A. **Specific Aims** (unmodified from original)

The goal of Project 3 was to estimate and decompose income-related health inequalities and health disparities in the US by using the latest methods, as well as developing new methods, in applied econometrics. Our work draws on a variety of large, nationally representative data sets. Below, we describe our main findings by topical area.

**Aim 1:** To estimate and compare quality of health by racial/ethnic group; by state; by community size; and to examine trends over time in quality of health.

**Aim 2:** To estimate within-group total and income-related health inequalities and their decomposition.

**Aim 3:** To decompose between-group health inequalities into their determinants with special emphasis on the role of community size.

B. **Accomplishments and Results**

*Income-related health inequality, health disparities among the elderly, and disparities in chronic disease*

In this group of papers, we address Aims 1 and 2 above by estimating and decomposing racial/ethnic and education-related disparities in chronic disease among the elderly, and by estimating trends in income-related health inequality among the elderly. Our focus is to address methodological issues in this area that can seriously bias estimates of racial/ethnic disparities in elderly health, and the estimation of health inequality among the elderly. In this group of papers, we find that accounting for issues such as sample selection and non-random attrition have important implications, and in some cases, are at odds with the results of other studies that have not considered these issues. Data come from the 1992-2010 waves of the Health and Retirement Study (HRS) and various waves of the NHANES.

Related to estimation of health disparities, our results suggest that among the US elderly, disparities in chronic disease are magnified when we take into account selection issues and racial/ethnic differences in undiagnosed disease [1]. In addition, among individuals with diabetes, although some studies show that trends in control of cardiovascular risk factors have improved over time, we find that these improvements have been concentrated in non-Latino white and higher educated populations [2]. Similarly, when accounting for undiagnosed chronic disease, education-related disparities in chronic illness start to emerge [3].

Finally, many studies in economics show that the well-documented relationship between income and health weakens around age 65, suggesting that social support programs such as Medicare may be playing a role in reducing income-related health inequality. Our findings, however, show that this weakening relationship is spurious. Instead, we find that non-random attrition (namely, the sickest, poorest individuals dying sooner) leads to the false impression that income-related health inequality improves as people age [4].

*Income-related health inequality and health disparities among children*

These papers address Aims 1 and 2. Data for our studies on children come from various waves of the Panel Study of Income Dynamics (PSID) and the 1997-2009 Child Development Supplement (CDS). In the area of child health disparities, we find that the main factor underlying income-related child health inequality is family income itself, although other factors, such as maternal education, also play a role. Decomposition of income-related health mobility indicates that health changes over time are more favorable to children with lower initial family incomes vs. children with higher initial family incomes. However, offsetting this effect, our findings also suggest that as children grow up, changes in family income ranking over time are related to children’s subsequent health status [5]. Moreover, we find that higher risk of onset of new chronic disease in low-income families is an important mechanism underlying the child health-income gradient in the US [14].
Economics research has shown that disparities in birthweight have lasting impact on later-life outcomes such as educational attainment and earnings. We study the role of health at birth in determining academic achievement in childhood, which may provide information regarding the link between birthweight and adult outcomes. We propose a nested error-component two-stage least squares (NEC2SLS) estimator that uses internal instruments from alternative dimensions of the panel data set. In particular, this alternative estimator allows us to exploit the information on children with no siblings in the sample, which comprises over 40 percent of the observations in our sample, as well as to obtain coefficient estimates for the time-invariant variables such as race and maternal education. This would not be feasible with the usual fixed-effects estimation. We obtain modest but significant effects of fetal growth rate on math and reading scores, with the effects concentrated in the low birthweight range. However, infant health measures appear to explain little of the well-documented black-white gap in test scores [6]. In another paper, we examine effects of the fetal growth rate on neuro-behavioral outcomes using sibling difference models. We find only modest effects, in contrast to previous work in the public health literature which has not taken into account fixed, unmeasured attributes that siblings share which also may affect birthweight and outcomes [7].

**Disparities in mental health outcomes and effects of mental health on human capital accumulation**

These papers are related to Aim 2. Data for these studies come from National Comorbidity Survey Replication I and II and the National Latino and Asian American Study. These data sets are unique in that they contain diagnostic batteries for psychiatric disorders, and well as offer very large samples of racial/ethnic minorities. The objective of this study is to identify the mechanisms, or most important symptoms, through which psychiatric disorders affect labor market outcomes, and we examine racial/ethnic disparities. In one paper, we focus on Major Depressive Episode, Panic Attack, Social Phobia and Generalized Anxiety Disorder. Our approach builds on prior work in that we consider the effects of symptoms both among individuals meeting and among individuals not meeting diagnostic criteria for mental disorders. Specifically, we use a structural equation model with latent indices for mental disorders, where the indices are generated from the model using multiple indicators (symptoms) and multiple causes of the disorders. We find that for Major Depressive Episode, symptoms of insomnia/hypersomnia, indecisiveness, severe emotional distress, and fatigue are crucial for labor market outcomes. In the case of Generalized Anxiety Disorder, the length of the episode, symptoms relating to difficulty controlling worry, and symptoms of worry/anxiety/nervousness causing significant emotional distress are most detrimental for work outcomes [8]. We do not find differences by race/ethnicity in the pattern of symptoms that affect labor market outcomes.

In another paper, we extend this work by addressing the potential endogeneity of mental illness using a Lewbel instrumental variables approach [9]. In two new papers in progress, we examine longitudinal effects of mental illness on work outcomes, and the effects of childhood onset disorders such as ADHD [16].

**Local inequality and its effects on community health**

Primarily to address Aim 3 which focuses on community size, we use pooled data from the 2000-2009 Behavior Risk Factor Surveillance System (BFRSS) to examine how local income inequality affects health. In this paper, we examine the effect of income inequality at the state and county level on overall self-assessed individual health. We also test whether public health spending is one of pathways linking local inequality to health, and finally we test whether the effects of income inequality are different by income group and geographic area.

Due to the limited years available from the decennial US Census and the lack of county information from the Current Population Survey data, we use multiple imputation methods applied to the BRFSS income data to derive synthetic Gini coefficients at the state level and at the county level for each year. Then we use ordered probit model to study the effect of income inequality. Our findings show that both state level and county level income inequality is negatively associated with health status after controlling for individual-level factors. Furthermore, this paper shows that provision of health related public goods is one of the pathways through which income inequality influences health. Income inequality has the largest negative effect on poorer people and smaller negative effects on people living in big cities [16-17].
**Disparities in cancer screening and the role of community size**

In order for us to obtain data on community size that can be linked with the National Health Interview Survey (NHIS), we are collaborating with Dr. Sandra Decker at the National Center for Health Statistics. We have pooled several recent years of the NHIS to investigate racial/ethnic disparities in cancer screening. We focus on African-Americans, Latinos, and non-Latino whites since small sample sizes do not allow analysis of Asians and other ethnic/racial groups. Our initial results show little evidence of racial/ethnic disparities in cancer screening. However, disparities may vary by city size. To study this issue, we are merging into the NHIS data on Rural-Urban Commuting Area (RUCA) codes, which is a measure of community size. We are now examining whether disparities change when we assess them by community size. This paper addresses the latter part of Aim 3 related to community size, which could not be adequately addressed using other data sources which did not have information on local community size [14].

**Disparities in access to dental services**

Using data from the 2000-2009 BRFSS, we examine income-related inequality in access to dental care and outcomes related to access. We find evidence of pro-rich inequality and inequity in dental care utilization. We find evidence suggesting that conventional horizontal inequity index underestimates the need-justified index of inequity in the presence of heterogeneity in use/need relationship [12]. In addition, we find little evidence that recent Medicaid expansions have remediated disparities in dental care utilization [13].

C. **Publications:** Please see compiled bibliography for all projects.

[Presentations: Please see compiled bibliography for all projects](#)

D. **Project-Generated Resources:** None