Available literature suggests US smokeless tobacco products (SLT) are less hazardous than cigarettes. We compare the health risks of SLT to cigarettes using mortality data linked to respondents from several years of two national public health surveys. We previously presented results of our analysis of the association between SLT use and the top 10 causes of mortality based on a single public health survey mortality linkage; here, we extend our study by including an additional nationally representative mortality linkage. We derived Cox proportional hazard ratios for mortality outcomes among SLT users and cigarette smokers based on data from the National Death Index (NDI) records of survey respondents to the National Health Interview Survey (NHIS) and the National Longitudinal Mortality Study (NLMS) at the National Center for Health Statistics.

An analysis was conducted to estimate mortality hazards for current SLT use and cigarette smoking based on data from the National Death Index (NDI) records of survey respondents to the National Health Interview Survey (NHIS) and the National Longitudinal Mortality Study (NLMS) at the National Center for Health Statistics. We focus here on the risk differential between SLT use and cigarette smoking.

**Abstract**

All tobacco products are hazardous and their use carries the risk of serious diseases. However, the type and magnitude of disease risks differ between tobacco product types. For example, it has been suggested that SLT products may carry lower health risks compared to conventional cigarettes and that, generally, combusted tobacco products have higher disease risks compared to non-combusted tobacco products. Researchers in the public health community have qualitatively placed tobacco products on "the continuum of risk," with conventional cigarettes shown as the highest risk tobacco product type, SLT products shown in an intermediate position, and smoking cessation as the lowest risk tobacco use state.

**METHODS**

**Data Sources**

- Observations and deaths (in brackets) among SLT and cigarette tobacco use groups

**RESULTS**

- Mortality risks among current cigarette smokers and current SLT users (Table 2)
  - Current cigarette smokers had significantly elevated risks for mortality from all causes, diseases of the heart, cancer, chronic lower respiratory diseases, cerebrovascular disease, influenza and pneumonia and diseases of the digestive system.
  - Current SLT users (snuff and chewing tobacco combined) had no significant excess mortality risks for any outcome.

- Mortality risks among nine cigarette and SLT use groups (Figure 1)
  - The all-cause, all cancer and diseases of the heart mortality risks for current cigarette smokers were not modified by SLT use status.
  - The mortality risks for former cigarette smokers were also not modified by SLT use status.

- Mortality risks among exclusive snuff and chewing tobacco users (Figure 2)
  - Both data sets identify chewing tobacco, snuff and chewing tobacco use, and that, generally, combusted tobacco products have higher disease risks compared to non-combusted tobacco products. Researchers in the public health community have qualitatively placed tobacco products on "the continuum of risk," with conventional cigarettes shown as the highest risk tobacco product type, SLT products shown in an intermediate position, and smoking cessation as the lowest risk tobacco use state.

**DISCUSSION**

- In contrast to current cigarette smokers, current SLT users did not have elevated mortality risks for the general or specific disease endpoints we analyzed in two large, nationally representative prospective mortality data sets.

- Our results are at odds with previous studies of SLT risks, which found excess risks for all cause mortality as well as some specific causes. The differences between prior studies and our results may be due to changes in the tobacco products available in the market, residual confounding in prior analyses, or lack of power in our studies.

- We recognize that these data do not address morbidity so that health effects with relatively high survival rates, such as oral cancer, may not be well represented. In addition, both data sets assess exposure at baseline only which may result in misclassification. However, the fact that the type and magnitude of mortality risks we detected for cigarette smokers are consistent with the published literature argues against significant misclassification, at least among cigarette smokers.

- The risk differential evident in our results is not reflected in the risk perceptions of the general population or among users of smokeless tobacco or cigarettes, who perceive SLT use to be as harmful or less harmful than cigarette smoking.

- The widely held misperceptions that SLT use is associated with similar levels of risk compared to cigarette smoking may prevent adult consumers from making informed choices regarding tobacco product use.