cases, the cause of the change to the stem cell is unknown. Mutations may be caused by environmental factors or by an error during cell division. While family clusters of ET, PV and MF have been reported, these are generally not inherited diseases. They arise from gene mutations that occur during a person's lifetime.

Researchers believe that proteins known as "Janus kinases" (JAKs) are involved. JAKs send signals that affect the production of blood cells in the bone marrow. These proteins help control the numbers of red blood cells, white blood cells and platelets. When JAKs send too many signals, they cause the bone marrow to make too many blood cells. This chain of events is referred to as "overactive JAK signaling." JAK signaling may become overactive in many ways. One way is a mutation of the *JAK2* gene.

Approximately 95 percent of PV patients have a mutation of the *JAK2* gene. Mutations in genes of hematopoietic stem cells are thought to be responsible for the overactive JAK signaling that causes MF. The mutations may be in the genes that make JAKs, or the mutations may be in genes that affect how JAKs work. Most patients with MF have either a mutation of the *JAK2, MPL* or *CALR* gene.

Most cases of ET are associated with one or more acquired genetic mutations to a hematopoietic stem cell that results in the overproduction of megakaryocytes, the precursor cells of platelets in the bone marrow. Most patients with ET have a mutation of the *JAK2, MPL* or *CALR* gene.

Treatment

Treatment for MPNs can vary based on specific diagnosis. Patients have symptoms and circumstances that require different treatments. There is no single treatment that is effective for all patients. Treatment for patients may include low-dose aspirin, therapeutic phlebotomy, drug therapy, allogeneic stem cell transplantation, and emerging drug therapies as part of clinical trials. The doctor will monitor the patient closely through regular examinations, watching for any signs of disease progression. All patients, however, need to be closely monitored.

Survival

For 2010-2016, the 5-year relative survival rate for MPNs was 85.0 percent.

Sex. From 2010 to 2016, 5-year relative survival rate was 83.8 percent for males and 86.2 percent for females.

Race and Ethnicity. Five-year survival from 2010 to 2016 was highest for Asian and Pacific Islander females (89.2 percent), followed by Black females (88.3 percent) and Hispanic females (85.2 percent). See Table 18.

Myeloproliferative Neoplasms 5-Year Relative Survival Rates, by Race/Ethnicity and Sex, 2010-2016

Type	Both Sexes	Male	Female
All Races	85.0	83.8	86.2
White	84.5	83.9	85.1
Black	85.5	81.7	88.3
Asian/Pacific Islander	85.8	82.0	89.2
American Indian/Alaska Native*	77.6	72.4	79.7
Hispanic (any race)**	84.9	84.5	85.2

Table 18. SEER*Explorer: An interactive website for SEER cancer statistics [Internet]. Surveillance Research Program, National Cancer Institute. [Cited 2020 Sep 14]. Available from https://seer.cancer.gov/explorer/.

* Rates for American Indian/Alaska Native are based on the PRCDA (Purchased/Referred Care Delivery Areas) counties.

** Hispanics are not mutually exclusive from whites, Blacks, Asian/Pacific Islanders, and American Indians/Alaska Natives. Incidence data for Hispanics are based on NAACCR Hispanic Identification Algorithm (NHIA) and exclude cases from the Alsaka Native Registry.

Deaths

The SEER report reflects mortality data from the National Cancer for Health Statistics (NCHS) database, in which MPNs are not included as a cause of death. Therefore, mortality statistics were not reported in 2021 at the time of this publication.

Incidence Rates

Tables 19, 20 and 21 show incidence rates for leukemia, non-Hodgkin lymphoma, Hodgkin lymphoma, myeloma, myelodysplastic syndromes and myeloproliferative neoplasms using data figures from 2013 to 2017 (the most recent data available). Rates are per 100,000 population and are age-adjusted to the 2000 US standard population.

Age-Adjusted Incidence Rates, by Sex, All Races, per 100,000 Population, 2013-2017

Type	Total	Male	Female
Leukemia	14.1	18.1	11.0
Non-Hodgkin Lymphoma	19.6	23.8	16.2
Hodgkin Lymphoma	2.6	2.9	2.3
Myeloma	7.0	8.8	5.7
Myelodysplastic Syndromes	4.3	6.0	3.2
Myeloproliferative Neoplasms	3.3	3.4	3.1

Table 19. Source: *SEER (Surveillance, Epidemiology, and End Results) Cancer Statistics Review, 1975-2017.* National Cancer Institute; 2020.

Age-Adjusted Incidence Rates, by Sex, for Blacks, per 100,000 Population, 2013-2017

Type	Total	Male	Female
Leukemia	10.8	13.6	8.9
Non-Hodgkin Lymphoma	14.7	17.7	12.5
Hodgkin Lymphoma	2.7	3.1	2.3
Myeloma	13.8	16.5	12.0
Myelodysplastic Syndromes	3.5	4.5	2.9
Myeloproliferative Neoplasms	3.1	3.2	3.0

Table 20. Source: *SEER (Surveillance, Epidemiology, and End Results) Cancer Statistics Review, 1975-2017.* National Cancer Institute; 2020.

Age-Adjusted Incidence Rates, by Sex, for Whites, per 100,000 Population, 2013-2017

Type	Total	Male	Female
Leukemia	15.0	19.2	11.6
Non-Hodgkin Lymphoma	20.6	25.0	17.0
Hodgkin Lymphoma	2.8	3.1	2.5
Myeloma	6.4	8.2	5.0
Myelodysplastic Syndromes	4.6	6.3	3.3
Myeloproliferative Neoplasms	3.4	3.5	3.2

Table 21. Source: *SEER (Surveillance, Epidemiology, and End Results) Cancer Statistics Review, 1975-2017.* National Cancer Institute; 2020.

Race and Ethnicity

Tables 22 - 27, on pages 20–22 show prevalence, incidence, survival and mortality for blood cancers by race and ethnicity. United States (US) prevalence estimates for January 1, 2017 are based on 2017 cancer prevalence proportions from the SEER 13 cancer registries (excluding the Alaska Native Registry) and US population estimates from the US Bureau of the Census. Incidence and mortality rates are per 100,000 population and are age-adjusted to the 2000 US standard population. To adjust for possible reporting delay, counts of incidence and mortality cases are provided as average annual counts for 2013-2017, using national data from US Cancer Statistics and the National Center for Health Statistics. Five-year relative survival is provided based on the SEER 18 cancer registries for 2010-2016.

Approximate US Prevalence of Blood Cancers, by Race/Ethnicity, as of January 1, 2017

Race/Ethnicity	All blood cancers	Lymphomas^	NHL^	HL^	Leukemia^	ALL^	CLL^	AML^	CML^	Myeloma^	MDS*	MPN*
All Races	**1,519,907**	**825,651**	672,980	152,671	**397,501**	74,301	181,665	55,548	55,164	**138,415**	**58,471**	**99,869**
White**	**1,323,438**	**727,361**	593,750	133,611	**355,110**	62,132	171,958	47,136	45,880	**104,369**	**51,018**	**85,580**
White Hispanic	**126,786**	**67,884**	52,116	15,768	**39,511**	19,151	5,713	7,159	5,296	**10,406**	**3,355**	**5,630**
White non-Hispanic	**1,196,652**	**659,477**	541,634	117,843	**315,599**	42,981	166,245	39,977	40,584	**93,963**	**47,663**	**79,950**
Black	**145,361**	**72,082**	54,040	18,042	**29,086**	5,238	10,480	5,088	6,083	**28,309**	**5,358**	**10,526**
Asian/Pacific Islander	**45,296**	**24,738**	21,124	3,614	**10,809**	3,465	1,801	2,712	2,116	**3,843**	**2,141**	**3,765**
American Indian/ Alaska Native	**4,798**	**2,112**	1,742	370	**1,548**	576	296	299	275	**605**	**202**	**331**
Hispanic (any race)***	**133,023**	**71,277**	54,782	16,495	**41,164**	19,802	6,058	7,475	5,548	**11,018**	**3,522**	**6,042**

Table 22. Source: SEER*Explorer: An interactive website for SEER cancer statistics [Internet]. Surveillance Research Program, National Cancer Institute. [Cited 2020 Sep 14]. Available from https://seer.cancer.gov/explorer/.

^ 25-year limited-duration prevalence.

* 16-year limited-duration prevalence. Shorter duration prevalence required due to fewer years of reportability for these cancers.

** Projected prevalence for whites incorporates Hispanic ethnicity to account for differing Hispanic proportions in the SEER white population versus the total US.

*** Hispanics are not mutually exclusive from whites, Blacks, Asian/Pacific Islanders, and American Indians/Alaska Natives. Incidence data for Hispanics are based on NAACCR Hispanic Identification Algorithm (NHIA) and exclude cases from the Alsaka Native Registry

Blood Cancer Incidence Rates, by Race/Ethnicity, 2013-2017, SEER 21 (Rates per 100,000 population)

Race/Ethnicity	All blood cancers	Lymphomas	NHL	HL	Leukemia	ALL	CLL	AML	CML	Myeloma	MDS	MPN
All Races	**51.0**	**22.2**	19.6	2.6	**14.1**	1.7	5.0	4.3	1.9	**7.0**	**4.3**	**3.3**
White	**52.7**	**23.4**	20.6	2.8	**15.0**	1.9	5.4	4.4	2.0	**6.4**	**4.6**	**3.4**
White Hispanic	**44.0**	**20.9**	18.5	2.4	**11.3**	2.7	2.1	3.8	1.6	**6.7**	**3.2**	**1.9**
White non-Hispanic	**54.0**	**24.0**	21.0	3.0	**15.4**	1.6	6.0	4.5	2.0	**6.3**	**4.7**	**3.6**
Black	**48.5**	**17.4**	14.7	2.7	**10.8**	1.0	3.3	3.7	1.8	**13.8**	**3.5**	**3.1**
Asian/Pacific Islander	**31.6**	**14.8**	13.5	1.3	**8.0**	1.5	1.1	3.5	1.2	**3.9**	**2.9**	**1.9**
American Indian/Alaska Native *	**30.0**	**12.2**	10.9	1.3	**8.1**	1.6	1.7	2.3	1.4	**5.7**	**2.4**	**1.6**
Hispanic (any race)**	**43.2**	**20.4**	18.1	2.4	**10.9**	2.5	2.2	3.6	1.6	**6.8**	**3.1**	**2.0**

Table 23. Source: Surveillance, Epidemiology, and End Results (SEER) Program (www.seer.cancer.gov) SEER* Stat Database: Incidence - SEER Research Plus Limited-Field Data, 21 Registries, Nov 2019 Sub (2000-2017) - Linked To County Attributes - Total U.S., 1969-2018 Counties, National Cancer Institute, DCCPS, Surveillance Research Program, released April 2020, based on the November 2019 submission.

* Rates for American Indian/Alaska Native are based on the PRCDA (Purchased/Referred Care Delivery Areas) counties.

** Hispanics are not mutually exclusive from whites, Blacks, Asian/Pacific Islanders, and American Indians/Alaska Natives. Incidence data for Hispanics are based on NAACCR Hispanic Identification Algorithm (NHIA) and exclude cases from the Alsaka Native Registry.

Average Annual Blood Cancer Incidence Counts, by Race/Ethnicity, 2013-2017, United States

Race/Ethnicity	All blood cancers	Lymphomas	NHL	HL	Leukemia	ALL	CLL	AML	CML	Myeloma	MDS	MPN
All Races	**181,053**	**78,532**	69,915	8,617	**49,909**	5,129	17,774	14,970	6,794	**25,313**	**15,099**	**12,314**
White	**152,274**	**67,164**	60,184	6,980	**42,876**	4,256	15,729	12,754	5,666	**18,876**	**13,189**	**10,261**
White Hispanic	**15,297**	**7,038**	5,985	1,053	**4,381**	1,336	687	1,283	606	**2,040**	**953**	**895**
White non-Hispanic	**136,977**	**60,126**	54,199	5,927	**38,494**	2,920	15,041	11,471	5,060	**16,837**	**12,236**	**9,365**
Black	**18,565**	**6,897**	5,747	1,150	**4,200**	431	1,218	1,386	693	**5,226**	**1,119**	**1,141**
Asian/Pacific Islander	**5,546**	**2,634**	2,374	260	**1,441**	265	199	609	222	**686**	**435**	**353**
American Indian/ Alaska Native	**955**	**398**	351	47	**284**	57	63	85	45	**159**	**59**	**56**
Hispanic (any race)**	**16,772**	**7,687**	6,525	1,162	**4,778**	1,439	763	1,394	670	**2,264**	**1,033**	**1,023**

Table 24. Source: National Program of Cancer Registries and Surveillance, Epidemiology, and End Results SEER*Stat Database: NPCR and SEER Incidence - U.S. Cancer Statistics 2001-2017 Public Use Research Database, 2019 Submission (2001-2017), United States Department of Health and Human Services, Centers for Disease Control and Prevention and National Cancer Institute. Released June 2020. Accessed at www.cdc.gov/cancer/uscs/public-use.

** Hispanics are not mutually exclusive from whites, Blacks, Asian/Pacific Islanders, and American Indians/Alaska Natives. Incidence data for Hispanics are based on NAACCR Hispanic Identification Algorithm (NHIA).

Blood Cancer 5-Year Relative Survival Rates, by Race/Ethnicity, 2010-2016, SEER 18

Race/Ethnicity	All blood cancers	Lymphomas	NHL	HL	Leukemia	ALL	CLL	AML	CML	Myeloma	MDS	MPN
All Races	**66.5**	**74.6**	72.7	87.4	**63.7**	68.8	86.1	28.7	70.4	**53.9**	**38.3**	**85.0**
White	**66.5**	**74.9**	73.1	87.5	**64.0**	68.4	85.9	28.3	69.3	**52.7**	**37.1**	**84.5**
White Hispanic	**64.9**	**71.8**	69.3	85.0	**61.7**	68.5	80.9	38.5	76.0	**52.8**	**38.4**	**84.7**
White non-Hispanic	**66.8**	**75.6**	73.8	88.2	**64.4**	68.4	86.2	26.1	68.0	**52.6**	**37.0**	**84.5**
Black	**64.3**	**71.6**	68.4	85.4	**58.9**	65.2	79.7	28.6	71.6	**56.8**	**48.3**	**85.5**
Asian/Pacific Islander	**61.7**	**69.4**	67.2	89.0	**54.1**	73.0	81.9	29.7	71.3	**53.5**	**35.7**	**85.8**
American Indian/ Alaska Native*	**63.6**	**70.8**	70.3	73.7	**60.9**	63.4	86.7	41.9	74.1	**50.0**	**47.0**	**77.6**
Hispanic (any race)**	**65.5**	**72.5**	69.9	85.4	**62.3**	69.0	81.5	38.8	76.0	**53.0**	**39.2**	**84.9**

Table 25. Source: Surveillance, Epidemiology, and End Results (SEER) Program (www.seer.cancer.gov) SEER*Stat Database: Incidence - SEER Research Plus Data, 18 Registries, Nov 2019 Sub (2000-2017) - Linked To County Attributes - Total U.S., 1969-2018 Counties, National Cancer Institute, DCCPS, Surveillance Research Program, released April 2020, based on the November 2019 submission.

* Data for American Indian/Alaska Native are based on the PRCDA (Purchased/Referred Care Delivery Areas) counties.

** Hispanics are not mutually exclusive from whites, Blacks, Asian/Pacific Islanders, and American Indians/Alaska Natives. Incidence data for Hispanics are based on NAACCR Hispanic Identification Algorithm (NHIA) and exclude cases from the Alsaka Native Registry.

Blood Cancer Mortality Rates, by Race/Ethnicity, 2013-2017, US (Rates per 100,000 population)

Race/Ethnicity	All blood cancers***	Lymphomas	NHL	HL	Leukemia	ALL	CLL	AML	CML	Myeloma
All Races	**15.5**	**5.8**	5.5	0.3	**6.4**	0.4	1.2	2.8	0.3	**3.3**
White	**15.8**	**6.0**	5.7	0.3	**6.7**	0.5	1.2	2.9	0.3	**3.0**
White Hispanic	**13.1**	**5.4**	5.0	0.4	**4.9**	0.7	0.5	2.1	0.3	**2.8**
White non-Hispanic	**15.9**	**6.1**	5.8	0.3	**6.8**	0.4	1.3	3.0	0.3	**3.0**
Black	**15.8**	**4.3**	4.0	0.3	**5.4**	0.3	1.0	2.2	0.3	**6.2**
Asian/Pacific Islander	**9.1**	**3.9**	3.8	0.1	**3.6**	0.3	0.2	2.0	0.1	**1.6**
American Indian/Alaska Native*	**11.6**	**4.5**	4.2	0.2	**4.0**	0.6	0.3	1.7	0.2	**3.2**
Hispanic (any race)**	**12.4**	**5.1**	4.7	0.4	**4.6**	0.7	0.5	2.0	0.2	**2.7**

Table 26. Source: Surveillance, Epidemiology, and End Results (SEER) Program (www.seer.cancer.gov) SEER*Stat Database: Mortality - All COD, Aggregated With State, Total U.S. (1990-2017) <Katrina/Rita Population Adjustment>, National Cancer Institute, DCCPS, Surveillance Research Program, released December 2019. Underlying mortality data provided by NCHS (www.cdc.gov/nchs).

Rates are per 100,000 and age-adjusted to the 2000 US Std Population (19 age groups - Census P25-1130) standard.

* Rates for American Indian/Alaska Native are based on the PRCDA (Purchased/Referred Care Delivery Areas) counties.

** Hispanics are not mutually exclusive from whites, Blacks, Asian/Pacific Islanders, and American Indians/Alaska Natives.

*** The National Center for Health Statistics (NCHS) US data, reported by SEER, does not include MDS nor MPNs as a cause of death. Therefore, mortality statistics for MDS and MPNs were not reported in 2021 at the time of this publication.

Average Annual Blood Cancer Deaths, by Race/Ethnicity, 2013-2017, US

Race/Ethnicity	All blood cancers***	Lymphomas	NHL	HL	Leukemia	ALL	CLL	AML	CML	Myeloma
All Races	**56,837**	**21,335**	20,276	1,059	**23,355**	1,495	4,373	10,140	1,094	**12,146**
White	**49,167**	**18,945**	18,021	923	**20,638**	1,289	3,980	8,908	954	**9,585**
White Hispanic	**4,089**	**1,610**	1,480	130	**1,650**	340	127	676	81	**830**
White non-Hispanic	**44,970**	**17,294**	16,502	792	**18,940**	946	3,843	8,212	870	**8,736**
Black	**5,863**	**1,633**	1,527	105	**2,003**	131	348	841	110	**2,227**
Asian/Pacific Islander	**1,553**	**665**	640	26	**618**	60	37	349	25	**269**
American Indian/Alaska Native*	**186**	**69**	65	4	**68**	13	5	29	3	**49**
Hispanic (any race)**	**4,192**	**1,642**	1,510	132	**1,694**	349	130	696	82	**856**

Table 27. Source: Surveillance, Epidemiology, and End Results (SEER) Program (www.seer.cancer.gov) SEER*Stat Database: Mortality - All COD, Aggregated With State, Total U.S. (1990-2017) <Katrina/Rita Population Adjustment>, National Cancer Institute, DCCPS, Surveillance Research Program, released December 2019. Underlying mortality data provided by NCHS (www.cdc.gov/nchs).

* Counts for American Indian/Alaska Native are based on the PRCDA (Purchased/Referred Care Delivery Areas) counties.

** Hispanics are not mutually exclusive from whites, Blacks, Asian/Pacific Islanders, and American Indians/Alaska Natives.

*** The National Center for Health Statistics (NCHS) US data, reported by SEER, does not include MDS nor MPNs as a cause of death. Therefore, mortality statistics for MDS and MPNs were not reported in 2021 at the time of this publication.

Estimated New Cases and Estimated Deaths, by State

Estimated New Cases of Blood Cancers, by State, 2021

State	Leukemia	Non-Hodgkin Lymphoma	Myeloma	Hodgkin Lymphoma
Alabama	870	1,080	550	130
Alaska	100	110	50	*
Arizona	1,110	1,690	610	160
Arkansas	520	680	300	80
California	5,830	8,510	3,320	900
Colorado	870	1,090	460	130
Connecticut	650	1,010	420	110
Delaware	200	290	130	*
Dist. of Columbia	80	110	90	*
Florida	6,660	8,440	3,370	760
Georgia	1,840	2,100	1,240	270
Hawaii	200	330	130	*
Idaho	350	450	170	*
Illinois	2,120	3,010	1,290	340
Indiana	1,150	1,570	670	180
Iowa	740	890	350	90
Kansas	570	690	280	80
Kentucky	870	1,130	460	110
Louisiana	850	1,110	540	140
Maine	330	430	150	*
Maryland	980	1,360	780	160
Massachusetts	1,000	1,730	730	190
Michigan	1,800	2,620	1,070	260
Minnesota	1,380	1,520	590	150
Mississippi	510	630	360	80
Missouri	1,180	1,500	620	160
Montana	240	310	110	*
Nebraska	390	460	170	60
Nevada	530	740	220	70
New Hampshire	270	410	140	*
New Jersey	1,840	2,460	1,010	270
New Mexico	350	460	190	50
New York	4,110	5,480	2,470	610
North Carolina	2,050	2,480	1,350	280
North Dakota	170	190	80	*
Ohio	1,930	2,890	1,150	320
Oklahoma	760	900	360	100
Oregon	720	1,070	370	110
Pennsylvania	2,690	3,840	1,450	400
Rhode Island	210	310	120	*
South Carolina	1,010	1,260	720	150
South Dakota	190	230	100	*
Tennessee	1,180	1,560	740	170
Texas	4,820	5,780	2,670	710
Utah	400	510	210	60
Vermont	110	190	70	*
Virginia	1,310	1,840	890	210
Washington	1,290	1,870	700	180
West Virginia	410	530	210	50
Wisconsin	1,240	1,560	630	170
Wyoming	90	130	50	*
United States	**61,090**	**81,560**	**34,920**	**8,830**

Table 28. * Estimate is fewer than 50 cases.
Estimates are rounded to the nearest 10. State estimates may not sum to US total due to rounding and exclusion of state.
Source: American Cancer Society.
(Note: The projected numbers of new cancer cases and deaths in 2021 should not be compared with previous years to track cancer trends because they are model-based and vary from year to year for reasons other than changes in cancer occurrence. Age-standardized incidence and death rates should be used to measure cancer trends.)

Estimated Deaths from Blood Cancers, by State, 2021

State	Leukemia	Non-Hodgkin Lymphoma	Myeloma	Hodgkin Lymphoma
Alabama	350	270	200	*
Alaska	*	*	*	*
Arizona	490	420	320	*
Arkansas	210	200	120	*
California	2,300	2,190	1,250	100
Colorado	300	270	200	*
Connecticut	250	230	130	*
Delaware	90	80	60	*
Dist. of Columbia	*	*	*	*
Florida	1,930	1,590	910	70
Georgia	640	550	340	*
Hawaii	90	90	50	*
Idaho	140	120	80	*
Illinois	890	770	450	*
Indiana	510	450	260	*
Iowa	260	240	150	*
Kansas	250	190	110	*
Kentucky	390	330	180	*
Louisiana	330	290	200	*
Maine	120	120	70	*
Maryland	430	350	280	*
Massachusetts	500	490	240	*
Michigan	800	750	450	*
Minnesota	470	400	220	*
Mississippi	270	170	140	*
Missouri	510	410	240	*
Montana	80	70	50	*
Nebraska	160	120	50	*
Nevada	210	180	100	*
New Hampshire	80	90	50	*
New Jersey	640	570	270	*
New Mexico	130	130	130	*
New York	1,410	1,220	720	50
North Carolina	760	630	390	*
North Dakota	60	50	*	*
Ohio	960	870	510	*
Oklahoma	310	270	150	*
Oregon	320	310	170	*
Pennsylvania	1,100	980	550	*
Rhode Island	120	70	*	*
South Carolina	410	320	260	*
South Dakota	60	60	*	*
Tennessee	540	480	290	*
Texas	1,710	1,420	920	80
Utah	170	150	80	*
Vermont	50	50	*	*
Virginia	580	580	320	*
Washington	510	470	270	*
West Virginia	190	160	90	*
Wisconsin	490	400	210	*
Wyoming	*	*	*	*
United States	**23,660**	**20,720**	**12,410**	**960**

Table 29. * Estimate is fewer than 50 deaths.
Estimates are rounded to the nearest 10. State estimates may not sum to US total due to rounding and exclusion of state.
Source: American Cancer Society.
(Note: The projected numbers of new cancer cases and deaths in 2021 should not be compared with previous years to track cancer trends because they are model-based and vary from year to year for reasons other than changes in cancer occurrence. Age-standardized incidence and death rates should be used to measure cancer trends.)

Average Annual Incidence and Deaths, by State

Average Annual Blood Cancer Incidence Counts, by State, 2013-2017* (All Races, Males and Females)

State	Leukemia	Non-Hodgkin Lymphoma	Myeloma	Hodgkin Lymphoma	Myelodys-plastic Syndromes	Myelopro-liferative Neoplasms
Alabama	659	922	409	118	159	140
Alaska	76	113	32	13	12	14
Arizona	815	1,227	400	151	234	122
Arkansas	487	632	242	81	143	114
California	4,970	7,515	2,424	873	1,485	989
Colorado	720	964	349	130	160	153
Connecticut	620	929	328	119	184	144
Delaware	144	236	87	28	42	33
Dist. of Columbia	53	99	58	20	9	8
Florida	4,867	6,452	2,309	687	2,721	2,513
Georgia	1,484	1,892	903	247	473	401
Hawaii	179	285	95	23	51	30
Idaho	287	351	118	40	64	63
Illinois	1,818	2,783	935	362	440	328
Indiana	980	1,386	501	177	259	160
Iowa	606	784	272	95	154	106
Kansas	488	641	222	70	145	124
Kentucky	804	1,036	369	115	257	184
Louisiana	707	979	419	131	208	185
Maine	255	374	113	42	74	52
Maryland	793	1,190	504	161	213	162
Massachusetts	926	1,524	521	195	243	198
Michigan	1,596	2,330	831	265	424	289
Minnesota	1,006	1,331	424	159	258	196
Mississippi	397	559	267	73	115	63
Missouri	959	1,348	482	168	265	183
Montana	190	243	90	25	58	57
Nebraska	296	436	132	57	76	39
Nevada	377	483	154	53	75	35
New Hampshire	218	351	101	39	60	53
New Jersey	1,592	2,263	785	291	552	364
New Mexico	313	365	135	51	57	52
New York	3,728	4,951	1,928	654	1,110	1,128
North Carolina	1,602	2,020	907	259	438	438
North Dakota	131	158	52	21	31	31
Ohio	1,576	2,641	833	326	346	226
Oklahoma	594	783	276	92	127	118
Oregon	600	912	262	95	133	85
Pennsylvania	2,309	3,384	1,125	424	688	549
Rhode Island	177	258	74	38	46	25
South Carolina	727	967	471	124	202	146
South Dakota	159	189	66	20	50	36
Tennessee	983	1,346	513	171	223	179
Texas	3,563	4,508	1,861	628	967	1,034
Utah	374	473	154	70	83	55
Vermont	92	162	45	18	19	20
Virginia	947	1,579	567	199	226	137
Washington	1,141	1,559	498	179	316	255
West Virginia	346	468	148	48	94	48
Wisconsin	1,096	1,423	487	178	316	238
Wyoming	83	111	37	13	13	14
United States	**49,909**	**69,915**	**25,313**	**8,617**	**15,099**	**12,314**

Table 30. National Program of Cancer Registries and Surveillance, Epidemiology, and End Results SEER*Stat Database: NPCR and SEER Incidence - U.S. Cancer Statistics 2001-2017 Public Use Research Database, 2019 Submission (2001-2017), United States Department of Health and Human Services, Centers for Disease Control and Prevention and National Cancer Institute. Released June 2020. Accessed at www.cdc.gov/cancer/uscs/public-use.

* In previous publications, total 5-year incidence counts were provided rather than yearly averages.

Average Annual Blood Cancer Deaths, by State, 2013-2017* (All Races, Males and Females)

State	Leukemia	Non-Hodgkin Lymphoma	Myeloma	Hodgkin Lymphoma
Alabama	365	302	210	17
Alaska	32	30	16	^
Arizona	489	404	239	25
Arkansas	251	194	120	12
California	2,426	2,142	1,210	133
Colorado	318	253	171	15
Connecticut	273	245	138	11
Delaware	77	73	46	4
Dist. of Columbia	32	28	24	^
Florida	1,798	1,529	862	75
Georgia	603	516	375	28
Hawaii	83	82	45	4
Idaho	120	115	64	5
Illinois	953	809	472	40
Indiana	515	472	259	21
Iowa	270	249	140	10
Kansas	243	194	119	9
Kentucky	365	319	172	17
Louisiana	325	294	192	17
Maine	119	114	62	5
Maryland	412	349	263	17
Massachusetts	500	435	255	19
Michigan	809	737	447	34
Minnesota	431	382	208	18
Mississippi	226	171	137	11
Missouri	507	411	245	23
Montana	79	72	43	3
Nebraska	152	127	71	5
Nevada	192	154	88	8
New Hampshire	102	93	50	4
New Jersey	655	572	333	26
New Mexico	127	116	70	9
New York	1,426	1,255	726	66
North Carolina	694	598	436	31
North Dakota	60	50	30	2
Ohio	973	867	515	42
Oklahoma	327	267	142	15
Oregon	306	288	170	14
Pennsylvania	1,120	1,017	569	41
Rhode Island	89	75	38	3
South Carolina	381	302	247	18
South Dakota	73	58	37	^
Tennessee	511	468	288	24
Texas	1,576	1,335	811	89
Utah	163	127	77	6
Vermont	52	47	27	2
Virginia	536	480	313	23
Washington	498	456	241	21
West Virginia	183	155	89	7
Wisconsin	494	410	228	23
Wyoming	45	37	17	^
United States	**23,355**	**20,276**	**12,146**	**1,059**

Table 31. Surveillance, Epidemiology, and End Results (SEER) Program (www.seer.cancer.gov) SEER*Stat Database: Mortality - All COD, Aggregated With State, Total U.S. (1969-2017) <Katrina/Rita Population Adjustment>, National Cancer Institute, DCCPS, Surveillance Research Program, released December 2019. Underlying mortality data provided by NCHS (www.cdc.gov/nchs).

Underlying mortality data provided by NCHS (www.cdc.gov/nchs).

^ Statistic not displayed due to fewer than 10 total deaths in the 5-year period. The suppressed cases, however, are included in the counts and rates for the US combined.

* In previous publications, total 5-year death counts were provided rather than yearly averages.

Average Annual Incidence, by Race and State

Average Annual Blood Cancer (Leukemia, Lymphoma, Myeloma, Myelodysplastic Syndromes and Myeloproliferative Neoplasms) Incidence Counts, by Race, Ethnicity and State, 2013-2017, Males and Females

State	All Races	White	White Hispanic	White Non-Hispanic	Black	Asian/Pacific Islander	American Indian/ Alaska Native	Hispanic**
Alabama	2,404	1,805	25	1,780	506	12	5	33
Alaska	260	199	8	191	11	12	37	9
Arizona	2,947	2,687	451	2,235	97	53	83	472
Arkansas	1,697	1,435	28	1,407	199	19	9	38
California	18,248	14,667	4,022	10,645	1,120	1,979	93	4,146
Colorado	2,474	2,285	261	2,024	89	44	16	283
Connecticut	2,322	2,043	147	1,896	172	33	4	188
Delaware	570	460	#	#	92	+	~	-
Dist. of Columbia	248	85	14	71	141	5	^	21
Florida	19,540	16,383	2,636	13,747	1,811	220	29	2,920
Georgia	5,396	3,823	203	3,620	1,444	106	5	230
Hawaii	662	214	19	195	11	423	^	39
Idaho	920	893	43	849	4	8	7	48
Illinois	6,663	5,588	549	5,039	786	192	~	578
Indiana	3,463	3,168	85	3,083	248	26	^	87
Iowa	2,014	1,948	33	1,915	41	13	3	33
Kansas	1,689	1,530	#	#	83	+	~	75
Kentucky	2,762	2,545	#	#	162	+	~	-
Louisiana	2,626	1,916	36	1,880	670	24	5	43
Maine	911	894	3	891	4	4	5	4
Maryland	3,022	2,102	61	2,041	769	99	6	83
Massachusetts	3,604	3,202	#	#	212	105	3	-
Michigan	5,730	4,875	96	4,779	643	69	31	114
Minnesota	3,372	3,143	65	3,078	93	56	30	72
Mississippi	1,474	1,014	11	1,002	447	9	4	12
Missouri	3,403	3,030	34	2,996	316	24	5	43
Montana	662	630	9	621	^	4	24	10
Nebraska	1,036	975	43	932	36	8	6	46
Nevada	1,177	997	153	843	81	64	10	159
New Hampshire	822	799	7	792	5	7	^	9
New Jersey	5,845	4,795	509	4,286	608	231	~	558
New Mexico	973	866	320	546	17	16	53	330
New York	13,488	10,822	1,184	9,638	1,782	575	~	1,539
North Carolina	5,660	4,378	111	4,267	1,060	60	35	144
North Dakota	423	402	^	401	4	^	13	^
Ohio	5,945	5,194	54	5,140	576	49	4	75
Oklahoma	1,988	1,632	57	1,575	124	26	175	78
Oregon	2,084	1,961	97	1,864	32	52	21	101
Pennsylvania	8,475	7,529	#	#	684	103	7	230
Rhode Island	618	569	22	542	25	7	^	34
South Carolina	2,634	1,990	33	1,957	581	22	^	41
South Dakota	520	494	4	490	4	^	19	5
Tennessee	3,412	2,917	52	2,865	427	26	^	67
Texas	12,552	10,753	2,947	7,806	1,361	328	45	3,009
Utah	1,208	1,152	93	1,058	12	25	9	99
Vermont	357	351	^	349	^	^	^	^
Virginia	3,652	2,789	92	2,697	651	104	5	126
Washington	3,943	3,491	167	3,324	122	213	57	187
West Virginia	1,152	1,109	^	1,107	33	^	^	4
Wisconsin	3,735	3,487	69	3,418	165	33	26	76
Wyoming	270	260	11	249	^	^	5	11

Table 32. National Program of Cancer Registries and Surveillance, Epidemiology, and End Results SEER*Stat Database: NPCR and SEER Incidence - U.S. Cancer Statistics 2001-2017 Public Use Research Database, 2019 Submission (2001-2017), United States Department of Health and Human Services, Centers for Disease Control and Prevention and National Cancer Institute. Released June 2020. Accessed at www.cdc.gov/cancer/uscs/public-use.

** Hispanics are not mutually exclusive from whites, Blacks, Asian/Pacific Islanders, and American Indians/Alaska Natives. Incidence data for Hispanics are based on NAACCR Hispanic Identification Algorithm (NHIA).

^ Statistic not displayed due to fewer than 16 total cases in the 5-year period.

~ Data for American Indians and Alaska Natives cannot be displayed for Delaware, Illinois, Kansas, Kentucky, New Jersey, and New York.

+ Data for Asians and Pacific Islanders cannot be displayed for Delaware, Kansas, and Kentucky.

- Hispanic ethnicity data cannot be displayed for Delaware, Kentucky, and Massachusetts.

Race and ethnicity combinations – white Hispanic, white non-Hispanic – cannot be displayed for Delaware, Kansas, Kentucky, Massachusetts, and Pennsylvania.

Average Annual Deaths, by Race and State

Average Annual Blood Cancer* (Leukemia, Lymphoma and Myeloma) Deaths, by Race/Ethnicity and State, 2013-2017, Males and Females

State	All Races	White	White Hispanic	White Non-Hispanic	Black	Asian/Pacific Islander	American Indian/Alaska Native	Hispanic**
Alabama	894	708	6	702	181	^	^	7
Alaska	79	63	^	61	^	4	11	^
Arizona	1,156	1,075	150	922	38	18	26	153
Arkansas	576	509	7	500	62	^	^	7
California	5,911	4,877	1,183	3,691	389	612	33	1,201
Colorado	757	715	77	637	26	13	4	78
Connecticut	667	611	31	580	46	9	^	31
Delaware	200	164	4	159	33	4	^	4
Dist. of Columbia	86	25	4	21	59	^	^	5
Florida	4,264	3,743	590	3,149	464	52	5	606
Georgia	1,522	1,102	35	1,066	396	23	^	38
Hawaii	214	69	5	64	^	144	^	11
Idaho	304	300	8	292	^	^	^	8
Illinois	2,275	1,950	135	1,814	277	47	^	136
Indiana	1,268	1,172	23	1,147	89	7	^	24
Iowa	670	657	8	650	8	4	^	8
Kansas	565	530	16	513	25	5	5	17
Kentucky	872	822	5	816	46	3	^	5
Louisiana	828	605	13	592	218	4	^	13
Maine	299	295	^	293	^	^	^	^
Maryland	1,041	735	22	711	269	35	^	24
Massachusetts	1,209	1,123	40	1,067	60	25	^	43
Michigan	2,027	1,782	30	1,749	219	19	7	32
Minnesota	1,040	995	13	981	24	14	7	14
Mississippi	545	384	^	382	159	^	^	^
Missouri	1,186	1,073	8	1,063	105	7	^	9
Montana	197	191	^	188	^	^	5	^
Nebraska	355	342	9	332	10	^	^	9
Nevada	441	379	41	339	36	23	^	42
New Hampshire	250	247	^	246	^	^	^	^
New Jersey	1,586	1,352	131	1,220	178	54	^	134
New Mexico	322	297	112	185	6	^	17	112
New York	3,472	2,872	308	2,535	468	127	6	326
North Carolina	1,759	1,396	31	1,361	337	16	11	32
North Dakota	142	137	^	136	^	^	4	^
Ohio	2,398	2,164	21	2,141	218	15	^	21
Oklahoma	752	657	16	641	45	6	44	17
Oregon	777	744	20	723	10	17	7	21
Pennsylvania	2,747	2,499	44	2,442	222	25	^	46
Rhode Island	204	197	7	190	5	^	^	7
South Carolina	947	721	9	712	221	5	^	11
South Dakota	170	163	^	162	^	^	6	^
Tennessee	1,291	1,121	10	1,109	164	5	^	11
Texas	3,810	3,319	800	2,515	404	82	4	803
Utah	373	362	20	341	^	7	^	21
Vermont	129	127	^	126	^	^	^	^
Virginia	1,352	1,073	30	1,039	244	34	^	32
Washington	1,216	1,108	37	1,071	34	58	16	38
West Virginia	434	420	^	418	12	^	^	^
Wisconsin	1,155	1,097	18	1,079	43	9	6	19
Wyoming	101	99	^	96	^	^	^	^

Table 33. Surveillance, Epidemiology, and End Results (SEER) Program (www.seer.cancer.gov) SEER*Stat Database: Mortality - All COD, Aggregated With State, Total U.S. (1990-2017) <Katrina/Rita Population Adjustment>, National Cancer Institute, DCCPS, Surveillance Research Program, released December 2019. Underlying mortality data provided by NCHS (www.cdc.gov/nchs).

* The National Center for Health Statistics (NCHS) US data, reported by SEER, does not include MDS nor MPNs as a cause of death. Therefore, mortality counts for blood cancers only include lymphomas, leukemias and myelomas.

** Hispanics are not mutually exclusive from whites, Blacks, Asian/Pacific Islanders, and American Indians/Alaska Natives.

^ Statistic not displayed due to fewer than 16 total cases in the 5-year period.

Average Annual Leukemia Incidence and Deaths, by State

Average Annual Leukemia Incidence Counts By State, 2013-2017.* All Races, Males and Females

State	Leukemia	Acute Lymphocytic Leukemia	Chronic Lymphocytic Leukemia	Acute Myeloid Leukemia	Chronic Myeloid Leukemia
Alabama	659	62	223	202	91
Alaska	76	9	20	25	11
Arizona	815	120	202	280	111
Arkansas	487	44	189	140	71
California	4,970	770	1,504	1,572	637
Colorado	720	75	249	228	92
Connecticut	620	54	247	175	80
Delaware	144	14	48	48	17
Dist. of Columbia	53	9	13	17	8
Florida	4,867	381	1,830	1,290	678
Georgia	1,484	135	548	435	219
Hawaii	179	24	38	68	31
Idaho	287	31	111	77	41
Illinois	1,818	207	576	622	237
Indiana	980	95	329	336	135
Iowa	606	50	238	189	77
Kansas	488	42	196	139	66
Kentucky	804	65	306	233	122
Louisiana	707	61	265	209	108
Maine	255	20	114	70	28
Maryland	793	84	265	257	106
Massachusetts	926	90	307	308	129
Michigan	1,596	144	561	517	225
Minnesota	1,006	82	407	305	134
Mississippi	397	40	133	127	62
Missouri	959	82	338	316	127
Montana	190	12	90	46	22
Nebraska	296	32	100	97	37
Nevada	377	45	126	111	45
New Hampshire	218	18	82	64	28
New Jersey	1,592	155	624	443	204
New Mexico	313	38	107	90	46
New York	3,728	308	1,537	1,046	478
North Carolina	1,602	146	608	468	228
North Dakota	131	11	58	33	18
Ohio	1,576	167	496	531	208
Oklahoma	594	59	215	178	85
Oregon	600	62	217	193	67
Pennsylvania	2,309	201	860	723	297
Rhode Island	177	13	66	50	26
South Carolina	727	70	246	233	110
South Dakota	159	13	62	46	27
Tennessee	983	100	345	298	142
Texas	3,563	502	1,183	908	517
Utah	374	51	127	110	47
Vermont	92	9	33	31	11
Virginia	947	105	272	327	131
Washington	1,141	118	456	324	146
West Virginia	346	21	127	114	50
Wisconsin	1,096	75	451	299	168
Wyoming	83	9	29	25	11
United States	**49,909**	**5,129**	**17,774**	**14,970**	**6,794**

Table 34. National Program of Cancer Registries and Surveillance, Epidemiology, and End Results SEER*Stat Database: NPCR and SEER Incidence - U.S. Cancer Statistics 2001-2017 Public Use Research Database, 2019 Submission (2001-2017), United States Department of Health and Human Services, Centers for Disease Control and Prevention and National Cancer Institute. Released June 2020. Accessed at www.cdc.gov/cancer/uscs/public-use.

* In previous publications, total 5-year incidence counts were provided rather than yearly averages.

Average Annual Leukemia Deaths By State, 2013-2017.* All Races, Males and Females

State	Leukemia	Acute Lymphocytic Leukemia	Chronic Lymphocytic Leukemia	Acute Myeloid Leukemia	Chronic Myeloid Leukemia
Alabama	365	20	55	135	14
Alaska	32	^	4	18	^
Arizona	489	41	96	210	21
Arkansas	251	13	42	99	12
California	2,426	238	419	1,095	117
Colorado	318	19	66	147	14
Connecticut	273	16	55	120	15
Delaware	77	4	15	39	4
Dist. of Columbia	32	3	6	12	^
Florida	1,798	114	316	778	91
Georgia	603	40	97	236	30
Hawaii	83	4	10	40	5
Idaho	120	8	23	52	5
Illinois	953	52	174	401	45
Indiana	515	28	103	246	21
Iowa	270	15	64	125	11
Kansas	243	13	54	102	12
Kentucky	365	21	75	154	16
Louisiana	325	17	52	120	15
Maine	119	6	25	53	5
Maryland	412	20	78	173	19
Massachusetts	500	27	105	220	19
Michigan	809	46	166	339	39
Minnesota	431	23	101	200	19
Mississippi	226	12	35	73	9
Missouri	507	29	100	232	20
Montana	79	5	20	32	4
Nebraska	152	8	34	72	7
Nevada	192	15	29	83	8
New Hampshire	102	5	22	44	4
New Jersey	655	36	119	263	26
New Mexico	127	9	21	59	4
New York	1,426	88	263	670	57
North Carolina	694	39	139	312	37
North Dakota	60	3	12	29	^
Ohio	973	52	185	419	49
Oklahoma	327	24	58	126	15
Oregon	306	17	62	142	15
Pennsylvania	1,120	55	224	481	45
Rhode Island	89	5	19	35	5
South Carolina	381	23	66	162	22
South Dakota	73	4	17	29	4
Tennessee	511	27	101	219	29
Texas	1,576	137	254	648	85
Utah	163	12	32	63	8
Vermont	52	3	11	27	2
Virginia	536	27	107	232	23
Washington	498	36	101	253	22
West Virginia	183	9	40	75	9
Wisconsin	494	24	93	226	24
Wyoming	45	3	7	21	^
United States	**23,355**	**1,495**	**4,373**	**10,140**	**1,094**

Table 35. Surveillance, Epidemiology, and End Results (SEER) Program (www.seer.cancer.gov) SEER*Stat Database: Mortality - All COD, Aggregated With State, Total U.S. (1969-2017) <Katrina/Rita Population Adjustment>, National Cancer Institute, DCCPS, Surveillance Research Program, released December 2019. Underlying mortality data provided by NCHS (www.cdc.gov/nchs).

^ Statistic not displayed due to fewer than 10 total deaths in the 5-year period. The suppressed cases, however, are included in the counts for the US combined.

* In previous publications, total 5-year death counts were provided rather than yearly averages.

Notes and Definitions

The classification of leukemia, myeloma and lymphomas used in this publication is based on The National Cancer Institute's Surveillance, Epidemiology, and End Results' (SEER) site recode definition (https://seer.cancer.gov/siterecode/icdo3_dwhoheme/index.html). This is consistent with the classifications used for most national cancer reporting, including SEER, United States Cancer Statistics (USCS) and the North American Association of Central Cancer Registries (NAACCR). Myelodysplastic syndromes (MDS) are defined using International Classification of Diseases-Oncology, Third Edition (ICD-O-3), histologic type codes 9980-9989. Myeloproliferative neoplasms (MPN) are defined using ICD-O-3 histologies 9950-9964.

The data within *Facts 2020-2021* reflect the most recent statistics from The National Cancer Institute's SEER Program, ***Cancer Statistics Review (CSR)*** 1975-2017. The CSR reports cancer incidence, mortality, survival, prevalence and lifetime risk statistics. Incidence, prevalence and survival data were released online by SEER, www.seer.cancer.gov, on April 15, 2020. New SEER statistics are expected to be published in the spring of 2021.

Incidence and mortality rates measure exactly what occurred and cover the entire period through the most recent year reported, 2017. However, in order to calculate survival rates, the most current year of data is not considered, because not enough time has passed for it to be included.

The SEER Program's CSR presents statistics by age, sex, race and ethnicity. Statistics for these categories reflect a blend of biological and cultural factors. Additionally, data reported by race and ethnicity represent both the diversity and the mixed heritage of the United States (US) population.

Data on Hispanic ethnicity are not shown for statistics/years for which they are not available. The Hispanic ethnicity categorization is not mutually exclusive with race, so in instances where comparisons are made using ethnicity, the groupings Hispanic whites and non-Hispanic whites are used when available to enable meaningful comparisons.

Mortality data reflected in the 2020 referenced SEER report reflect data from the National Cancer for Health Statistics (NCHS) from 1969 to 2017 and were made available in 2020. State-level mortality data is also provided by NCHS and is presented as a yearly average of deaths from 2013-2017.

When reporting statistics using the SEER data, different populations are used depending on the statistic type. The SEER 21 regions, used for recent incidence rates, cover about 36.7 percent of the US population. Survival data is not available for all of the SEER 21 areas, so the SEER 18 areas (about 27.8 percent of the US population) are used for recent survival statistics. Data is not available for either the SEER 21 or SEER 18 regions before 2000, so long-term incidence and survival trends must rely on a smaller subset of the data, most often SEER 9, which covers only about 9.4 percent of the US population. The data can be extrapolated for the entire US by multiplying by the population ratio, but these figures do not take into account differences in geography, race and ethnicity in various regions, or region-specific health risks.

Data on American Indians and Alaska Natives (AIs/ANs) should be interpreted with care because the data reflect statistics from purchased/referred care delivery areas only. A purchased/referred care delivery area (PRCDA) is a geographic area within which purchased/referred care is made available by the Indian Health Service (IHS) to members of an identified Indian community who reside in the area. A PRCDA was formerly a contract health service delivery area (CHSDA). Many AIs/ANs do not reside in such counties, and other AI/AN individuals are not members of federally recognized tribes and cannot avail themselves of IHS services.

Limited data on MDS and MPNs were included in the SEER statistics as entities on their own beginning in 2007.

The American Cancer Society (ACS) projected the number of estimated cancer cases for 2021 using a model based on incidence data from 50 states and the District of Columbia for the years from 2003 to 2017. That incidence data met the NAACCR's high-quality data standard for incidence. This method considers geographic variations in sociodemographic and lifestyle factors, medical settings and cancer screening behaviors as predictors of incidence, and also accounts for expected delays in case reporting. The ACS projected the estimated number of US cancer deaths by fitting the number of cancer deaths from 2004 to 2018 to a statistical model that forecasts the number of deaths expected to occur in 2021. The estimated number of cancer deaths for each state is calculated similarly, using state-level data. For both US and state estimates, data on the number of deaths are obtained from the National Center for Health Statistics (NCHS) at the Centers for Disease Control and Prevention (CDC).

In instances where 2021 incidence count estimates are not available from the ACS, actual national incidence counts were obtained using the USCS public use database, which contains cancer incidence for the entire US for 2001 to 2017, sourced from the CDC's National Program for Cancer Registries (NPCR) and SEER. National and state-level incidence counts are presented as a yearly average of the 5 most recent years of US incidence available.

Definitions

Age-adjusted rate is an incidence or death rate that has been adjusted to reduce the bias of age in the makeup of the populations that are being compared, thereby providing a more reliable rate for comparison. Incidence or death rates can be adjusted for any demographic factor or any combination of factors, such as age (the most common), sex and race.

Incidence is the number of newly diagnosed cases either for a specific cancer, or for all cancers combined, during a specific

time period. When expressed as a rate, it is the number of new cases per standard unit of population during the time period. Incidence rates can be calculated based on a number of factors, such as age, race or sex.

Prevalence is the estimated number of people alive on a certain date in a population who previously had a diagnosis of the disease. It includes new cases (incidence) and preexisting cases and is a function of both past incidence and survival. Prevalence may be calculated in a number of different ways, especially in looking at populations in which individuals have had more than one type of cancer. In some prevalence statistics, only the first diagnosed cancer counts. Thus, if a person is initially diagnosed with melanoma and later develops leukemia, his or her survival with leukemia may not be counted in leukemia prevalence statistics. Therefore, prevalence numbers reported may vary depending upon the method used to determine them. In this report, complete prevalence is reported as defined by SEER as "an estimate of the number of persons (or the proportion of population) alive on a specified date who had been diagnosed with the given cancer, no matter how long ago that diagnosis was." Most prevalence in this publication is using the "25-year limited duration" prevalence figures, based on the "first invasive tumor for each cancer site diagnosed during the previous 25 years (1992-2016)," as per SEER Table 1.21. Because MDS and MPNs have been collected for a shorter period of time, 13-year limited duration prevalence is used for those cancers. The specified date is January 1, 2017 for the prevalence estimates. The prevalence counts in *Facts 2020-2021* are adjusted for race, sex and age.

Relative survival rate is an estimate of the percentage of patients who would be expected to survive the effects of the cancer. This rate is calculated by adjusting the observed survival rate so that the effects of causes of death other than those related to the cancer in question are removed. The relative survival rate is a comparison of survival to that of a person who is free of the disease. ("Observed survival" is the actual percentage of patients still alive at some specified time after diagnosis of cancer. It considers deaths from all causes, cancer or otherwise.)

Remission is when signs of a disease disappear. This usually follows treatment. The words "complete" and "partial" are sometimes used to further define the term "remission." Complete remission means that all evidence of the disease is gone. Partial remission means that the disease is markedly improved by treatment, but residual evidence of the disease is present.

About The Leukemia & Lymphoma Society

The Leukemia & Lymphoma Society (LLS) has helped millions impacted by blood cancer since our founding in 1949, funding research to advance breakthroughs and providing lifesaving support and advocacy for patients.

- **LLS has invested nearly $1.3 billion in research since our founding in 1949, leading to breakthroughs in cancer treatment.**
- **LLS is the leading source of free blood cancer information, education and support, and helps patients navigate their cancer treatment, access quality care and find clinical trials.**
- **LLS advocates for policy changes to break down the barriers that stand between patients and the care they need.**

Research

Since our founding in 1949, LLS has invested nearly $1.3 billion in research to advance therapies and save lives. We provide funding across the continuum, from basic research through clinical trials—from bench to bedside. LLS research grants have funded many of today's most promising advances, including targeted therapies and immunotherapies. Our funding supports the training of the next generation of first-rate cancer researchers.

Our **Research Grant programs** support scientific studies at academic centers throughout the world.

- The *Career Development Program (CDP)* provides stipends to investigators of exceptional promise in the early stages of their careers. CDP is stratified into two separately reviewed programs: basic or clinical research.
- The *Translational Research Program (TRP)* supports outstanding investigations likely to translate basic biomedical discoveries into safe and effective treatments. Awards are for an initial 3 year period. Renewals to support clinical trials are possible for an additional 2 years.
- The *Specialized Center of Research Program (SCOR)* encourages multidisciplinary academic investigations by teams of at least three research groups, regardless of their location.
- The *Screen to Lead Program (SLP)* provides support for medicinal chemistry and/or drug target screening in blood cancers.
- The *Blood Cancer Discoveries Grants Program (BCDG)* supports groundbreaking early-stage research aimed at understanding and advancing the treatment and cure of blood cancers.
- The *Impactful Medicine Providing Access to Clinical Trials (IMPACT)* program supports clinical trial networks that expand access to patients in underserved communities.

LLS creates partnerships with universities and biotechnology and pharmaceutical companies to get treatments to patients faster than ever—especially to patients with unmet medical needs.

Our ***Therapy Acceleration Program® (TAP)*** speeds the path of potentially better therapies into preclinical development and clinical trials. Working with academic investigators, medical centers, and biotechnology and pharmaceutical companies, TAP is increasing the likelihood that breakthrough treatments will be available to patients sooner. Three TAP programs have led to FDA-approved therapies in 2017-2018.

LLS has foundation partnerships with

- The MPN Research Foundation, to fund innovative grants to better understand and treat the range of myeloproliferative neoplasms (MPN)
- The International Waldenström's Macroglobulinemia (WM) Foundation, to fund research to improve quality of life and to better understand and treat WM and other B-cell malignancies
- The Rising Tide Foundation for Clinical Cancer Research, to fund novel immunotherapy and prevention research linked to clinical trials for all blood cancers
- The Babich Family Foundation/***RUNX1*** Research Program, to fund translational research seeking to control familial platelet disorder (FPD) leading to acute myeloid leukemia (AML)
- The Sarah Cannon Research Institute, to fund an intensive research program in mantle cell lymphoma
- The Snowdome Foundation, to fund translational research on blood cancer in Australia
- The Mark Foundation and The Paul G. Allen Frontiers Group, to fund early-stage discovery research
- Major partnerships with University of Colorado, University of Miami, Weill Cornell Medical School, Emory University and the Fred Hutchinson Cancer Center, to support large, multi-investigator research grants.

Visit www.LLS.org or email researchprograms@LLS.org for information about LLS research grant programs.

Public Policy

LLS recognizes that finding cures is not enough. We must also work diligently to ensure patients have access to treatments that allow them to live healthy, productive lives. The LLS Office of Public Policy (OPP) is dedicated to removing public policy barriers that pose obstacles to treatment. The Office of Public Policy works directly with lawmakers and regulators in Washington, DC and state capitals across the country to advance policies that promote patients' access to affordable health insurance

coverage and medical care. The Office of Public Policy also promotes policies that ensure new, innovative treatments can reach blood cancer patients safely and without delay.

The department is composed of leaders in government affairs, public policy, advocacy and communications. They are proud to work closely with an incredible network of volunteer patient advocates whose lives have been touched by blood cancer. Together, we work to elevate the voices of cancer patients and their families and make their interests heard by all levels of government.

The work of OPP helps to provide more patients with life-saving treatment.

To learn more about OPP's work and how to get involved, visit www.LLS.org/Policy-Advocacy or text SPEAK to 698-66 to join the LLS Mobile Action Network.

Education and Support Services

LLS is the leading source of free blood cancer information, education and support. To help ensure access to the latest treatments and survivorship care, and improve quality of life, staff and volunteers provide assistance and resources to patients, caregivers and healthcare professionals nationally and in communities through our chapters across the United States (US) and Canada.

- **Personalized disease and treatment information and support.** Our Information Specialists are highly trained oncology social workers, nurses and health educators who provide free one-on-one assistance to patients, families and healthcare professionals. These Specialists offer personalized guidance for coping with a blood cancer diagnosis, current disease and treatment information, and referral to financial and support resources within LLS and beyond.

  Information Specialists can be contacted at (800) 955-4572, Monday through Friday, from 9 am to 9 pm Eastern Time, or by email or live chat at www.LLS.org/InformationSpecialists.

- **Clinical Trial Support Center (CTSC).** Patients and caregivers can work one-on-one with an LLS Clinical Trial Nurse Navigator who will conduct a comprehensive clinical trial search and personally assist them throughout the entire clinical trial process. Clinical Trial Nurse Navigators are registered nurses with expertise in blood cancers. To speak with a CTSC nurse navigator at no cost, call our Information Specialists or visit www.LLS.org/CTSC.

- **Nutrition consultations.** LLS offers free one-on-one nutrition consultations to patients and caregivers by phone or email with a registered dietitian who has expertise in oncology nutrition. Visit www.LLS.org/nutrition.

- **Assistance with financial burdens.** The Leukemia & Lymphoma Society (LLS) offers financial assistance to help individuals with blood cancer.
  - Our *Co-Pay Assistance Program* has provided almost $700 million to date to help patients pay for out-of-pocket expenses related to health insurance, including premiums, co-pays and deductibles. The program also assists with prescribed treatment-related and supportive medications, like chemotherapy and antibiotics, as well as treatment-related scans, labs and tests. Eligibility for this program is based on fund availability for specific blood cancer diagnoses and financial need criteria. A current list of funds by blood cancer diagnosis is available at www.LLS.org/copay or at (877) 557-2672.
  - Our *Patient Aid Program* provides financial assistance to blood cancer patients. Eligible patients will receive a one-time $100 stipend to help offset expenses. There are no income criteria to qualify for this program. Visit www.LLS.org/PatientAid or call (877) 557-2672.
  - Our *Susan Lang Pay-it-Forward Patient Travel Assistance Program* provides financial assistance to patients diagnosed with a blood cancer who struggle to pay for treatment-related transportation and/or lodging expenses. Eligible patients will receive $500. Patient assistance is based upon available funding. Visit www.LLS.org/travel or call (877) 557-2672.
  - Our *Susan Lang Pre CAR T-cell Therapy Travel Assistance Program* is available to blood cancer patients with significant financial need who are being evaluated to receive CAR T-cell therapy as either standard treatment or a clinical trial. Eligible patients will receive $2,500 to help pay for approved transportation and/or lodging expenses. Patient assistance is based upon available funding. Visit www.LLS.org/PreCARTtravel or call (877) 557-2672.
  - Our *Urgent Need Program,* established in partnership with Moppie's Love and Charlie's Fund, helps pediatric, young adult and adult blood cancer patients with acute financial need. The program provides a $500 grant to assist with non-medical expenses, including utilities, rent, mortgage, food, lodging, dental care, childcare, elder care and other essential needs. Patient assistance is based upon available funding. Visit www.LLS.org/UrgentNeed or call (877) 557-2672.

For information about all LLS Financial Assistance Programs, visit www.LLS.org/finances.

- **Information booklets.** Free disease, treatment and support booklets in English, Spanish and several other languages are available through our Information Specialists and LLS chapters, and can be downloaded and ordered at www.LLS.org/booklets.

- **Education programs.** LLS provides free education programs for patients, caregivers and healthcare professionals.

  Programs and videos for patients and caregivers feature experts who share the latest disease, treatment and research updates, including information about survivorship. These programs are available via telephone and Web. Visit www.LLS.org/programs and www.LLS.org/EducationVideos.

LLS also offers free continuing education programs for nurses, social workers and physicians. Visit www.LLS.org/ProfessionalEd.

- **Free Mobile Apps**
  - LLS Health Manager™ – Helps you track side effects, medication, food and hydration, questions for your doctor, and more. Visit www.LLS.org/HealthManager to download for free.
  - LLS Coloring For Kids™ – Allows children to express their creativity and offers activities to help them learn about blood cancer and its treatment. Visit www.LLS.org/ColoringApp to download for free.
- **Podcasts.**
  - Our podcast series for patients and caregivers, *The Bloodline with LLS*, features patients, caregivers, advocates, doctors and other healthcare professionals who discuss diagnosis, treatment options, quality-of-life concerns, treatment side effects, doctor-patient communication and other important survivorship topics. For more information and to subscribe, visit www.LLS.org/TheBloodline.
  - Our podcast series for healthcare professionals (HCPs), *Treating Blood Cancers,* provides up-to-date and accurate information on diagnosis, treatment and survivorship to educate HCPs. For more information and to subscribe, visit www.LLS.org/CE.
- **Connection with other blood cancer survivors.** LLS has created many opportunities for peer-to-peer support.
  - Weekly online chats are moderated by a licensed social worker; the chats give cancer patients and caregivers the opportunity to reach out, share information, and provide support to one another in a structured, online setting. For more information, visit www.LLS.org/chat.
  - The *Patti Robinson Kaufmann First Connection® Program* gives patients and caregivers the opportunity to talk about their experiences one-on-one with someone who has "been through it," and obtain valuable information about the community resources available to support them. Visit www.LLS.org/FirstConnection.
  - *LLS Community* is a one-stop virtual meeting place for talking with other patients and caregivers, receiving the latest blood cancer resources and information, and getting personalized support from trained LLS staff. To join, visit www.LLS.org/community.
  - Support groups in local communities provide mutual support and offer the opportunity to discuss anxieties and concerns with others who share the same experiences. To find out if there is a support group near you, visit www.LLS.org/ChapterFind to contact your chapter.
- **Blood Cancer Conferences.** LLS Blood Cancer Conferences are free educational events where blood cancer patients, caregivers and their families can learn more about the latest disease-specific breakthroughs, current treatments and survivorship information from local and national experts. Visit www.LLS.org/BCC for a list of these upcoming events.
- ***Myeloma Link.*** *Myeloma Link* is a special program designed to connect Black communities to information, expert myeloma care, treatment and support, as the rate of myeloma is twice as high among Blacks than whites. This unique community-based program is currently being implemented in select cities around the US. Visit www.LLS.org/MyelomaLink to learn more.

Visit www.LLS.org/PatientSupport for access to up-to-date disease, treatment and support information.

Citations and Acknowledgements

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LEUKEMIA & LYMPHOMA SOCIETY®

The Leukemia & Lymphoma Society 3 International Drive, Suite 200, Rye Brook, NY 10573 914-949-5213

The mission of The Leukemia & Lymphoma Society (LLS) is to cure leukemia, lymphoma, Hodgkin's disease and myeloma, and improve the quality of life of patients and their families. Find out more at www.LLS.org.

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