Guidance for Comparing States' Cancer Data

Measuring Burden

The importance of cancer as a public health problem in a state is more a function of the absolute rate of cancer rather than the state's relative ranking in incidence or mortality. For example, Utah has proportionately fewer smokers than other states and also has the lowest lung cancer incidence rate of any state. Nevertheless, in Utah lung cancer kills more people than any other cancer, a fact that might be overlooked if one focused only on its low ranking in incidence compared with other states. Also, the true burden of cancer on the health care system and economy of a state is determined by the number of people diagnosed with or the number of people dying of cancer and not by the age-adjusted cancer rate. Therefore, the observation that the cancer rate in one state appears high compared with other states may obscure the fact that the absolute number of cases is not large.

Completeness of Cancer Incidence Data

States contribute cancer incidence data to these ranking figures if their registries collected 90% or more of the cancers diagnosed in 2002. Because states vary in their completeness above 90%, rankings may vary to a minor extent because of differences in reporting completeness.

Random Factors and Cancer Rates

Even if registries were able to collect 100% of diagnosed cancer cases, there would still be some uncertainty in computed cancer rates because many factors contribute to the incidence and death rate in any given year or state, and some factors exhibit random behavior. Chance plays a role in determining if and when cancer develops in an individual, whether that cancer is detected, whether the information is entered into the cancer registry, and whether that cancer progresses and leads to death. For these reasons, the reported rates are expected to vary from year to year within a state even in the absence of a general trend. Caution is warranted, therefore, when examining cancer rates for a single year, and especially when the rates are based on a relatively small number of cases.

Confidence Intervals

A 95% confidence interval for the rate is an interval that is expected to contain the true underlying rate 95% of the time. Confidence intervals around the observed state age-adjusted rates are available on the Web (http://www.cdc.gov/cancer/npcr/uscs) to help with interpreting the results. Because of the variation in the population sizes and number of reported cases and deaths across states, there is more uncertainty in the incidence and mortality rates for some states compared with others. The confidence intervals provide a measure of the variability in the rates and some perspective for making state-specific comparisons. It should be noted, however, that using overlapping confidence intervals to conclude that rates are not significantly different is not recommended. This is a conservative test because it fails to detect significant differences more often than does standard statistical hypothesis testing.

Another consideration when comparing differences between rates is their public health importance. For some rates in this report, numerators and denominators are large and the standard errors are small with the result that some statistically significant differences may be so small as to lack importance for decisions related to population-based public health programs.