The Effects of Childhood Health Trajectories on College Enrollment

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Airan Liu, Peking University
Narayan Sastry, University of Michigan
Robert Bozick, RAND Corporation

Introduction

A growing body of research has made it increasingly clear that childhood health conditions have significant consequences for a wide range of educational and social outcomes in adulthood. Having a chronic health condition or experiencing poor general health in childhood can impair an individual's social and cognitive development, lead to lower educational attainment, undermine labor market outcomes in adulthood, and impede the social status attainment over the lifecourse (Bengtsson & Lindström, 2000; Case, Fertig, & Paxson, 2005; Conley & Bennett, 2000; Lee & Jackson, 2017). Thus, a comprehensive understanding of the contribution of childhood health to future health and social status is needed. Because educational attainment in young adulthood—specifically, the college enrollment decision—sets a cornerstone for the stratification process later in the lifecourse, it is important to understand the relationship between childhood health and educational attainment. Despite the recent resurgence of studies on this topic which has increased our understanding of the sizable effects of childhood health on educational outcomes, two important questions remain understudied—first, whether and how specific types of health problems in childhood are related to educational attainment in young adulthood and beyond. And, second, whether and how the relationship between childhood health conditions and young adult education outcomes differs across childhood developmental stages. Examining these two questions will strengthen our understanding of the association between health in early life and educational and social attainment later in the life course, but also have the potential to provide important insights into potential policy changes and interventions.

This study investigates the relationships between multiple childhood health conditions and young adult educational attainment and examines how these relationships vary by childhood developmental stage, contrasting experiences of poor health between childhood (ages 6–10 years) and adolescence (ages 11–15 years). Our preliminary findings suggest that specific health conditions experienced in childhood compared to adolescence have different effects on educational attainment in young adulthood.

Early-life Health and Education Attainment

Health conditions in childhood have lasting effects on the education attainment in young adulthood. For example, low-birth weight, the most commonly used indicator of health disadvantage in early childhood, is negatively associated with academic achievement in adolescence and educational attainment in adulthood (Boardman, Powers, Padilla, & Hummer, 2002; Currie & Stabile, 2006); self-rated poor health during adolescence is also found to be significantly linked with high school graduation (Jackson, 2009). Most existing studies of the relationship between childhood health and educational attainment in young adulthood are based on composite measures that reflect general health status, which reflect a self-rating by children themselves or by a child's primary caregiver. However, this measurement only provides limited insights into the effects of childhood health on socio-economic attainment because it does not provide any insights into the effects of specific diseases or health conditions, instead only yielding a general nature of the relationship between health and subsequent socio-economic outcomes. It is likely that different types of health issues in childhood are differentially related with educational attainment outcomes. For example, speech impairments, which keep children from being fully engaged in school life, are likely to be more detrimental to children's academic development than diseases such as asthma; also, mental and other social behavior health problems may plague children's education progression more seriously than some physical health problems (Currie & Stabile, 2006; McLeod & Shanahan, 1993). In this study, we investigate the following hypotheses:

H1.a: Compared with other types of health conditions, childhood diagnoses of ADHD, cognitive impairments (including developmental delay and autism), sensory limitations, speech impairment, and externalizing and internalizing behavior problems will each reduce the likelihood of college enrollment because these conditions directly impinge on individuals' full participation in primary and secondary education and compromise their academic development and achievement.

H1.b: Chronic conditions such as diabetes, asthma, and anemia have unclear consequences for college enrollment. These chronic conditions in many cases do not impinge on youth's ability to perform well in school. However, parents may limit activities of their children with chronic conditions to reduce fatigue and stress that may compromise their overall health which, in turn, may affect their educational outcomes.

Different Stages, Different Effects: The Timing of Health Problems

In the current literature, the temporal dimension of childhood health has gained only limited attention. Although numerous studies have examined this question and found a negative effect on educational attainment from poor health in infancy and in young adolescence (Case et al., 2005; Jackson, 2009), these prior studies have only considered a single childhood stage rather than examining possibly disparate effects across different stages of childhood. The few studies that have analyzed the relationship between childhood health and socioeconomic attainment in adulthood suggest that this relationship is contingent on the timing of poor health, and continuously deteriorating health over life course has more persistent negative effects on socio-economic status in adulthood than experiencing a transient episode of poor health (Lee & Jackson, 2017).

We hypothesize that health conditions that emerge in young adolescence are more likely to have a negative effect on educational outcomes during young adulthood because parents are constrained in the remedies they can implement at this later stage of their child's life. In contrast, parents have more opportunity to find and implement remedies and adaptations for health problems that emerge in childhood and can thus lessen the negative effects of these health problems on their children's subsequent development and educational outcomes. In this study, we hypothesize that:

H2: The negative effects of health conditions in young adolescence on college enrollment will be more prominent than the effects of health conditions in childhood.

Data and Measures

Data. We use data from the Panel Study of Income Dynamics (PSID) and, in particular, from the PSID Child Development Supplement (CDS) and the PSID Transition into Adulthood Supplement (TAS). CDS was fielded in three waves: 1997, 2002-03, and 2007-08. In its first 1997 wave, CDS selected a sample of up to two children aged 0-12 years per family in PSID households, and a total of 3,563 children and their caregivers were interviewed. Children from CDS continued into TAS once they reach age 18 and graduated from high school. We will use health data from all the three waves of CDS, augmented with educational attainment measures from the six wave of TAS that were completed between 2005 and 2015.

Outcome Variables. We use several variables to measure educational attainment in young adulthood. Our main measure is college enrollment status before age 25. We choose age 25 as the cut-off point to measure college attendance because 80% of the recent cohort will attend college by that time according to national statistics. We will also differentiate between attendance at a 2-year college versus a 4-year college.

Health Conditions in Early Life. Our analysis will include three sets of indicators of health in early life: (1) the primary caregiver's subjective assessment of the child's overall health status; (2) a series of binary indicators of the following specific health conditions: acute conditions (ear infections, allergies, headaches); anemia; asthma; other chronic conditions (epilepsy, diabetes, orthopedic impairments, heart conditions); ADHD; retardation (including developmental delays and autism); sensory limitations; speech impairment; externalizing and

internalizing behavior problems; and obesity; and (3) a latent class measurement on health derived from the above binary indicators. We will also construct all the three health measures for two lifecourse periods: childhood (ages 6–10) and young adolescence (ages 11–15).

We will control for an extensive set of demographic variable (both time invariant and time-varying) that are related to health and/or that are known to influence educational attainment in young adulthood, including race/ethnicity, gender, family income, family structure, parental education, parental health, and cognitive ability.

Analytical Strategy

Our analyses will proceed in two stages based on the measure of college enrollment. We will first use a binary indicator of college enrollment by age 25 as the outcome variable. Second, we will use a categorical outcome variable that reflects the type of college. We will use several estimation strategies in both parts: (1) standard regression models; (2) regression with family fixed-effects; and (3) regression with inverse probability of treatment weighting. We will use binary and multinomial logit regression models to test our hypothesis that poor health in childhood and adolescence will impede college enrollment status by age 25 and influence the college type for enrollment. The general form of the model will be:

$$logit(Y) = \beta_0 + \beta_1 * HEA_1 + \beta_2 * HEA_2 + \beta_3 * \bar{X}$$

In this equation, Y is the categorical variable measuring college enrollment status or the type of enrolled college. HEA_1 represents the health conditions measured during childhood, and HEA_2 measures the health conditions during young adolescence. $\bar{X}$ is a vector of covariates, which include both time-invariant variables such as gender and mother's marital status at birth, which are measured at baseline, and time-varying variables, such as family income and household size, which are measured prospectively during childhood and adolescence. The presence of a sizable sample of siblings in CDS allows us to introduce family fixed-effects into our model to obtain a better estimate of the effects of health's conditions by eliminating the effects of unobserved family-level factors.

Because the key independent variables (which describe health conditions during childhood) change over the course of childhood/adolescence, conventional regression will not correctly estimate their time-varying effects on educational outcomes. In particular, if we adjust for time-varying covariates, regular regression will introduce over control bias and collider bias as it assumes that observed time-varying covariates are exogenous to or independent from time-varying health conditions. To attenuate such bias and obtain sound estimates, we estimate models with inverse probability of treatment weights (IPTW). Intuitively, IPTW account for time-varying confounders by creating a pseudo population where trajectory of children's health status is balanced based on the covariates used to generate the weights. For example, children from wealthy families are much less likely to experience poor childhood health than their peers from poor families. Children from wealthy families are also more likely to attend 4-year colleges. Thus, children from privileged background will be under-represented in poor health trajectories. IPTW will assign them greater weights in the analyses to account for such selection into different health trajectories due to family background. IPTW is calculated as the inverse of predicted probabilities of "treatment"—which in this study is poor health in childhood and adolescence. Our analyses using IPTW will allow us to assess the robustness of our findings from standard and fixed-effects regression models.

Outline of Paper and Plan for Completion

This extended abstract provides a short overview of the paper that we will prepare. Prior to the PAA Annual Meeting, we will refine and finalize our analysis (which we have begun and on which we have made substantial progress). We will have a draft manuscript uploaded to the PAA website well in advance of the conference deadline.