

## Cancer

The term “cancer” is used to characterize diseases in which abnormal cells divide without control. A cancerous cell loses its ability to regulate its own growth, control cell division, and communicate with other cells. Cancer cells can invade nearby tissues and can spread through the bloodstream and lymphatic system to other parts of the body (NCI, n.d.). The risk of developing cancer increases with age. Environmental exposures, genetic predisposition, certain viruses, and socioeconomic factors may all play a role in the development and progression of the disease.

For the U.S. population, age-adjusted cancer incidence rates for all sites combined decreased from 2002 to 2011 for men and women overall and for all racial and ethnic populations (Kohler et al., 2015). Nevertheless, cancer continues to be the second leading cause of death in the U.S., accounting for about 23 percent of all deaths in 2013 ( [General Mortality](#) indicator). Many different types of cancer exist. These can develop in various organs and tissues within the body and contributing causal factors can vary depending on the cancer site and type. Therefore, tracking rates for individual cancer sites is more meaningful when evaluating cancer trends.

Many factors are known to contribute, or are suspected of contributing, to cancer risk. These include lifestyle factors (for instance, tobacco and alcohol use), exposures on the job, or other environmental exposures, including medical exposures. These factors may contribute individually (i.e., additively) or synergistically (i.e., producing an effect greater than the sum of each factor acting alone) to the development of cancer. Further, the cancer hazard to any individual is dependent on the amount and duration of exposure and the individual’s susceptibility to a particular substance. Only in a small number of cases is it known what specific exposures or conditions are responsible for the onset and development of cancers (NTP, 2016).

This indicator presents cancer incidence rates for the U.S. population from 1973 to 2012 using data collected through the National Cancer Institute’s Surveillance, Epidemiology, and End Results (SEER) Program. The SEER Program collects and publishes cancer incidence and survival data from 9 (SEER 9), 13 (SEER 13), and 18 (SEER 18) population-based cancer registries, including state, central, metropolitan, and Alaska Native registries. This indicator uses data collected through NCI’s SEER 9 Registries, which cover nearly 10 percent of the U.S. population and have the most years of available data (NCI, 2015). The 10 most commonly diagnosed cancer sites presented are based on 2012 data compiled from SEER. Site classifications (e.g., lung and bronchus, colon and rectum) were compared to the American Cancer Society’s “leading sites” classification to ensure consistency in how data are presented (ACS, 2015).

### What the Data Show

Although a slow steady increase in cancer incidence generally occurred between 1973 and 1992, peaking in 1992 with an age-adjusted cancer incidence of 511 cases per 100,000, overall incidence rates appear to have remained stable or slowly declined since that time. Some differences exist in incidence rates across age, sex, and racial groups (Exhibit 1).

During 2012, those ages 65 and older had the highest incidence rates (1,981 cases per 100,000) compared to all other age categories. Total (all sites combined) cancer incidence rates are higher for males compared to females and for blacks compared to whites (Exhibit 1). The age-adjusted cancer incidence rate in 2012 for blacks was 474 cases per 100,000 compared to 450 cases per 100,000 for

whites; the age-adjusted cancer incidence rate in 2012 was 483 cases per 100,000 for males compared to 416 cases per 100,000 among females.

Exhibits 2 and 3 show the differences between the top 10 cancer sites in males and females, respectively. For both, the top three cancers represent roughly half of all newly identified cancer cases in 2012. Among the most notable differences is the rate of urinary bladder cancer, which continues to be the fourth leading cancer identified among males (36.1 cases per 100,000 in 2012). This rate is more than four times that of females (9.0 cases per 100,000 in 2012) (data not shown). Melanoma of the skin is also higher among males (29.4 cases per 100,000) than females (18.1 cases per 100,000). In 2012, thyroid cancer continued as the fifth leading cancer in females (21.7 cases per 100,000), but is not among the top 10 for males (8.0 cases per 100,000) (data not shown).

Exhibit 4 displays age-adjusted cancer incidence rates for the top 10 cancers in males in 2012, and shows incidence rate trends for these 10 cancers between 1973 and 2012. Prostate cancer incidence rates increased dramatically between 1986 and the early 1990s, with a decline in rates between 1992 and 1995. This increase is likely due to the introduction of serum prostate-specific antigen testing for the early detection and screening of prostate cancer (Hankey et al., 1999). Colon and rectum, lung and bronchus, urinary bladder, and non-Hodgkin's lymphoma have either been relatively stable or have showed a small decline over the last decade. The incidence rate of melanoma of the skin exceeded that of non-Hodgkin's lymphoma for the last eight years (2005-2012).

Trends over the last decade among the less prevalent site-specific cancers in males show some increases in incidence rates. For example, rates for cancers of the kidney and renal pelvis have increased from 17.9 (2002) to 20.8 (2012) cases per 100,000. The incidence rate for cancer of the pancreas has increased from 13.1 (2002) to 14.5 (2012) cases per 100,000 (Exhibit 4).

As shown in Exhibit 5, among females, breast cancer remains the leading cancer and incidence rates have generally increased from 1973 to 1999, with a small but notable overall decline after 1999. While lung and bronchus is the second leading cancer among men and women in 2012, rates among men have slowly declined over the past decade and rates among women were relatively steady from 2000 to 2009, and have decreased since then.

The incidence rate of colon and rectum cancer among women increased between 1973 and 1985, but has generally declined slowly since. The incidence of uterine (corpus uteri) cancer in females was relatively stable from the mid-1980s through 2007, ranging from 24 (1986) to 24.7 (2007) cases per 100,000; rates increased slightly from 2008 (25.6 cases per 100,000) to 2012 (26.8 cases per 100,000). The incidence rate of melanoma of the skin has fluctuated since 1999, but it was consistently above thyroid cancer from 1973 until 2007, when thyroid cancer surpassed melanoma of the skin. There was an approximate three-fold increase in the rate of thyroid cancer and melanoma of the skin over the entire reporting period.

Trends over the last decade among the less prevalent site-specific cancers in females show relatively stable or slightly declining incidence rates for non-Hodgkin's lymphoma and cancer of the pancreas. Incidence rates decreased more notably for cancers of the ovary, from 13.9 (2002) to 11.9 (2012) cases per 100,000. However, rates for cancer of the kidney and renal pelvis have increased from 8.9 (2002) to 10.7 (2012) cases per 100,000 (Exhibit 5).

## Limitations

- SEER 9 Registries data cover approximately 10 percent of the U.S. population, though it is designed to be representative of the entire U.S. population. EPA acknowledges that other cancer incidence data sources exist, and is examining and considering these other sources for

future ROE updates.

- Incidence data generated from SEER are updated annually. There may be changes in the numerator (e.g., revised counts of newly identified cases) or denominator (e.g., revised population counts) numbers that result in small changes in the overall incidence rates for the same year, depending on when a query is run within the SEER database. For example, the SEER database queried in 2009 generating incidence rates for the year 2000 may provide different incidence rates than the database queried in 2008 for the year 2000.

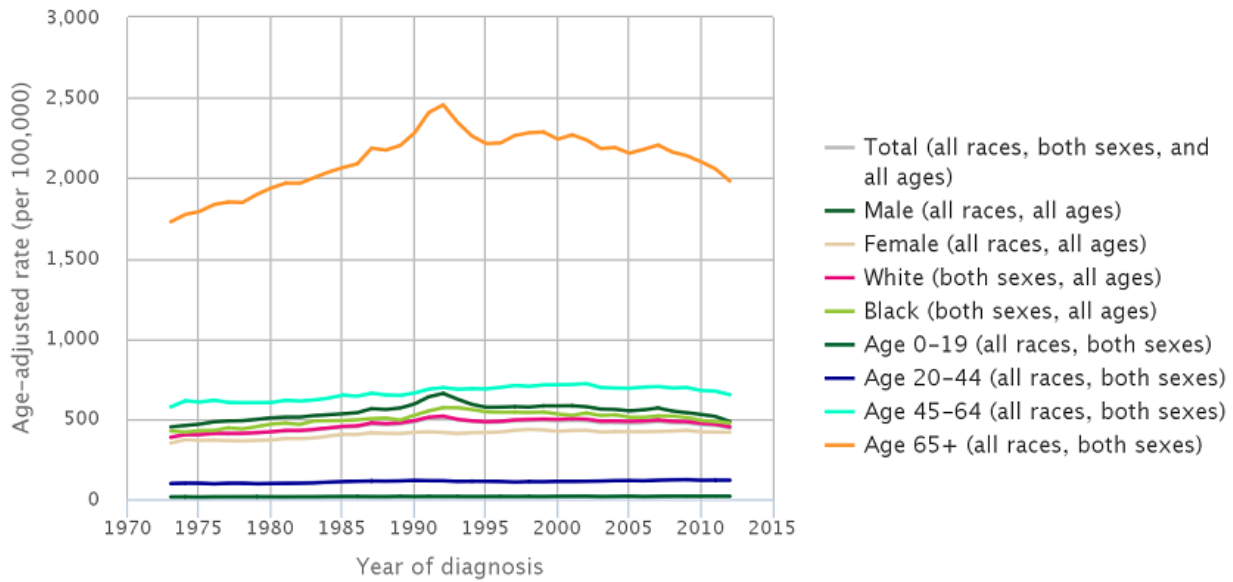
## Data Sources

Cancer incidence data for this indicator were obtained by querying the National Cancer Institute's SEER Program database through its Cancer Query System (CanQues) (NCI, 2015), available at <http://seer.cancer.gov/canques/incidence.html>.

## References

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<https://ntp.niehs.nih.gov/pubhealth/roc/index-1.html>.

**Exhibit 1. Age-adjusted cancer incidence rates in the U.S., 1973-2012: All cancer sites for all ages, by sex, race, and age group**



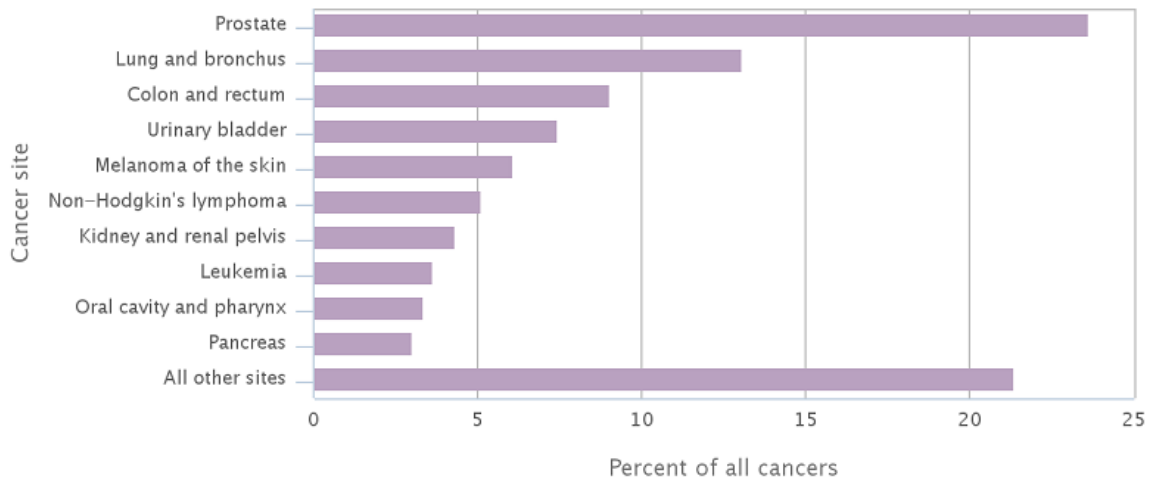
Rates are age-adjusted to the 2000 U.S. standard population.

Rates for age groups are not age-adjusted.

Information on the statistical significance of the trends in this exhibit is not presented here. For more information about uncertainty, variability, and statistical analysis, view the technical documentation for this indicator.

Data source: NCI, 2015

## Exhibit 2. Age-adjusted cancer incidence rates in the U.S., 2012: 10 leading cancer sites for males



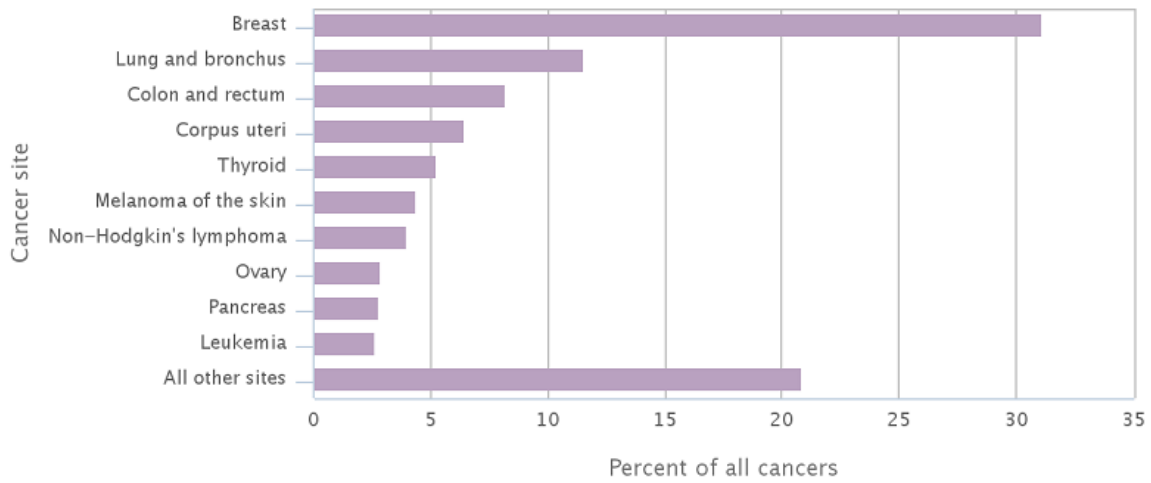
Excludes basal and squamous cell skin cancers and in situ carcinoma, except urinary bladder.

Rates are age-adjusted to the 2000 U.S. standard population.

Trend analysis has not been conducted because these data represent a single snapshot in time. For more information about uncertainty, variability, and statistical analysis, view the technical documentation for this indicator.

Data source: NCI, 2015

### Exhibit 3. Age-adjusted cancer incidence rates in the U.S., 2012: 10 leading cancer sites for females



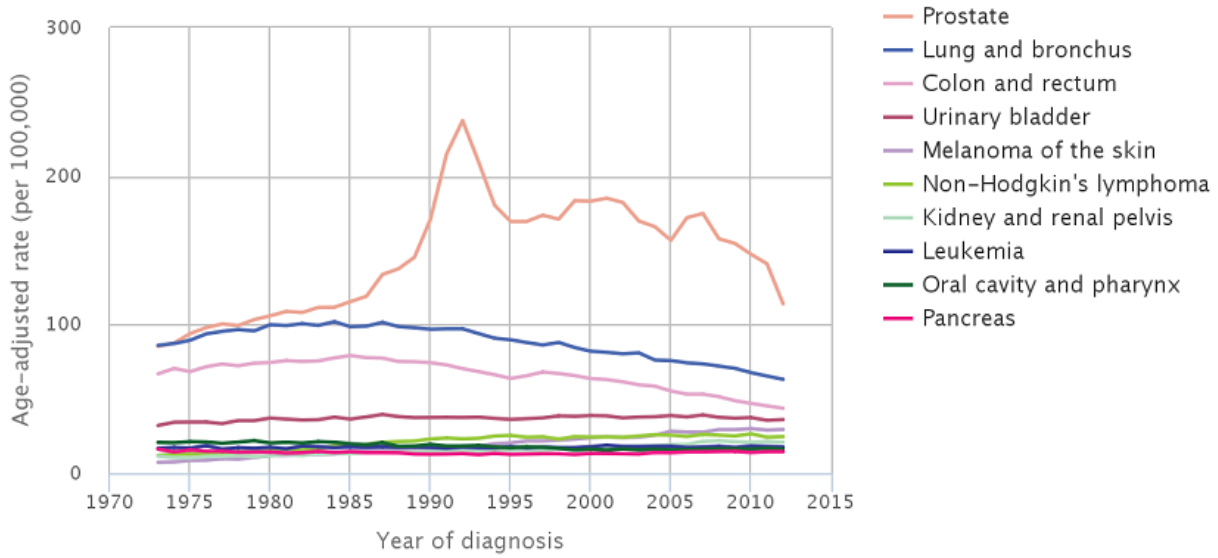
Excludes basal and squamous cell skin cancers and in situ carcinoma, except urinary bladder.

Rates are age-adjusted to the 2000 U.S. standard population.

Trend analysis has not been conducted because these data represent a single snapshot in time. For more information about uncertainty, variability, and statistical analysis, view the technical documentation for this indicator.

Data source: NCI, 2015

### Exhibit 4. Age-adjusted cancer incidence rates in the U.S., 1973-2012: Top 10 cancers in males of all ages

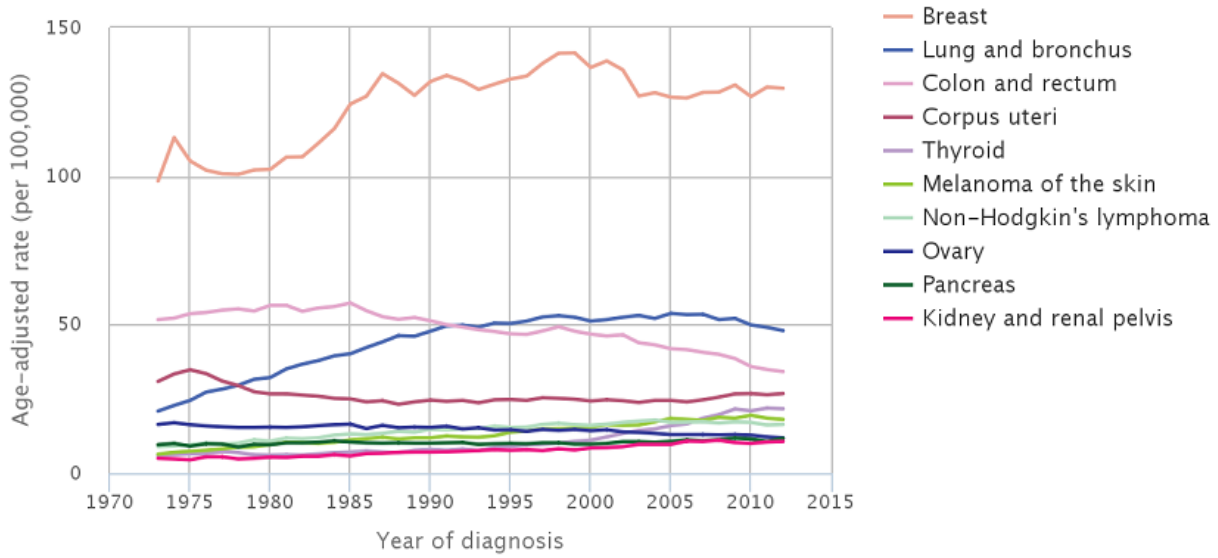


Rates are age-adjusted to the 2000 U.S. standard population.

Information on the statistical significance of the trends in this exhibit is not presented here. For more information about uncertainty, variability, and statistical analysis, view the technical documentation for this indicator.

Data source: NCI, 2015

### Exhibit 5. Age-adjusted cancer incidence rates in the U.S., 1973-2012: Top 10 cancers in females of all ages



Rates are age-adjusted to the 2000 U.S. standard population.

Information on the statistical significance of the trends in this exhibit is not presented here. For more information about uncertainty, variability, and statistical analysis, view the technical documentation for this indicator.

Data source: NCI, 2015