Smoking-Attributable Mortality: An Indicator for Prioritizing South Carolina Counties for Smoking Reduction

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Background

- Nearly 1 in 5 adults in South Carolina was a current smoker in 2015
- Smoking costs the state $2.2 billion in annual health care expenditures
- Community interventions are a key component of effective tobacco control programs;
- Availability of local-level data to inform decision-making is limited
- In partnership with USC, DHEC recently developed county-level smoking prevalence estimates
- Smoking-Attributable Mortality (SAM) is a validated metric of the devastating effects of smoking

Methods

- We calculated Smoking-attributable fractions (SAF) and smoking-attributable mortalities (SAM):
  \[ SAF = \left(\frac{p_0 + p_1(RR1) + p_2(RR2)}{p_0 + p_1 + p_2(RR2)} - 1\right) / \left(\frac{p_0 + p_1 + p_2}{100}\right) \]
  Where: p0 = % of adult never smokers in study group; p1 = % of adult current smokers; p2 = % of adult former smokers; RR1 = Relative risk of death for current smokers relative to never smokers; and RR2 = Relative risk of death for former smokers relative to never smokers
  \[ SAM = Number \ of \ disease-specific \ deaths \ * \ SAF \]
- SAFs and SAMs calculated for each disease, sex and age group
- Data used:
  1) 2005-2015 aggregate state and county-level deaths among adults for 21 conditions associated with smoking (Table 1), stratified by gender and age group
  2) State and county-level prevalence of current smokers, former smokers, and never smokers
  3) Gender-stratified RRs of death for current and former smokers relative to never smokers from each of the 21 underlying conditions (2014 Surgeon General's Report)
  4) Total state and county adult population

Results

- 224631 deaths of SC residents from the 21 underlying conditions were recorded during 2005-2015
- 78186 deaths were estimated to be smoking-related, with an average yearly SAM of 7108 and an annual SAM rate of 192 per 100,000 adult people
- Cancer-related deaths were higher than cardiovascular disease and respiratory disease-related deaths (Fig 1)
- Men had higher counts of smoking-attributable deaths in contrast to women; they also had a larger number of cancers deaths whereas women died predominantly of cardiovascular diseases, and cancers (Fig 1)
- Yearly SAM rates ranged from 119 (Richland County) to 365 per 100,000 adult people, with Union County having the highest rate, followed by Chester (344) and Colleton (326) counties (Fig. 2)
- Yearly SAM rate from cancers was highest in Colleton (135), followed by Union (132) and Chester (129) counties (Fig. 3)
- Yearly SAM rate from cardiovascular diseases was highest in Chester County (143), followed by Union County (133) (Fig. 4)
- Yearly SAM rate from respiratory diseases was largest in Union County (99) (Fig 5)

Discussion

- The limitation of the attributable-fraction methodology is examining both exposure and outcomes within the same timeframe although it takes years/decades for smoking to have effects on health
- However, although most lifelong smokers have taken to smoking during their teen years, most of the deaths used to generate SAM estimates originated in the older age groups

Public health implications

- Findings provide state and local coalitions and partners with specific data to support tobacco prevention and control efforts
- Potential for greater collaboration with other DHEC divisions addressing cancer and cardiovascular diseases, particularly in target counties that have higher SAM rates
- Given the large number of smoking-related respiratory disease deaths, DHEC could consider creating a division that addresses risk factors for respiratory conditions