Supplementary Online Content


**eMethods.** Calculation of Smoking-Attributable Morbidity and Variance Estimates

This supplementary material has been provided by the authors to give readers additional information about their work.
Calculation of Smoking-Attributable Morbidity and Variance Estimates

Smoking-attributable morbidity, $SAM_b$, is calculated as the number of persons who have had a particular medical condition due to smoking by sex, age group, and smoking status for current and former smokers using the following formula:

$$SAM_b = N \cdot P_e \cdot P_{d|ns} \cdot (RR - 1),$$

where $N$ is the number of persons in the population group, $P_e$ is the prevalence of the smoking status, $P_{d|ns}$ is the proportion of never smokers who have had the condition, and $RR$ is the relative risk of the condition by smoking status.

The variance of $SAM_b$ is calculated as the product of three independent random variables with $N$ treated as a constant in the following manner:

$$Var(SAM_b) = N^2 \cdot (P_e^2 P_{d|ns}^2 Var(RR - 1) + P_{d|ns}^2 (RR - 1)^2 Var(P_e) + P_e^2 Var(P_{d|ns}) Var(RR - 1) +$$

$$P_{d|ns}^2 Var(P_e) Var(RR - 1) + (RR - 1)^2 Var(P_e) Var(P_{d|ns}) +$$

$$Var(P_e) Var(P_{d|ns}) Var(RR - 1).$$

$Var(RR - 1)$ is estimated as $Var(RR)$ using the delta method as $Var(e^x)$ where $x$ is a random variable with mean $\mu$ equal to $log \ RR$. Taylor series expansion provides that $Var(f(x)) \approx (f'(\mu))^2 Var(x)$, so $Var(e^x) \approx (e^\mu)^2 Var(x)$ and $Var(RR) \approx RR^2 Var(log RR)$.

The total number of smoking-attributable conditions in the population is calculated as the sum of smoking-attributable conditions by sex, age group, smoking status, and medical condition. Its variance is calculated as the sum of the variances of estimates by sex, age group, smoking status, and medical condition.

Similar methods were used to calculate the number of persons in the population with at least one medical condition attributable to smoking, using input values for disease prevalence and relative risks for individuals having had at least one of the relevant medical conditions.