Declines in lung cancer death rates among US women have lagged in two hot spots

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While lung cancer death rates among women in most of the United States have declined substantially in recent years, progress among women in a region covering central Appalachia and southern parts of the Midwest and in northern parts of the Midwest has lagged.

The study is published in *Cancer Epidemiology, Biomarkers & Prevention*, a journal of the American Association for Cancer Research, by Katherine Ross, MPH, a graduate student in the Department of Epidemiology of the Rollins School of Public Health at Emory University, Atlanta.

Ross explained that nationally, lung cancer death rates have been declining steadily among women since the mid-2000s. "We wanted to see if there were geographic differences in this decline so that we could identify places in the United States where women might benefit from targeted tobacco control and smoking cessation programs, and other interventions aimed at reducing the burden of lung cancer," she said.

To conduct the study, Ross and her colleagues used data on the number of lung cancer deaths among women obtained from the National Cancer Institute's Surveillance, Epidemiology and End Results Program (SEER) database to calculate age-standardized lung cancer death rates for each county in the contiguous United States from 1990 to 1999 and from 2006 to 2015. They then calculated the absolute change and the relative change in the death rates between the two periods for each county.

The researchers used a software tool called ArcGIS to identify clusters of counties with increases or small decreases in lung cancer death rates between the two periods, called hot spots.

They found that from 1990-1999 to 2006-2015, lung cancer death rates among women rose by 13 percent in a hot spot encompassing 669 counties in 21 states in central Appalachia and southern parts of the Midwest. During the same period, in a second hot spot that encompasses 81 counties in four states in the northern Midwest, lung cancer death rates among women rose by 7 percent. In the remainder of the contiguous United States, lung cancer death rates among women fell by 6 percent.

The researchers also compared lung cancer death rates among women in each hot spot with those among women in the remainder of the United States. In 1990, the death rate for the largest hot spot was 4 percent lower than the death rate for non-hot spot regions, but in 2015, it was 28 percent higher. For the second hot spot, the death rate was 18 percent lower than the non-hot spot death rate in 1990 but equivalent to the non-hot spot death rate in 2015.

"We know that Midwestern and Appalachian states have the highest prevalence of smoking among women and the lowest percent declines in smoking in recent years, so it is perhaps not surprising that we found that women in these areas experienced a disparity in lung cancer death rates," said Ross. "This geographic disparity may widen unless we specifically aim to reduce tobacco use among women in these hot spots.

"There are several effective tobacco control policies available, such as increased excise taxes on tobacco and comprehensive smoke-free air laws that ban smoking in the workplace, restaurants, and bars," continued Ross. "However, many states in our identified hot spots either do not have these measures in place, or they are comparatively weak and could be strengthened."

According to Ross, the main limitation of the study is that the researchers are not able to draw any conclusions about whether or not differences in tobacco control are responsible for the trends they observed. "In addition, in some counties there was not enough information about rates available to

draw conclusions about their trends in lung cancer mortality among women, which means that the results of the study might not apply to those counties," Ross added.

Ross declares no conflicts of interest.

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