Health Disparities by Education across US States: Influence of State Policies and Contexts

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ABSTRACT

The impact of policies and broader socio-political contexts across US states is an emerging area of research in population health. In contrast, the association between educational attainment and health is a well-established fact. We merge these two lines of inquiry and ask: which state-level characteristics influence the individual-level effects of education on health?

We use 2015-2017 BRFSS data on 748,000 adults age 30-64 in all US States. We describe the education-health disparities across states; we then use multilevel models with extensive set of state-level variables to assess how state policies and contexts influence the disparities.

Preliminary findings show large variation across states in health levels and in education-health disparities. The state variation is large enough that adults with lower schooling in some states have better health than adults with more schooling in other states. We will examine which state-level factors explain the observed differences in health levels and disparities.

EXTENDED ABSTRACT

Educational attainment is one of the strongest determinants of adult health (Cutler and Lleras-Muney 2008, Montez and Friedman 2015, Ross and Wu 1995, Zajacova and Lawrence 2018). Education is typically conceptualized as a personal resource that influences health through economic, health-behavioral, and psychosocial pathways (Kirkpatrick Johnson et al. 2016, Ross, Masters and Hummer 2012, Skalamera and Hummer 2016, Zajacova, Hummer and Rogers 2012). However, most of the analyses have been conducted at the national level, with little attention paid to potential geographic variation in the education-health association (Montez et al. 2019).

Across different granularities of geography, we posit that US states are the most important level to understand for population health (Montez, Zajacova and Hayward 2016). Since the 1980s, the devolution of federal power to the states, combined with varied and progressively more polarized political orientations across states, have yielded an increasingly disparate sociopolitical contexts across state levels (Montez 2017). Unsurprisingly, the diverse state contexts are associated with correspondingly different levels of health and mortality of their residents (Borrell et al. 2014, Montez, Hayward and Wolf 2017).

However, it is unclear how individual-level health determinants such as education interact with state-level contexts to influence population health and health disparities. In this project, we determine the variation across US states in the levels of health outcomes and health behaviors, as well as the variation in education-health gradients. We then examine how specific state-level policy and contextual factors, such as economic, political, or social clusters of variables, influence the health and health disparities by education.

METHOD

Data

We use data Behavioral Risk Factors Surveillance Study (Centers for Disease Control and Prevention 2018). Initial analyses are estimated using the most recent three waves: 2015, 2016, and 2017. Sample is defined as adults age 30-64 residing in the 50 US states plus DC with valid self-rated health and schooling information (N=748,315). The lower age boundary is selected to ensure completed education for most adults in the sample as over 10% of adults younger than 30 are still enrolled in a postsecondary institution. The upper age boundary is chosen to maximize the ages under observation while minimizing the inclusion of older birth cohorts whose education and working lives unfolded under different conditions.

Variables

Health outcomes. Initial analyses are estimated using primarily self-rated health, which is assessed in BRFSS on the standard 5-point scale from excellent to poor. We also examined other measures of health (functional limitation, specifically difficulty walking) and health behaviors (current smoking). We may include additional health outcomes such as chronic conditions and additional health behaviors such as body weight or excessive alcohol use.

Educational attainment is coded as the following four categories: less than high school, high school graduate of GED, some college or technical school, college graduate or more. This is the most granularity available in BRFSS except we merged 2.3% or respondents with only elementary or no education with the larger category of high school dropouts.

Individual-level covariates included in all models are respondents' age, gender (some models are stratified by gender), and race/ethnicity. We will also control for additional sociodemographic variables important in the education-health association: marital status and household composition, employment, and income.

State-level characteristics include at least 21 characteristics ranging from sociopolitical factors (e.g., percent of residents voting republican in presidential elections, percent of workers covered by unions), economic factors (median household income, welfare expenditures per capita), medical factors (Medicaid generosity, primary-care providers per capita), cohesion (social capital index, violent crime rate). We have successfully worked with a comparable set in prior research where reduced the individual measures using exploratory and confirmatory factor analyses and examined the influence of the latent state factors on women's mortality (Montez, Zajacova and Hayward 2016).

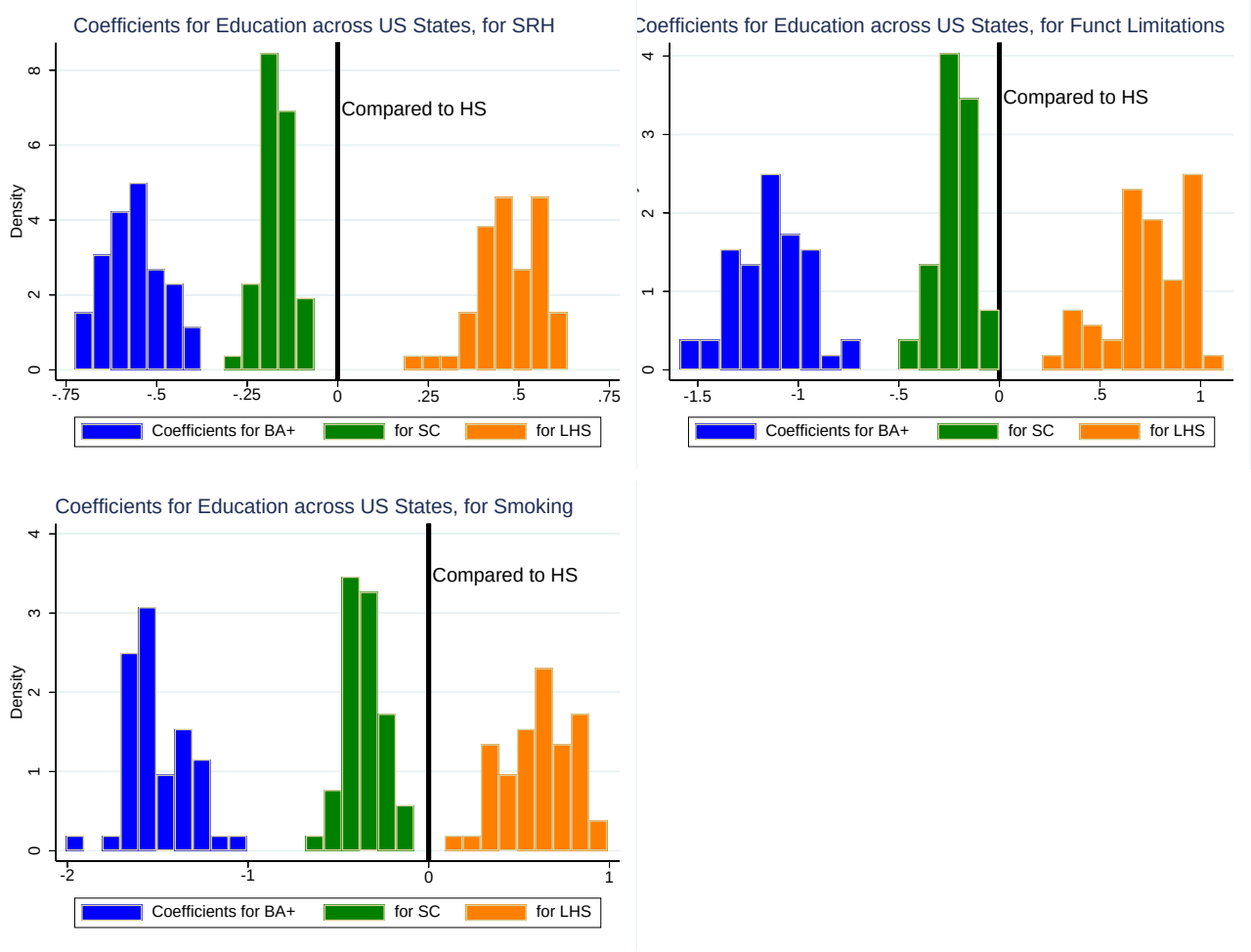
Approach

Extensive descriptive analyses will describe the disparities in health by education across states, using state-specific regression models of health outcomes. Results will be presented graphically to condense large amount of information parsimoniously.

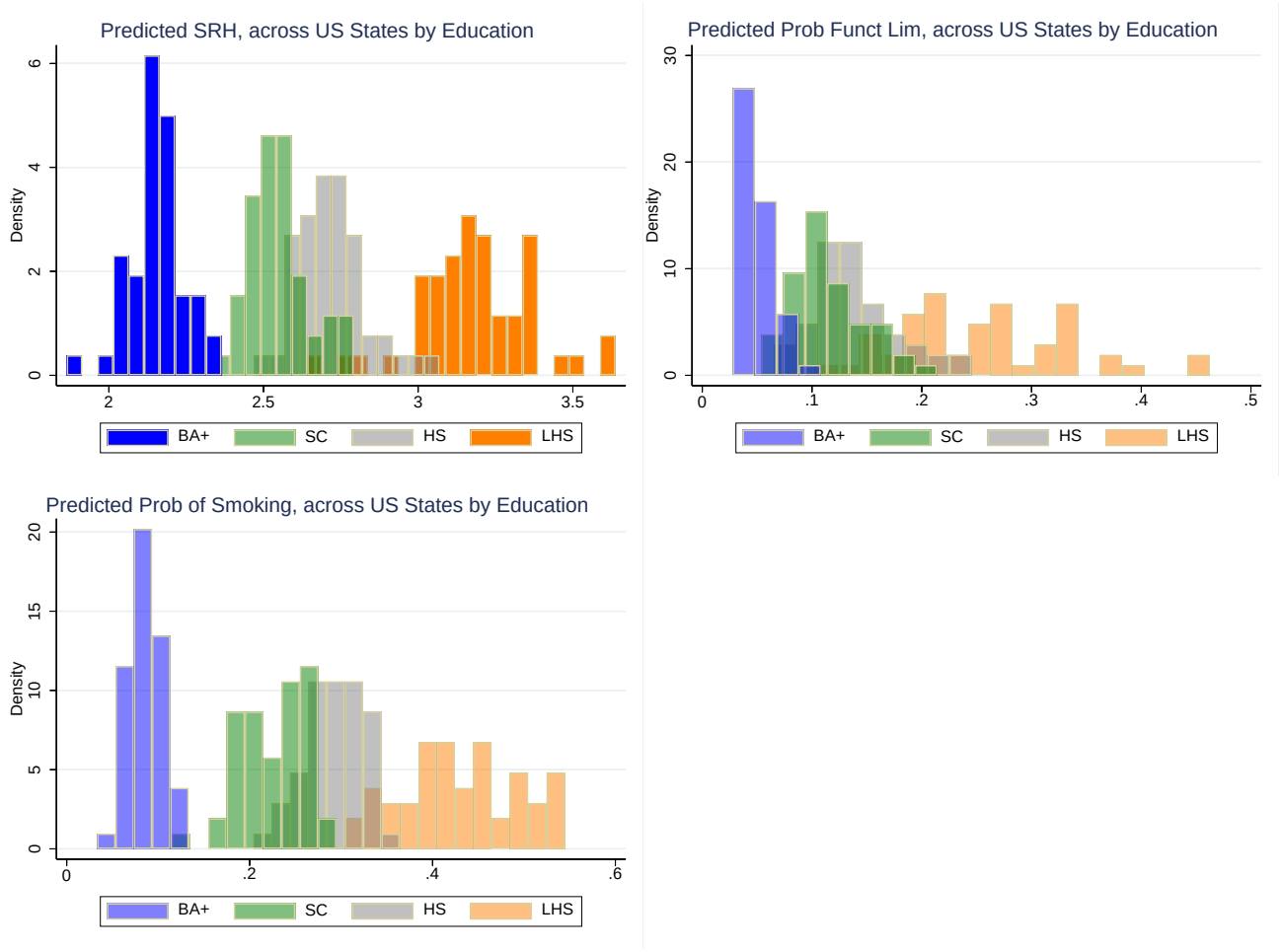
Main analyses, to be completed by December 2018, will estimate multilevel models to account for the two-level hierarchical data structure with individuals nested within states. The inclusion of individual and state-level characteristics will enable us to observe their impact on health and observing the change (attenuation) of the state-level residuals will inform the contribution of state context and policies on the health disparities.

PRELIMINARY RESULTS

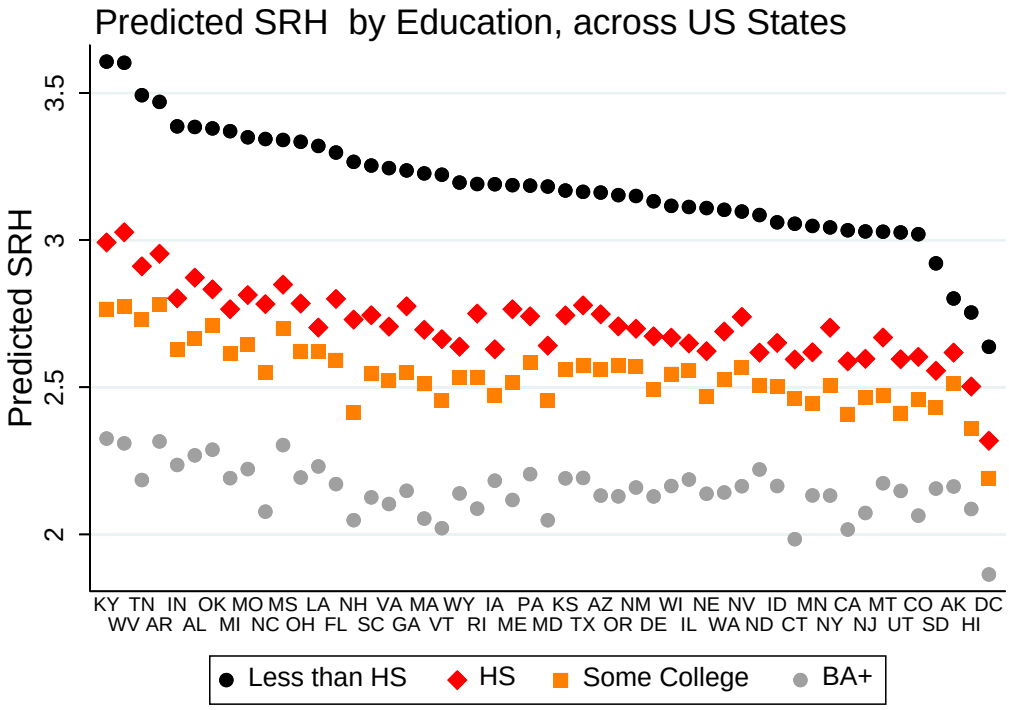
How do educational gradients in health outcomes vary across states? Appropriate regression models of three sample outcomes (SRH, functional limitations, and smoking) by education net of demographics were estimated separately for each state and resulting distribution of the coefficients plotted. Two findings stand out: 1) There is a large variation in gradients across states at all education level. For instance, the standard deviation of predicted SRH for the 4 education level ranges from about 0.28 in Alaska, Hawaii, South Dakota, and DC, up to about 0.53 in Tennessee, West Virginia, Kentucky, and North Carolina. 2) However, the coefficients never overlap across states, meaning that the BA relative to HS difference is larger in every state than some college (SC) relative to HS. This pattern appears to support the perspective that individual-level determinants like education trump state-level variation.

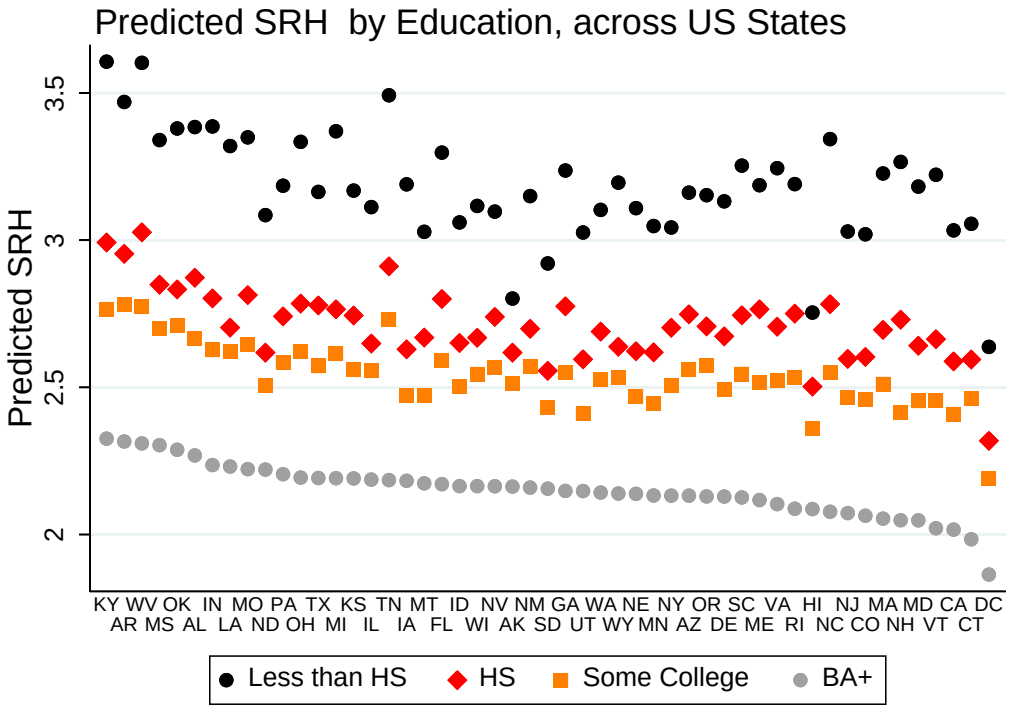


Next we calculated the predicted level of each of these outcomes at every schooling level in each US state (predictions are made for white males at age 50). This exercise yields a different picture of the state variation: for all outcomes there is considerable overlap between education-specific levels across states. In other words, adults with some college (SC) education in some states have worse health than adults in other states with only a high school diploma. This overlap pattern, which is contrary to the education-health gradient expectations that more schooling equals better health, highlights the importance of state-level contexts in influencing the health of their adult populations across every education level.



Which states have better health across levels of education, and which states have worse health? We used the predicted levels of health at each education level within each state and ranked the states from worst health to best, first by the health of adults with less than high school and then by the health of adults with a college degree. The states with worse health include KY, WV, AR, IN, AL, MS and others clustered to a considerable degree in the South. The states with best health include DC, HI, CT, and others – although at this end there is more difference in which states have best health based on whether we rank them by the health of the low-educated or the high educated.





The next steps in the analyses will focus on estimating how individual and contextual characteristics influence the education gradients in health using multilevel models.

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