Type of EPHT Indicator	Health Outcome
Measures	1. Annual number of cases in children < 20 years of age 2. Annual number of cases in children < 15 years of age 3. Annual age-adjusted incidence rate in children < 20 years of age per 1,000,000 population 4. Annual age-adjusted incidence rate in children < 15 years of age per 1,000,000 population Number of cases and incidence rates will be available by predetermined sex and race/ethnicity groups.
Derivation of measure	Numerator is composed of counts of unique invasive primary incident cases of cancer "x" diagnosed during a specified calendar year within residents of a specified geographic region. Incident cancer data were originally collected by state and regional cancer registries. Denominator is composed of counts of the population residing in the geographic region of interest as of a specified date. Population data were originally collected by the U.S. Census. For these national cancer indicators population data were obtained from the NCI and CDC's State Cancer Profiles, which use U.S. Census data as modified by SEER. Rates are age-adjusted to year 2000 U.S. standard population.
Unit	Newly reported cancer case
Geographic Scope	State and national
Geographic Scale	State
Time Period	2000-current
Time Scale	Annual~~, 5 year~~
Rationale	Cancer, a diverse group of diseases characterized by the uncontrolled growth and spread of abnormal cells, is believed to be caused by both external and internal risk factors. Approximately 1.6 million Americans were diagnosed with cancer during 2012. The number of Americans with a history of cancer, estimated 13.7 million in 2012, will grow to almost 18 million by 2022, according to a report by the American Cancer Society (ACS) in collaboration with the National Cancer Institute (NCI). The risk of being diagnosed with cancer increases as a

person ages, and 77% of all cancers are diagnosed in Americans age 55 years and older.

Major risk factors for cancer include tobacco use, diet, exercise, and sun exposure. For example, male smokers are about 23 times more likely to develop lung cancer than male non-smokers. Researchers have also identified genetic risks for cancer. Female first degree relatives (mother, sisters, and daughters) of women with breast cancer are about twice as likely to develop breast cancer as women who do not have a family history of breast cancer (*Cancer Facts and Figures, 2007*; ACS, 2007).

However, the etiology of many cancer types is not well established. The physical environment (e.g., air quality, chemical pollution, and water quality) remains a source of great public concern but few community-level environmental exposures have been well studied. Studies of occupational cohorts have identified numerous suggestive epidemiological associations between certain occupational exposures and elevated cancer rates. After reviewing the evidence regarding the causes of cancer in the United States, Doll and Peto published a seminal article in 1981 estimating that 35% of all U.S. cancer deaths were attributable to diet, 30% to smoking, 4% to occupation, and 2% to pollution. While some authors have agreed with Doll and Peto (Ames and Gold 1998), and others have cautioned against their approach: "there is substantial evidence that occupational and environmental exposures contribute to the burden of cancer" (Clapp, Howe, and Jacobs 2006).

One way to assess cancer burden is to study geographic variation. In recent years, geographic information systems (GIS) have become an important tool for health and environmental research. GIS can extend the analysis of data beyond simple mapping by enabling the linkage, visualization, and analysis of multiple layers of health and environmental data from both spatial and temporal perspectives.

One important use of geographic analysis of health data is in the analysis of regional variations in cancer mortality and incidence. The National Cancer Institute's *Atlas of Cancer Mortality for U.S. Counties: 1950–1969* (Mason et al. 1975), represented the first

	effort to map cancer mortality data at the county level throughout the United States. In 1999, the national level analysis of cancer mortality was updated by the NCI (*Atlas of Cancer Mortality in the United States, 1950–94*, Devesa et al. 1999). More recently, multiple Web-based data query systems have made U.S. cancer incidence and mortality datasets and or maps available at the county (NCI/CDC State Cancer Profiles: http://statecancerprofiles.cancer.gov/; NCI SEER data: http://seer.cancer.gov/data/; NJ DHSS cancer online: http://www.cancer-rates.info/nj/) and/or state level (NAACCR CINA+ Online: http://www.cancer-rates.info/naaccr/; CDC U.S. Cancer Statistics: http://apps.nccd.cdc.gov/uscs/).
Use of the Measure	Allow for a better understanding of spatial and temporal patterns of selected cancers suggested to be linked to environmental exposures within states. The number of cases provides cancer burden for a specific geography and/or population subgroup; age-adjusted rates allow people compare cancer occurrence across larger geographic areas and/or population subgroups. Such information is vital for hypothesis generating and further developing linkage studies to evaluate environmental impact on cancer.
Limitations of the Measure	Counts and rates are calculated based upon residential address at time of diagnosis. No information is available on prior residences. Geocoding accuracy, level of geocoding, and geocoding completeness may vary by time and space. This could potentially create geographically non-random errors in calculated rates of cancer. No personal exposure information will be available, including smoking history, diet, lifestyle, or history of cancer. Case counts less than 16 and rates based on counts less than 16 are suppressed to protect confidentiality and to prevent misinterpretation of unstable rates. No information will be available on the latency of cancer cases.
Data Sources	SEER and NPCR
Strengths and Limitations	Every year, cancer registry data are reviewed and

of Data Sources	certified by the North American Association of Central Cancer Registries (insert hyperlink http://www.naaccr.org/Certification/Criteria.aspx). Most of the US population is covered by registries that are consistently certified. Registry training, data collection, data coding, data cleaning, and quality control programs are highly standardized. State cancer registry programs vary regarding the availability and quality of residential address information collected and completeness of geocoding efforts.