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Describing and Investigating Trends in Adolescent Disability, 1997-2010: The Role of Low Birth Weight, ADD/ADHD, and Autism

Between 1980 and the present day, the prevalence of disability has declined substantially among people aged 65 and older in the U.S. These results have been confirmed and replicated in a number of studies looking at the elderly and the oldest old (e.g., Crimmins, Saito and Ingegneri 1997; Freedman et al. 2007) leading to general consensus that there has been a real decrease in disability prevalence among the elderly. Studies of trends in disability prevalence focus on observed declines in disability prevalence among the population of retirement age or elderly adults, but ignore the continued rise in disability prevalence among U.S. children and adolescents.

The goals of this study are to 1) provide new evidence on trends in disability among adolescents between the ages of 12 and 17; and 2) test potential explanations for the observed trends in youth disability. Using a pooled sample of the 1997-2010 National Health Interview Surveys (NHIS), I examine the role of trends in the prevalence of low birth weight, ADD/ADHD, and autism in explaining disability trends among U.S. adolescents.

BACKGROUND

Existing Prevalence Estimates of Disability among Adolescents

Existing descriptions of adolescent disability prevalence are largely cross-sectional and focus on Children with Special Health Care Needs (CSHCN), a concept which overlaps with functional limitations but that is nonetheless distinct (Stein et al. 1993). Like the functional limitation measures used to capture adult disability prevalence, the five-item measure used to identify CSHCN includes one item covering functional limitations, but unlike the functional limitation measures, most CSHCN items are geared towards capturing higher than average use of health care services and use of special therapies or prescription medications.

From these largely cross-sectional studies, the trend in adolescent disability appears to be one of increase between 1970 and 1990, and no clear trend between 1994 and 2003. In the only study I could locate that used functional limitation measures to track trends in disability among adolescents, Crimmins and colleagues found that, between 1970 and 1990, the prevalence of functional limitations increased or remained constant among adolescents aged 10-19 (Crimmins, Saito and Ingegneri 1997). In 1970, the rate of functional limitations among males age 10-14 was 3.71%; by 1990, the rate among males age 10-14 increased by 3.5 percentage points to 7.25%. There was no change in disability rates among males aged 15-19 over the same time period (~5.8%). Among females, disability increased from 2.66% in 1970 to 3.61% in 1990 among those aged 10-14, and from 3.96% to 6.38% among those aged 15-19. Although there has been no published analysis of post-1990 disability trends among adolescents using functional limitations, published cross-sectional prevalence estimates of the number of CSCHN indicate that 21% of adolescents age 11-14 and 21.5% of adolescents age 15-17 had chronic health conditions in 1994 (Newacheck et al. 1998); 15.8% of adolescents age 12-17 had chronic health conditions in 2001; and 21.4% of adolescents age 12-17 had chronic health conditions in 2003 (Bethell et al. 2008).

Reasons to Expect Increases in Adolescent Disability

While descriptions of disability trends among U.S. adolescents are spotty, systematic evaluations of factors that contribute to these trends are non-existent. I review two factors that may contribute to trends in adolescent disability: 1) Increased survivorship among frail infants; and 2) Increases in the diagnoses of ADD/ADHD and autism.

One reason to expect increases in adolescent disability over time is the increased survivorship of frail infants. The CDC concluded in a 1999 report that: "During the last few decades, the key reason for the decline in neonatal mortality has been the improved rates of survival among LBW [low birth weight] babies," adding that, "The long-term effects of LBW include neurologic disorders, learning disabilities, and delayed development" (U.S. CDC 1999: 824). A second reason is the increase in certain behavioral and cognitive diagnoses – ADD/ADHD and autism in particular – among children. Debate continues over whether increases in ADD/ADHD and autism are the result of increases in the underlying prevalence of these conditions or due to the interplay of complex social and health care changes that lead to increased rates of diagnosis (Martin et al. 2007; Liu, King and Bearman 2010), but the share of youth identified with these conditions on national surveys increased steadily over the 1990s.

The Current Study

In the current study, I first present annual population estimates of disability among adolescents aged 12-17 over the 1997-2010 time period. I then apply methods used to analyze late-life disability trends to evaluate the contributions of low birth weight, ADD/ADHD, and autism to trends in disability prevalence among U.S. adolescents.

DATA AND METHODS

Data

To describe and investigate trends in adolescent disability, I rely primarily on the 1997-2010 National Health Interview Surveys (NHIS) harmonized by the Integrated Health Interview Survey project at the Minnesota Population Center (MPC and SHADAC 2010). The NHIS are the leading source of population-level information on U.S. health; collected through an in-person interview, the NHIS collects information on all residents of the household and then administers an additional in-depth questionnaire to one randomly selected adult and one randomly selected child under 18 from each household (the focal adult and focal child, respectively. The data for this study come from the in-depth questionnaire completed for focal children, limited to adolescents between the ages of 12 and 17. I also use other sources of data on child health to produce alternate estimates of disability using the CSHCN measure, generally unavailable in the NHIS[1]: the 2001 and 2005-06 National Surveys of Children with Special Health Care Needs and the 2003 and 2007 National Surveys of Children's Health.

Key measures

I measure disability in two different ways. First, as an affirmative response to any of the Activity of Daily Living (ADL) measures asking whether the child needs help bathing, dressing, eating, toileting, getting around the home, and/or getting into or out of bed or a chair. Second, I use the items from the Questionnaire for Identifying Children with Chronic Conditions

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[1] The 2002 NHIS includes the CSHCN screener, which I include as a data point for 2002.

(QuICCC) to produce an alternate measure of disability that is more sensitive to social and health care changes than ADLs. The QuICCC consists of five question sequences, asking "whether the child 1) is limited or prevented in any way in his or her ability to do things most children of the same age can do; 2) needs or uses medications prescribed by a doctor (other than vitamins); 3) needs or uses specialized therapies such as physical, occupational, or speech therapy; 4) has above-routine need or use of medical, mental health, or educational services; and 5) needs or receives treatment or counseling for an emotional, behavioral, or developmental problem" (Bethell et al. 2002:40).

In decomposition analyses, I consider two specifications of low birth weight (LBW): 1) low birth weight (<2,500 grams) and extremely low birth weight (<1,000 grams), based on an item measuring birth weight for all focal children under 18. In the child questionnaire, respondents were asked whether "a doctor or health professional ever told you that [Sample Child] had…Attention Deficit Hyperactivity Disorder (ADHD) or Attention Deficit Disorder (ADD)?" If this item was answered affirmatively, I consider that child to have an ADD/ADHD diagnosis. Similarly, respondents were also asked whether "a doctor or health professional ever told you that [Sample Child] had…autism?" Likewise, if this answer was answered affirmatively, I consider that child to have an autism diagnosis.

Method

To evaluate the contributions of LBW, ADD/ADHD, and Autism to adolescent disability trends, I apply the Freedman and colleagues' (2007) method for comparing disability prevalence rates across many years of data. In this paper, I will estimate linear regression models predicting ADL disability using year of survey measured as a continuous variable (so that 1997 = 0 and 2010 = 14), single years of age, sex, race/ethnicity (non-Hispanic white, Hispanic, black, and other), household income as a percentage of the federal poverty line (<100%, <300%, >= 300%), education of the most highly educated co-resident parent (<HS, HS graduate, some college, college graduate), indicator variables for LBW, ADD/ADHD, and autism, and interactions between year of survey and all variables in the model.

I will then assess the total contribution of each factor to aggregate changes in disability by summing the contribution of a factor, for example LBW, to aggregate changes in disability and the contribution of a change in the probability of having a disability given having been born LBW:

$$\left((X_{1997} - X_{2010})\frac{\beta_{1997} + \beta_{2010}}{2}\right) + \left((\beta_{1997} - \beta_{2010})\frac{X_{1997} + X_{2010}}{2}\right),$$

where β represents the year coefficient multiplied by the relevant year value. So, the simple effect of β represents 1997 and β multiplied by 14 represents the effect of 2010. X is the proportion of adolescents in a given year who were born LBW.

In the paper that I present at PAA, I will be able to present figures describing the disability trends in adolescent disability over the 1997-2010 period and a table of results that will look like Table 1 below (adapted from Freedman et al. 2007:468-69), with estimates of how changes in LBW survivorship, ADD/ADHD diagnosis, and autism diagnosis contribute to overall adolescent disability trends.

Table 1. Example Table of Results

	Prevalence			Probability of disability			Contribution of change in		
	1997	2010	*p*	1997	2010	*p*	Prevalence	Probability of Disability	Total Contribution
Demographic Variables									
Low Birth Weight									
ADD/ADHD									
Autism									

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