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# **Factors responsible for mortality variation in the United States: A latent variable analysis**

By [Christopher Tencza](#), [Andrew Stokes](#), [Samuel Preston](#)

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## Abstract

**Background:** Factors including smoking, drinking, substance abuse, obesity, and health care have all been shown to affect health and longevity. The relative importance of each of these factors is disputed in the literature, and has been assessed through a number of methods.

**Objective:** This paper uses a novel approach to identify factors responsible for interstate mortality variation. It identifies factors through their imprint on mortality patterns and can therefore identify factors that are difficult or impossible to measure directly, such as sensitive health behaviors.

**Methods:** The analysis calculates age-standardized death rates by cause of death from 2000-2009 for white men and women separately. Only premature deaths between ages 20-64 are included. Latent variables responsible for mortality variation are then identified through a factor analysis conducted on a death-rate-by-state matrix. These unobserved latent variables are inferred from observed mortality data and interpreted based on their correlations with individual causes of death.

**Results:** Smoking and obesity, substance abuse, and rural/urban residence are the three factors that make the largest contributions to state-level mortality variation among males. The same factors are at work for women but are less vividly revealed. The identification of factors is supported by a review of epidemiologic studies and strengthened by correlations with observable behavioral variables. Results are not sensitive to the choice of factor-analytic method used.

**Conclusions:** The majority of interstate variation in mortality among white working-age adults in the United States is associated with a combination of smoking and obesity, substance abuse and rural/urban residence.

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