**Supplemental Material**

Joinpoint Analysis

The joinpoint program applies piecewise least-squares linear regression to fit linear slopes, either on the absolute or logarithmic scale, in the observed annual mortality rates from 1999-2017, for each subgroup (1). First, the program executes a grid search method to sequentially fit linear regressions for all data points before and after each year, to determine the time points where the linear slope in mortality rate changes significantly (2). Each significant change in average mortality rate is demarcated by a joinpoint (i.e. change in slope). Second, the program tests the null hypothesis that zero joinpoints exist (i.e., the data are best fit using a straight line), against the alternative hypothesis that one or more joinpoints exist. Finally, each possible combination of joinpoints is tested using a permutation approach and similar hypothesis testing to identify the minimum number of distinct joinpoints that still best fit the observed data, up to a pre-specified maximum of 3 joinpoints.

Based on the final joinpoints, we estimated ARD, APC, and AAPC for the observed data, overall and within each subgroup. The ARD, which represents the crude average change in mortality rate per year, was estimated using joinpoint regression on the absolute scale, which assumes that mortality rate changes by a constant *amount* per year. The APC, which represents the average *percent* change in mortality rate per year, was estimated using joinpoint regression on the logarithmic scale, which assumes that mortality rate changes by a constant *percent* per year. Both the ARD and APC were estimated using the same set of joinpoints. Finally, the AAPC, which provides a single summary statistic for the mortality rate trend across the entire time period, was estimated as a weighted average of the APCs over the entire time period. Standard errors and 95% confidence intervals were estimated using Monte Carlo simulation with 4,500 iterations.

References:

1. Kim HJ, Fay MP, Feuer EJ, et al. Permutation tests for joinpoint regression with applications to cancer rates. Statistics in medicine 2000;19:335-51.

2. Lerman PM. Fitting Segmented Regression Models by Grid Search. Journal of the Royal Statistical Society 1980;29:77-84.