The Effects of Public Health Insurance Expansions on the Mental and Behavioral Health of Children

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Abstract
In this paper, we examine the effect of public health insurance expansions during 1997-2002 on the mental and behavioral health of children. Using three waves of the National Survey of America's Families (NSAF) and legislative State Children's Health Insurance Program (SCHIP) and Medicaid income eligibility thresholds by state-year-age, we explore the causal impact of public health insurance generosity on participation, general health care utilization, mental health services utilization, and finally children's mental and behavioral health measures. Our results first confirm that expanded eligibility significantly increased public health insurance coverage and general health care utilization. However, there is almost no statistically significant evidence of increases in mental health care utilization or improvements in general mental health outcomes for the whole sample, despite improved access to mental health coverage. When we focus on the thirteen Assessing the New Federalism (ANF) "study states" that comprise the bulk of the NSAF sample, we find a bit more evidence that insurance expansions may have slightly increased the probability of receiving mental health care as well as a few specific mental health outcomes for some age groups, but overall estimated effects remain small.

Key words:
Public health insurance, SCHIP threshold, mental and behavioral health

1. Introduction

Many children and teenagers in the U.S. have mental health challenges that interfere with normal functioning and healthy development through the lifespan; an estimated 13% to 20% of children experience a mental disorder in a given year (Centers for Disease Control and Prevention, 2013). The prevalence of mental illness among children is an important public health issue that – when untreated – can deteriorate the welfare of the children themselves, their families, and community. One of the worst scenarios is suicide, which can result from the interaction of mental disorders and other factors, and was the second leading cause of death among children aged 12–17 years in 2010. But due to the shortage of affordable mental health care, lack of awareness of mental health care, or the stigma of being labeled with mental illness, it is widely believed that only a minority of children receive appropriate mental health services. The question of public health insurance's effectiveness in addressing children's mental health is particularly important because poor children are more likely to suffer from mental health problems than non-poor children (Frank and Gertler, 1989; Costello et al, 2003).

To improve children's mental health, their access to mental health care has been increased in recent years, both through enactments of mental health mandates in private health insurance and expansions in public health insurance that include comprehensive mental health coverage. As the largest payer of children's mental health services, Medicaid provides a safety net for this population and plays a critical role in ensuring access to child mental health services. In fact, public insurance typically has better coverage for mental health than private health insurance plans: it provides a broader range of services from acute hospital services, to psychosocial rehabilitation services, to psychotropic medications. The State Children's Health Insurance Program (SCHIP) was introduced in 1997 as an important step in public health insurance expansions focused on children, and it was designed to reach children with incomes above the traditional Medicaid limit; at the same time, many states expanded traditional child Medicaid as well. Both programs expanded eligibility – differently across states – throughout the late 1990s and early 2000s.

Understanding the effect of public health insurance expansions on the mental health of children is essential for future policy making, especially as Congress considers rolling back the some of the "essential benefits" (including mental health benefits) established under the Affordable Care Act (ACA).[1] Much of the previous literature– particular in dealing with mental health outcomes – examines only adults. Part of the contribution of this work is our focus on mental health outcomes of children, who are less studied in this context. Though their experience is less well-understood, the effectiveness of public health insurance in meeting mental health needs may potentially be even more consequential for children than for adults, as without treatment, these problems can continue into adulthood. We know, for example, that early intervention services for children can have large impacts on future success if caught early (National Institute of Mental Health, 2009). Similarly, mental health challenges addressed during the teenage years can help keep a young adult from pursuing risky behaviors with long-term consequences (Kim-Cohen et al., 2003).

In this paper, we utilize the National Survey of America's Families (NSAF, with cross sections in 1997, 1999, and 2002) to investigate the effect of Medicaid/SCHIP expansions on children's insurance coverage, mental health care utilization, and mental health outcomes. The NSAF is nationally representative with proper weights, but was collected primarily in 13 states (the focal

[1] The American Health Care Act (AHCA) passed by the House of Representatives in May 2017 includes provisions allowing states to waive certain essential benefits, including mental health care and substance abuse treatment.

states of the "Assessing the New Federalism" (ANF) project at the Urban Institute). We use both the full sample and the ANF sample throughout our analysis.

This paper sets out to establish a series of possible causal relationships, each dependent on the last: if Medicaid expansions are to ultimately improve mental health, then they must first generate participation in Medicaid, then utilization of mental health services provided through that coverage, and finally improvements in measured mental health as a result of those services. Our work here assesses the effectiveness of each of these pathways in turn, which necessarily means this paper draws on several streams of literature, each more narrowly focused on establishing one of these causal pathways. In this study, we draw this literature together as we ask whether expansions in children Medicaid eligibility, combined with the introduction and expansion of the State Children's Health Insurance Plan (SCHIP) for children in near-poor families, improved mental health service utilization and, ultimately, mental health and behavioral outcomes of children.

The strength of using NSAF is that it provides fundamental information about children's health insurance coverage status and mental health service usage, and also contains rich measurements about children's behavioral and emotional problems captured in children's behavioral problems "index scores" and their components. The scores are created using responses regarding children's daily emotional and behavioral problems such as feeling depressed, having trouble getting along with other kids, or having sleep problems. Even though those measurements are not coming from the professional diagnoses of doctors or reports of psychological consultants, they do effectively represent some classic symptoms of childhood mental disorders, which can be described as changes in the way children typically learn, behave, form friendships, or handle their emotions (The American Psychiatric Association, 2013).

Our main identification strategy relies on the variation in Medicaid/SCHIP eligibility thresholds for different age groups by state and year, thus our results provide estimated effects of raising the Medicaid/SCHIP thresholds on participation in health insurance coverage, health care utilization, and mental health outcomes for the whole sample and the 13-state sample separately. We find that these expansions result in increases in Medicaid/SCHIP participation in the population. An increase in the eligibility threshold of 100 percent of the Federal Poverty Line (FPL) – for example, moving from 50% to 150% FPL – is associated with a 10-20% increase in Medicaid/SCHIP relative to baseline. We also find that effects are driven by children with family income under 300% FPL (as expected) and are strongest among older children, who experienced increased thresholds from a lower base.

Our findings indicate that, consistent with past literature, raising Medicaid/SCHIP eligibility thresholds leads to meaningful increases in several general health care utilization measures such as well-child visits. However, we find little to no effect of the coverage expansions on mental health care utilization or mental health outcomes of children. Our findings do point to some potential differences in the effects of expansion on both coverage and mental health utilization when comparing states with Medicaid (or equivalent) mental health coverage and states with more limited coverage through their SCHIP programs. The vast majority of coverage expansions seem driven by the states with more limited mental health coverage, while we see some small increases in mental health care utilization in the states with the higher quality coverage. We hope to examine the potential mechanisms for this difference in future work.

The rest of the paper proceeds as follows: In section 2, we first introduce how Medicaid is involved in provision of mental health services, followed by an introduction to different expansions of Medicaid during recent decades including enactment of SCHIP. After a review of

the previous literature in section 3, we use section 4 to describe the data, provide descriptive statistics and plots for the sample, and lay out the methodology for analysis. Sections 5 and 6 provide the main analysis and robustness checks/expansions, respectively. Section 7 concludes and describes policy implications and future research plans.

2. Medicaid/SCHIP expansions and children's mental health care

As one of the most important public health care programs in US, Medicaid has had an enormous influence on access to mental health care for families and individuals with low income and limited resources. Since the 1980s, Medicaid has expanded mental health care access and paid for a broad range of mental health services. There are two facts we need to know about Medicaid and mental health. First, Medicaid is the most important source of funding mental health services: 46% of state controlled funds for mental health services came from Medicaid in 2008 (National Alliance of Mental Illness, 2013). Second, children in Medicaid programs can be covered by more comprehensive mental health insurance compared with most private insurance plans. Along with generous mandated benefits (inpatient care and outpatient care) and optional benefits (prescription drugs and rehabilitation), state Medicaid programs also provide Early and Periodic Screening, Diagnosis, and the Treatment (EPSDT) because of the provision of the Omnibus Budget Reconciliation Act of 1989.

Medicaid has been through dramatic expansions in the past two decades. First, Medicaid eligibility has been uncoupled from the eligibility for cash assistance (Aid to Families with Dependent Children, or AFDC). In the late 1990s, the State Children's Health Insurance Program (SCHIP) was introduced to expand children's eligibility higher into the income distribution. There was also a gradual expansion of parental Medicaid eligibility during the same time period. By increasing income eligibility thresholds and extending the coverage to older children, SCHIP is widely considered the largest expansion of taxpayer funded health insurance coverage for children in the US since Medicaid was enacted in 1965.

SCHIP is a joint federal-state program which can be a Medicaid expansion program, a new separate health insurance program for children, or a combination of both. States are given flexibility in designing eligibility criteria and specific program characteristics. Prior to enactment of SCHIP, younger children had more generous Medicaid coverage than older ones. For example, infants and children under age 6 faced income thresholds of at least 133% of the federal poverty level (FPL), while the older ones had a minimum threshold of 100% FPL. However, by 2002 more than half of states had rapidly increased eligibility to all children up to age 19 at or above 200% FPL through SCHIP. Table 1 presents a comparison of initial pre-SCHIP eligibility thresholds (January 1997) and more generous SCHIP thresholds (January, 2002). They come from publicly available sources and are all established as a percent of FPL.

As with Medicaid before it, SCHIP has also been playing an important role in funding public mental health care for poor and near-poor children. As for the specific benefit designs and the approaches to financing and delivering mental health services, there exists wide variation across states (Urban Institute, 2004). For example, the states that adopted Medicaid expansion programs (Minnesota and Wisconsin) have Medicaid-equivalent mental health benefits and services, while some other states that established separate SCHIP programs are subject to more limited mental health benefits. In addition, state Medicaid managed care services for children's mental health have different features. Some states have maintained fee-for-service payments for mental health care services, while others have mental health included under their managed care programs.

Table 1

Summary of Medicaid/SCHIP expansions, by state and age for 1997 and 2002

State	% FPL threshold, <6 years old		% FPL threshold, ≥6 years old	
	1997	2002	1997	2002
AK	133	200	100	200
AL	133	200	100	200
AR	133	200	100	200
AZ	133	200	100	200
CA	133	250	100	250
CO	133	185	100	185
CT	185	300	185	300
DC	133	200	100	200
DE	100	200	100	200
FL	133	200	100	200
GA	100	235	100	235
HI	133	200	100	200
IA	133	200	100	200
ID	133	150	100	150
IL	133	185	100	185
IN	133	200	100	200
KS	133	200	100	200
KY	100	200	100	200
LA	133	200	100	200
MA	200	200	133	200
MD	185	300	185	300
ME	133	200	125	200
MI	150	200	150	200
MN	275	275	275	275
MO	100	300	100	300
MS	133	200	100	200
MT	133	150	100	150
NC	133	200	100	200
ND	133	140	100	140
NE	133	185	100	185
NH	185	300	185	300
NJ	133	350	100	350
NM	185	235	185	235
NV	133	200	100	200
NY	100	200	100	200
OH	133	200	100	200
OK	133	185	100	185
OR	133	170	100	170
PA	133	200	100	200
RI	250	250	100	250
SC	133	150	100	150
SD	133	200	100	200
TN	133	400	100	400
TX	133	200	100	200
UT	133	200	100	200
VA	100	200	100	200
VT	225	300	225	300
WA	200	250	200	250
WI	185	185	100	185
WV	133	200	100	200
WY	133	133	100	133

Note: Data come from a combination of sources, described in more detail in Hamersma and Kim (2013).

3. Literature review

The first stream of literature that help us to develop our analysis answers the research question: "Do Medicaid expansions increase public health coverage?" There is substantial evidence that early stage expansions of Medicaid (during the late 1980s and early 1990s) results in increased participation in Medicaid itself, both for children and adults (Culter and Gruber, 1996; Dubay and Kenney, 1996; Shore-Sheppard, 2000; Yazici and Kaestner, 2000; Card and Shore-Sheppard; 2004; Ham and Shore-Sheppard, 2005). Some of the research finds substantial and significant take-up and crowd-out effects while some of others indicate small or insignificant crowd-out.

There are also several empirical studies that estimate the effect of more recent parental Medicaid expansions in the mid-1990s. Exploiting CPS or SIPP data and variation in eligibility rules, they find that the expansions increase Medicaid coverage of both parents and children (Kronick and Gilmer, 2002; Aizer and Grogger, 2003; Busch and Duchovny, 2005; Sommers, 2006; Hamersma and Kim, 2013). Finally, the relatively recent Medicaid expansion via SCHIP has been found to increase public health insurance as well (Zuckerman et al., 2001; Rosenbach et al., 2001; Dubay and Kenney, 2003; Lo Sasso and Buchmueller, 2004; Gruber and Simon, 2008;), especially for children above the poverty line and children in older age groups. In addition, the anti-crowd out provisions of SCHIP may have a positive effect.

Because we would like to link SCHIP/Medicaid access to children's mental health in this analysis, the second stream of literature is about whether these health insurance coverage expansions can increase health care utilization and improve health outcomes. Card and Shore-Sheppard (2004) use a regression discontinuity approach to study the effect of Medicaid expansions on low-income children in specific age ranges and birth cohorts, and they find that the effect on doctor visits is rather large. Parental coverage expansions and SCHIP are also shown to have positive but less dramatic effect on access to and use of medical and preventive care (Shen and Zuckerman, 2005; Currie et al., 2008). As for health outcomes, Currie and Gruber (1996) show that simulated prenatal Medicaid eligibility lowers the incidence of infant mortality and low birth weight significantly over the 1979-1992 period, but the evidence on general health outcomes is still limited and mixed (Kaestner et al., 1999; Damiano et al., 2003; Cullen et al., 2005)

Medicaid/SCHIP has been designed to provide more comprehensive mental health benefits for low-income children compared to private insurance (Frank et al., 2003; Howell et al., 2000; Howell, 2004). A few studies offer some explanations for a link between Medicaid and mental health outcomes. Considering income as a function of mental health, Frank and Gertler (1989) show that early Medicaid eligibility policies improved poverty caused by mental illness. Cuellar and Markowitz (2007) estimate that the increasing Medicaid spending on psychotropic drugs improves several mental health outcomes such as the suicide rate (1991-2001) at the state level. What is more, capitation arrangements and carve-outs of Medicaid mental health managed care generally reduce costs and use of inpatient services. Moreover, relative to FFS, HMO coverage reduces the probability of follow-up appointments for children who receive a mental health diagnosis while increasing the drug treatment (Hutchinson and Foster, 2003; Turner, 2015).

The study most closely related to ours is by Li and Baughman (2011), who use NSAF data (1997-2002) to study the effect of the SCHIP income threshold (by state-year-age) on general health outcomes (health condition that limits activity). They found that SCHIP significantly increases health insurance coverage and well-child doctor visits, but with a relatively small effect on health outcomes. We use a similar strategy to theirs but take advantage of additional variables in the NSAF data that they did not explore, bringing our focus to mental health outcomes (not just

general health outcomes) and to the role of mental health care utilization. Our study is the first empirical study to explore the effect of SCHIP on several children's mental and behavioral health measurements at the individual level from national survey data. We also provide new empirical evidence on the effect of Medicaid expansions on the pathway from public coverage to mental health utilization to mental and behavioral health outcomes by age group and program type.

4. Data and methodology

4.1 Data source and sample characteristics

Our analysis is based on data from the National Survey of America's Families (NSAF), which is one of the components of the Assessing the New Federalism (ANF) Project at the Urban Institute. The ANF project was designed to better understand the effects of decentralizing many social programs from the federal government to the states. NSAF provides a comprehensive look at characteristics, behaviors, and conditions of children, adults, and their families to explore linkages between state policy and child and family well-being. There are three cross-sectional samples in the NSAF survey: 1997, 1999, and 2002. Each round includes household, family, person, adult, and child level data. The main sample we exploit for this analysis is the child-level data that contains information about the sample children in each household as well as the "most knowledgeable adult" (MKA). The MKA is usually the children's parent or legal guardian who responds to the survey and reports the child's information.

The NSAF draws households from a random-digit dial (RDD) approach (for households with telephones) and a supplementary area sample conducted in person (for households without telephones) separately. One of the features of NSAF is that the survey oversamples the low-income population in 13 targeted states: Alabama, California, Colorado, Florida, Massachusetts, Michigan, Minnesota, Mississippi, New Jersey, New York, Texas, Washington, and Wisconsin. They represent 87% of the whole sample; the rest is drawn from other states to allow for national estimates. These states are ANF focal states whose social policies are monitored by the Urban Institute (Kondaratas et al, 1998), and they account for over half of the U.S. population and have a broad array of government programs, fiscal capacity, and child well-being.

The NSAF child level data includes children who are under 18 years old in each sample household, but no more than two children were sampled from each household to reduce the respondent burden. If there were multiple children under age 6, one was randomly selected. The same was done for children ages 6 to 17. There are 34,439 observations in 1997 wave, 35,938 observations in 1999 wave, and 34,332 observations for 2002. All MKAs were asked the questions about children's health coverage, health care usage, health status, and behavioral and emotional problems. They are our primary sources of outcomes of interest in the following study. Along with the demographic characteristics of children and MKAs reported in the child level data, we also combine some other information about the MKA and family from the adult pairs and household level datasets within NSAF. We also merge in the policy data on SCHIP and Medicaid income thresholds as shown in Table 1 -- including those in the middle year of the NSAF, not shown in Table 1 (see Hamersma and Kim, 2013, for data source details).

Table 2 reports weighted summary statistics for the entire sample, and also compares the full sample to that of children with lower than 300% FPL family income who are most likely to be affected by Medicaid policy. The first half of the table is data on the children, the middle part

Table 2:
Summary statistics: weighted means

	All states		13 ANF states	
	(1) All	(2) <300% FPL	(3) All	(4) <300% FPL
Age	8.569	8.334	8.503	8.319
	(5.126)	(5.071)	(5.108)	(5.054)
Male	0.512	0.508	0.512	0.508
	(0.500)	(0.500)	(0.500)	(0.500)
Hispanic	0.166	0.223	0.246	0.334
	(0.372)	(0.416)	(0.431)	(0.472)
Black	0.168	0.221	0.156	0.204
	(0.374)	(0.415)	(0.363)	(0.403)
Asian or American native	0.060	0.053	0.075	0.063
	(0.237)	(0.224)	(0.263)	(0.243)
Biological mother	0.901	0.893	0.898	0.894
	(0.300)	(0.309)	(0.302)	(0.307)
Biological father	0.663	0.560	0.657	0.552
	(0.473)	(0.496)	(0.475)	(0.497)
US born	0.958	0.948	0.938	0.920
	(0.200)	(0.223)	(0.242)	(0.272)
MKA age	36.714	35.352	36.968	35.689
	(8.278)	(8.625)	(8.324)	(8.777)
MKA female	0.809	0.843	0.801	0.836
	(0.393)	(0.364)	(0.399)	(0.370)
MKA lower than high school	0.166	0.256	0.168	0.261
	(0.372)	(0.437)	(0.374)	(0.439)
MKA high school	0.569	0.616	0.560	0.606
	(0.495)	(0.486)	(0.496)	(0.489)
MKA bachelor	0.265	0.128	0.272	0.133
	(0.441)	(0.334)	(0.445)	(0.340)
MKA Has a spouse/partner	0.755	0.658	0.745	0.644
	(0.430)	(0.475)	(0.436)	(0.479)
MKA Employment	0.676	0.592	0.676	0.596
	(0.468)	(0.491)	(0.468)	(0.491)
Child is living with two parents	0.629	0.524	0.626	0.519
	(0.483)	(0.499)	(0.484)	(0.500)
Number of children ages 0-5	0.752	0.859	0.758	0.857
	(0.896)	(0.951)	(0.882)	(0.928)
Number of children ages 6-17	1.673	1.811	1.671	1.822
	(1.239)	(1.328)	(1.229)	(1.314)
N	104,709	64,194	91,029	55,517

Note: National and site level focal child full sample weights are used. Standard deviations are reported in parentheses. Sample used is pooled NSAF focal child, adult pairs, and household level data 1997, 1999, and 2002. MKA is the most knowledgeable adult. Sample sizes are smaller for some variables due to missing data.

reports on their MKAs, and the last three rows show related household characteristics.[2] Compared to children from higher income families, the low-income children have the expected features, including higher percentage non-white, lower education levels and employment rate of MKAs, and larger families.

4.2 Trends in insurance, utilization, and mental and behavioral health

In this section, we summarize key time trend plots of SCHIP eligibility and outcomes of interest used in our empirical analysis. Since the NSAF data only provide mental health outcomes for children above age 2, we exclude the information about infants in following aggregate figures showing the basic trends in key independent and dependent variables from 1997 to 2002. Fig. 1 reports SCHIP eligibility thresholds and different types of coverage trends for different age groups. The SCHIP income threshold is linked to microdata by every child's state, year and age group. In the first two panels, children ages 6-17 experience a very generous expansion of public health insurance and an increase in Medicaid/SCHIP coverage during these years. Younger kids have more moderately increased eligibility and public health insurance coverage. Panels C and D show the time trends in private insurance (group and individual insurance) and total health coverage. The former decreases while the latter increases, especially for older children in 2002.

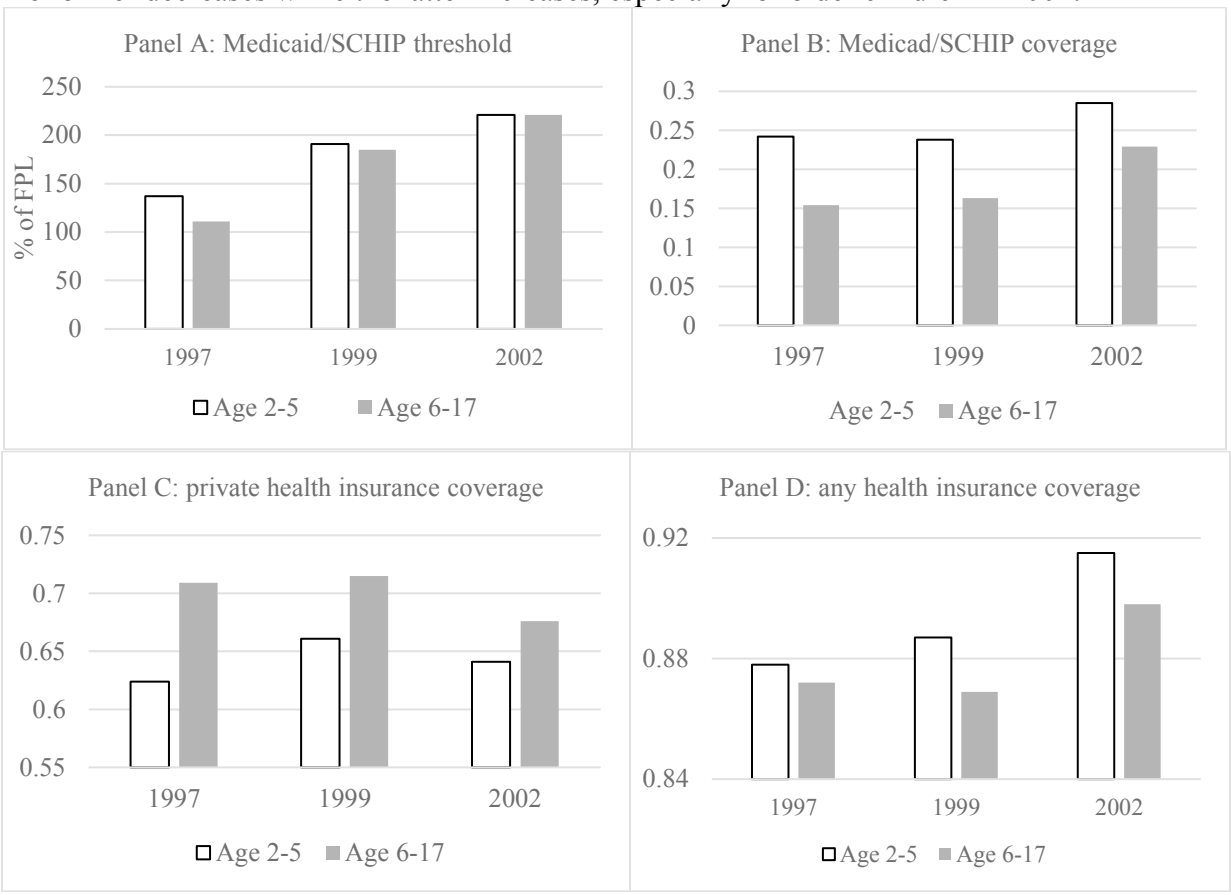
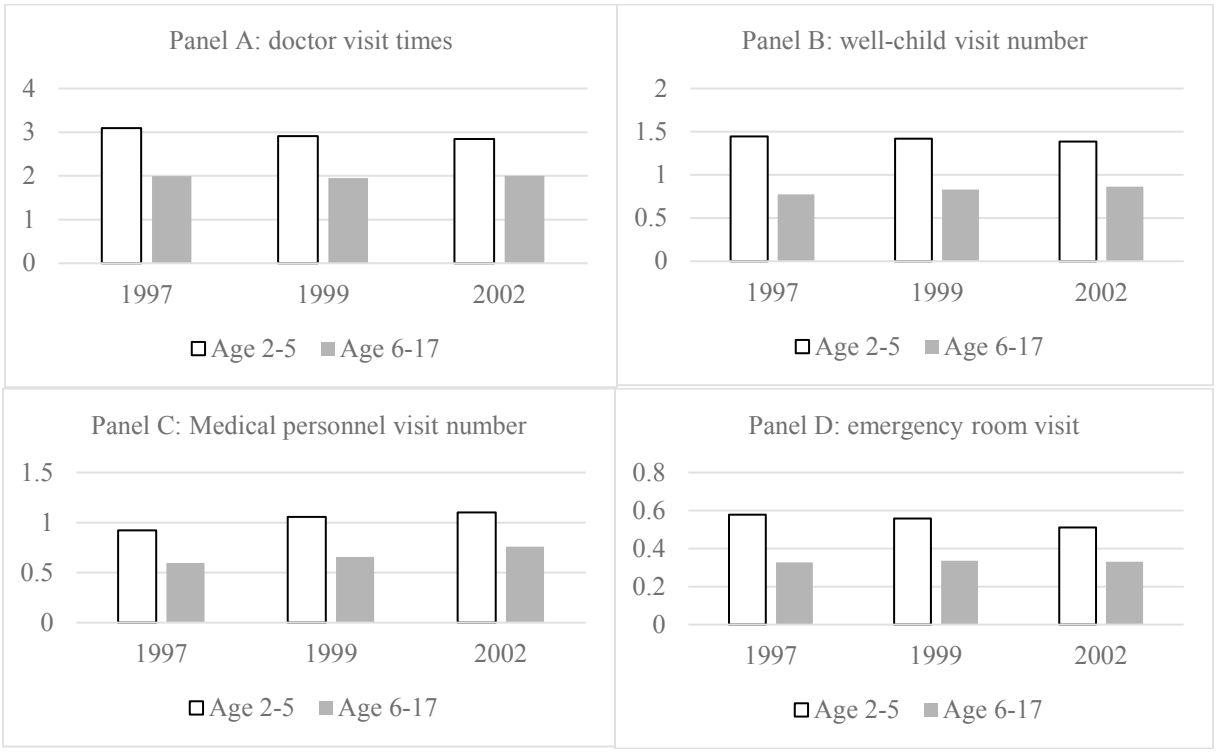


Fig. 1. Trends in SCHIP eligibility thresholds and health insurance coverage

[2] Most of the characteristics are coming from the child level data, while the employment status of MKA are merged from adult pair data and all the family information is collected from household data.

Figure 2 reports the plotted time trends in six different health care utilization outcomes for different age groups. Panels A through D report four general measures of health care utilization: number of doctor visits, number of "well-child care" visits, number of professional health visits, and number of emergency room visits in the past 12 months. "Well-child care" indicates visits for shots or immunizations, annual or other periodic checkups, hearing exams, physicals, and other visits for preventive care. Professional medical personnel mean nurse practitioner, physician's assistant or midwife visit. According to the plots, the aggregate level of general health care utilization does not change substantially during the study period.

Panels E and F in Figure 2 present the plotted time trends in two mental health visit measurements; the first is the number of mental health visits, the second is a dummy variable indicating whether the child had at least one mental health visit during the past 12 months. The survey questions about mental health visits are only for children age 3 or older. Mental health services here include mental health services received from a doctor, mental health counselor, or therapist. The figures show there is a small amount of increase in mental health visits and percent of children who have at least one mental health visit from 1997 to 2002. One of our goals here is to assess whether this increase might be related to the expansion of Medicaid and SCHIP.



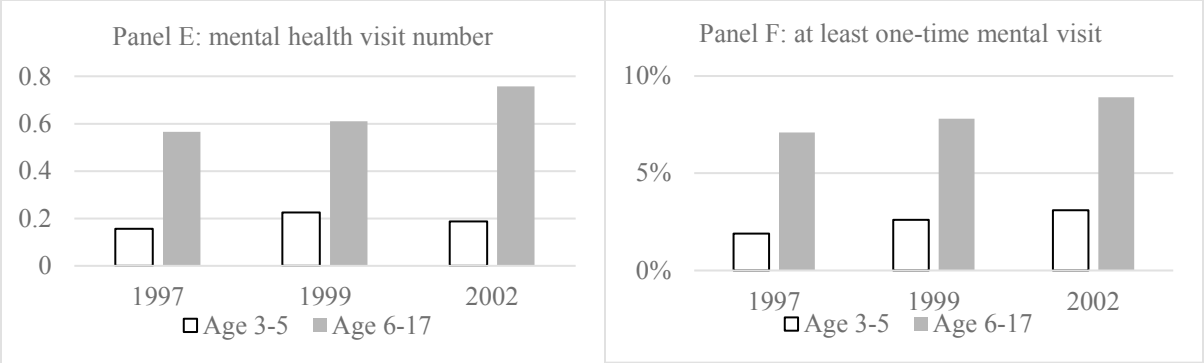


Fig. 2. Trends in general and mental health care utilization outcomes

Along with the use of mental health services among children nationwide, NSAF provides scales to assess the prevalence of emotional and behavioral problems. The main scales we use in our analysis are "behavioral problems index scores for children age 6-11" and "behavioral problems index scores for children age 12-17". Generally speaking, behavioral problems index scores are aggregated from the responses to six questions that concern the MKA`s perceptions about the child's behavior in the past month. For children ages 6-11, the six questions in this survey ask whether the following have "often" been true, "sometimes" been true, or "never" been true for your child during the past month: "doesn't get along with other kids," "can`t concentrate for long," "has been sad or depressed," "feels worthless or inferior," "has been nervous or tense," and "acts too young for his age." For children ages 12-17, their MKAs are asked to respond to the same first three questions and alternative other three: "has trouble sleeping," "lies or cheats," and "does poorly at schoolwork."

The response categories included often true (assigned a value of 1), sometimes true (assigned a value of 2), and never true (assigned a value of 3). After the responses are totaled, a scale score ranging from 6 to 18 has been created. The "never true" means the children have fewer behavioral and emotional problems, thus a higher score indicates better mental health outcomes.[3] Using the total score, we also create two indicator measurements: "positive behavior for children age 6-11" when they have full behavioral problems index scores (18 points), and "positive behavior for children age 12-17" when they have full index scores. Figure 4 presents the plotted time trends in these four mental health outcomes. It shows that children age 6-11 seem to have more behavioral problems according to MKAs' reports and that teenagers experienced an improvement of mental health outcomes from 1997 to 1999 but they decreased again after that.

[3] Scores for respondents who answered five out of the six questions were standardized to the 18-point scale.

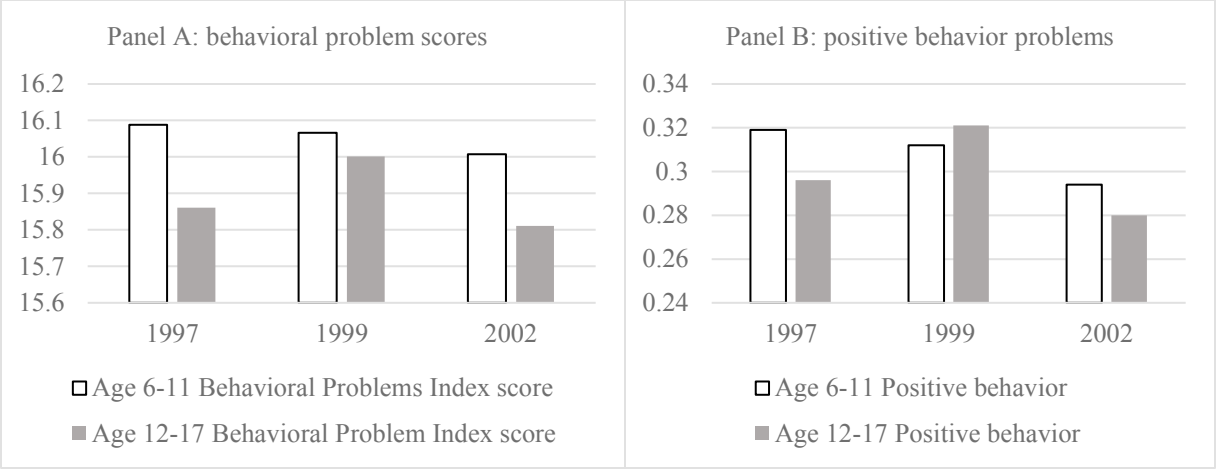


Fig. 4. Trends in mental health outcomes

4.3 Econometric specification

Our main approach to measuring the impact of Medicaid/SCHIP expansions comes from a model in which the variable of interest is the actual Medicaid/SCHIP eligibility income threshold faced by each child. This is analogous to an "intent-to-treat" framework rather than one that relies on imputing eligibility indicators to each child, which can be fraught with error (see Hamersma and Kim, 2013, for further discussion). After we link thresholds to every observation by state-year-age, measured by the percent of FPL, and include state fixed effects, the identifying variation comes from the extent of within-state expansions of public insurance eligibility over the research period. To control for other determinants of outcomes as well as any systematic shocks to outcomes of interest that are correlated with, but not due to, the expansion of the Medicaid/SCHIP eligibility threshold, we use the basic estimating equation as follows:

$$Y_{ijt} = \beta_0 + \beta_1 Threshold_{ijt} + \beta_2 X_{ijt} + \gamma_j + \delta_t + \pi_j \cdot \delta_t + \epsilon \quad (1)$$

In this equation, the dependent variable Y_{ijt} is one of the outcomes of health insurance coverage, general or mental health care utilization, and mental health outcomes for child i in state j reported in year t. $Threshold_{ijt}$ is coded as the eligibility threshold (measured in percent of FPL) divided by 100 (e.g., for a given age group, state of residence, and year of observation, a threshold of "1.33" indicates "133 percent of FPL). X_{ijt} indexes a set of individual level characteristics: child's age category, gender, race, living situation, MKA's age, gender, educational level, employment status, and children number in the household. The regression specification includes state fixed effects γ_j, to control for any differences across states with different time-invariant health care and health outcome patterns, and year fixed effects δ_t to capture any national trends in health care and health outcomes. It also includes region-by-year effects to control for region-specific shocks over this period that are correlated with Medicaid/SCHIP expansions.

The key coefficient β_1 represents the effect of the Medicaid/SCHIP eligibility threshold on the outcomes of interest. Because we include state fixed effects, the estimator can be interpreted as the effect of changing the thresholds over time (including changes related to children aging into a different threshold), and it is thus straightforward to use this model to consider policy proposals

for policy makers. We estimate several specifications with linear models, representing the effect of Medicaid/SCHIP on the full pathway from coverage to mental health care utilization to mental health outcomes. In addition, we allow the effect of the threshold to vary across different age groups, noting that the structure of the policy thresholds by age group may result in a nonlinear relationship between child age and coverage (and therefore other outcomes).

5. Main Results

Our analysis using the NSAF begins with estimating the direct effect of Medicaid/SCHIP on health insurance coverage, and then moves to the more indirect effect on health care utilization (including mental and behavioral health). We ultimately try to assess whether Medicaid/SCHIP can be credited with any improvements in mental or behavioral health.

Table 3 presents the (weighted) means of the outcomes of interest used in our analysis. Columns (1) and (2) report the means of the all-state sample and its low-income subsample (< 300% FPL), and columns (3) and (4) provide the same for the 13-state sample. The all-state and 13-state samples are by and large very similar, while the low-income subsamples differ dramatically from the full sample. The table shows about 50% higher participation in Medicaid/SCHIP among those below 300% FPL compared to the full sample. Since the low-income sample make up just over 60% of the sample (see Table 2), this suggests nearly all Medicaid/SCHIP participation is in fact in the low-income group, as we would expect. The rate of uninsurance in the full samples is about 11-12% while in the low-income samples it is 16-18%. The raw differences between the two groups in terms of health care utilization and mental health outcomes are much smaller – however, the slightly higher number of emergency room and mental health visits and slightly worse mental health outcome measures may not be surprising in a population that is relatively disadvantaged.

Table 3:
Weighted sample means of outcomes of interest

	All states		13 ANF states	
	(1) All	(2) <300% FPL	(3) All	(4) <300% FPL
Panel A: health insurance coverage				
Medicaid/SCHIP	0.212	0.331	0.227	0.355
Private insurance	0.679	0.511	0.656	0.473
Any insurance	0.887	0.833	0.878	0.817
Panel B: general and mental health care utilization				
Doctor visits	2.462	2.313	2.481	2.325
Well-child visits	1.218	1.231	1.248	1.254
Medical personnel visits	0.846	0.871	0.852	0.891
Emergency room visits	0.408	0.484	0.374	0.440
Mental health visits	0.555	0.609	0.548	0.603
Any mental visit	0.069	0.074	0.065	0.068
Panel C: mental health outcomes				
Age 6-11 index score	16.053	15.921	16.031	15.888
Age 6-11 positive behavior	0.308	0.292	0.307	0.288
Age 12-17 index score	15.890	15.635	15.938	15.705

Age 12-17 positive behavior	0.299	0.268	0.311	0.284
Does not get along with others	2.659	2.621	2.669	2.630
Cannot concentrate	2.529	2.480	2.528	2.481
Being sad/depressed	2.587	2.570	2.596	2.577

Notes: National and site level focal child full sample weights are used. Sample used is pooled NSAF focal child level data 1997, 1999, and 2002. In Panel B, NSAF collects the mental health care utilization from children 3 years of age or older. In Panel C, NSAF collects the information from children 6 years of age or older. The behavior index is a scale score ranging from 6 to 18. The behavior question scores is ranging from 1 to 3. Higher score indicates better mental health. Positive behavior is an indicator for an index score of 18. The final three questions are from a 3-point scale, where a score of 3 indicates never having this issue.

A. Coverage

There is strong evidence in the NSAF that more generous income thresholds for Medicaid/SCHIP coverage (summarized "SCHIP" in the tables and from here forward) results in higher levels of public coverage for children. For the all-state sample, Panel A of Table 4 indicates that an increase in the SCHIP threshold of 100 percent of FPL (ex. from 50% FPL to 150% FPL) is associated with an estimated 2.3 percentage point increase in SCHIP participation (about 11 percent of baseline coverage of 21 percent). The average increase in state thresholds from 1997 to 2002 for older children is in fact nearly 100 percent of FPL, so our findings indicate a substantial increase in coverage.[4] Columns 2 and 3 provide estimated changes in "private" and "any" coverage, but we find there is not conclusive evidence on the extent to which the added SCHIP participants have crowded out private coverage or represent new coverage. At face value, the estimates do suggest possible crowd-out since the estimated increase in "any insurance" is much smaller than the SCHIP increase and the estimated decline in private insurance is approaching statistical significance (p=0.152). These results are consistent with Li and Baughman's (2011) findings on the same outcomes, though they were measured slightly differently.[5]

The first row of Panel A of Table 4 uses the whole sample, including many who are certainly ineligible for SCHIP (and not near the margin at which they might consider intentionally becoming eligible). To the extent these people are unaffected by SCHIP, they may be diluting its estimated effect on the population of interest. The second row of Panel A limits the sample to those most likely to be influenced by SCHIP (below 300% of FPL), and the results confirm our expectations: for lower-income families, SCHIP has larger estimated effects than in the full sample. The findings indicate that an increase in the threshold equal to 100% of FPL is associated with a 3.4 percentage point increase in Medicaid participation, which is almost 10% of the mean level of participation in that subsample. The irrelevance of SCHIP for high-income families is confirmed in the final row of Panel A, where we find no effect at all on their Medicaid/ SCHIP participation.

[4] Using Table 1, the average state increase for younger children is 71% FPL and for older children is 98% FPL. These are unweighted means, treating each state as an observation.

[5] Li and Baughman (2011) assigned each child only one possible insurance coverage, whereas we included them under any categories reported; children who had access to both Medicaid and private coverage were indicated as such in each regression. The Li and Baughman (2011) approach has the advantage of creating an "adding up" condition when comparing across the row, while our approach leaves the data more intact.

Table 4: The effect of eligibility expansions on health insurance coverage

	(1) Medicaid/SCHIP	(2) Private insurance	(3) Any insurance	(4) N
Panel A: all states				
SCHIP threshold	0.023***	-0.012	0.009*	10,3815
	(0.009)	(0.008)	(0.005)	
Under 300% FPL				
SCHIP threshold	0.034**	-0.016	0.014	63,517
	(0.014)	(0.013)	(0.010)	
Over 300% FPL				
SCHIP threshold	0.0006	0.0012	0.003	40,298
	(0.0050)	(0.0073)	(0.006)	
Panel B: 13 ANF states				
SCHIP threshold	0.045***	-0.025***	0.013**	90,249
	(0.008)	(0.009)	(0.006)	
Under 300% FPL				
SCHIP threshold	0.072***	-0.030**	0.028***	54,932
	(0.011)	(0.012)	(0.010)	
Over 300% FPL				
SCHIP threshold	-0.0001	-0.012	-0.009*	35,317
	(0.006)	(0.009)	(0.005)	

Notes: Only the coefficients of interests are reported. All regressions include a full set of demographic controls, year dummy variables, state dummy variables, and region by year dummy variables. National and site level focal child full sample weights are used. Standard errors are calculated by Taylor-linearized variance estimation. PSU and strata variables are used in "svy" Stata commands to adjust for complex survey design. SCHIP threshold is measured by 100 percent of federal poverty level (FPL).
Standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

We repeat our analysis using NSAF's 13-state sample, which accounts for 87% of the overall sample, in Panel B of Table 4. The elimination of states with sparse data seems to improve the precision with which we can estimate the effects of the SCHIP threshold on coverage, while (of course) limiting the population to which the estimates apply. For the low-income sample, the estimates suggestion that a 100% of FPL increase in the threshold would result in a 7.2 percentage point increase in coverage, or about 20% of baseline. The results for other types of coverage suggest that roughly half of this coverage increase is crowd-out from private coverage. In general, the 13-state subsample seems to include states experiencing larger effects of expansions than other states. However, the high-income subsample again indicates no effects on Medicaid/SCHIP coverage (though there is a small, marginally significant reduction in "any coverage" that may be driven by falling private coverage in more generous states). These results are again qualitatively consistent with those obtained by Li and Baughman (2011).

Since Medicaid and SCHIP expansions for children have often been applied to specific age groups, and since these age groups may have different propensities to take up public coverage (for example, if parents are more concerned about children's coverage at certain ages), we also estimate separate effects of SCHIP by age category of the child.[6] We have broken the ages into the 0-5

[6] Note that Li and Baughman (2011) limit their analysis to comparing two age groups: 0-5 and 6-17.

year old bracket and then 3-year brackets up to age 17 (and these bracket dummies are used as the age controls in all regressions in the paper to allow for nonlinear age effects). Table 5 shows the estimated effects of SCHIP by age group on SCHIP coverage, in both the all-state and 13-state samples for both the all-income and low-income subgroups. (The unreported estimates for high-income subgroups are all small and statistically insignificant). We find larger impacts of expanded eligibility for older children, perhaps because their initial eligibility limits were so low that there was more latent demand for coverage. This is consistent with other work showing that marginal effects of Medicaid expansions on coverage get smaller as the initial eligibility threshold becomes more generous (Card and Shore-Sheppard, 2004; Hamersma and Kim, 2013). In the ANF low-income sample, we see a 5.4 to 7.5 percentage point estimated increase in Medicaid/SCHIP coverage for children ages 6-11 in response to an eligibility expansion equal to 100% of FPL. For the older children, the estimated effect is larger at 8.2 to 9.9%.

Table 5
The effect of Medicaid/SCHIP income limits on Medicaid/SCHIP coverage by age group

	All states		13 ANF states	
	(1) All	(2) <300% FPL	(3) All	(4) <300% FPL
SCHIP×Age 0-5	0.018	0.028	0.017*	0.031*
	(0.012)	(0.017)	(0.010)	(0.015)
SCHIP×Age 6-8	0.022	0.025	0.031***	0.054***
	(0.013)	(0.020)	(0.011)	(0.016)
SCHIP×Age 9-11	0.015	0.026	0.048***	0.075***
	(0.011)	(0.018)	(0.0100)	(0.015)
SCHIP×Age 12-14	0.028***	0.046***	0.062***	0.099***
	(0.010)	(0.016)	(0.011)	(0.017)
SCHIP×Age 15-17	0.033***	0.049***	0.054***	0.082***
	(0.009)	(0.015)	(0.010)	(0.016)
N	103,815	63,517	90,249	54,932

Notes: Only the coefficients of interests are reported. All regressions include full set of demographic controls, year dummy variables, state dummy variables, and region by year dummy variables. National level focal child full sample weights are used. Standard errors are calculated by Taylor-linearized variance estimation. PSU and strata variables are used in "svy" Stata commands to adjust for complex survey design. SCHIP is measured by 100 percent of federal poverty level (FPL).
Standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

B. Utilization

Having established a relationship between SCHIP expansions and participation in coverage, we now consider whether this increased public coverage manifested in increased usage of health care services. Since the higher-income subsample showed no evidence of increased Medicaid/SCHIP coverage – in fact, the estimated effect was a fairly precise zero (see Table 4) – we do not expect Medicaid thresholds to affect their utilization or outcomes directly. We therefore focus on the low-income subsamples for the remainder of our analysis. We also continue to break out estimates by age group, as there seems to be potential for heterogeneous effects by age given the differences in coverage responsiveness.

Table 6 displays the estimated effects of the Medicaid/SCHIP thresholds on four measures of general health care utilization. The results using the all-state sample (in Panel A) indicate positive estimated effects on four measures of utilization available in NSAF: doctor visits, well-child visits, visits to other medical personnel, and emergency room visits, but only one of these positive estimated effects is statistically significantly different from zero (well-child visits). This estimate suggests that raising the threshold by 100 percent FPL increases the number of well-child visits by about one-fourth of a visit (.272), or 22 percent relative to its mean (1.231). While the positive estimated effects are consistent with Li and Baughman (2011), we use the actual number of visits for our outcome instead of using the probability of visit (any visit), and add two more measurements to the analysis, so our results are distinct. We find that the effect on well-child visits is distributed throughout the age distribution. In contrast, the effects of Medicaid/SCHIP thresholds on two other outcomes are positive and precisely-estimated only for certain age groups: the bulk of the effect on medical personnel visits seems to come from small children (ages 0-5), while we see an increase in emergency room visits among young teens. Increased usage of emergency care when Medicaid expands is in line with recent work on the Oregon Medicaid Experiment (Taubman et al., 2014), where people who were randomly assigned into Medicaid obtained more of all types of care, including emergency care.

When we focus on the 13-state sample (Panel B), we see similar but more pronounced patterns, likely reflecting the larger coverage effects in this subsample. Higher Medicaid/SCHIP thresholds are associated with more consumption of care, and these effects are substantial and statistically significant for nearly all age groups when thresholds are interacted with age group. The exception in this case is emergency care, where most estimates are small and statistically insignificant; the negative, marginally-significant estimated effect on the youngest group would be consistent with transferring care to the other types of services (where they show consistently large increases in utilization).

Table 6
The effect of SCHIP on general health care utilization

	(1) Doctor	(2) Well-child	(3) Medical personnel	(4) Emergency room
Panel A: all states				
SCHIP threshold	0.137	0.272***	0.061	0.044
	(0.095)	(0.052)	(0.038)	(0.036)
Different age groups				
SCHIP×Age 0-5	0.145	0.409***	0.173**	0.0381
	(0.142)	(0.076)	(0.066)	(0.054)
SCHIP×Age 6-8	0.136	0.269***	0.011	0.040
	(0.110)	(0.052)	(0.048)	(0.039)
SCHIP×Age 9-11	0.180	0.306***	0.063	0.031
	(0.133)	(0.103)	(0.056)	(0.055)
SCHIP×Age 12-14	0.127	0.168**	0.083	0.067*
	(0.099)	(0.066)	(0.055)	(0.037)
SCHIP×Age 15-17	0.091	0.232***	-0.002	0.046
	(0.128)	(0.047)	(0.061)	(0.046)
N	63517	63517	63517	63517

Panel B: 13 ANF states				
SCHIP threshold	0.436***	0.505***	0.146***	-0.00129
	(0.0721)	(0.0487)	(0.0463)	(0.0205)
Different age groups				
SCHIP×Age 0-5	0.536***	0.942***	0.346***	-0.0583*
	(0.111)	(0.0705)	(0.0800)	(0.0346)
SCHIP×Age 6-8	0.213**	0.419***	0.0718	-0.0184
	(0.0974)	(0.0515)	(0.0535)	(0.0266)
SCHIP×Age 9-11	0.581***	0.499***	0.145**	-0.00247
	(0.0809)	(0.0650)	(0.0635)	(0.0326)
SCHIP×Age 12-14	0.522***	0.455***	0.124*	0.0284
	(0.0899)	(0.0647)	(0.0628)	(0.0266)
SCHIP×Age 15-17	0.384***	0.438***	0.157**	0.0172
	(0.0988)	(0.0546)	(0.0664)	(0.0284)
N	54,932	54,932	54,932	54,932

Notes: National and site level focal child full sample weights are used. Standard errors are calculated by Taylor-linearized variance estimation. PSU and strata variables are used in "svy" Stata commands to adjust for complex survey design. Standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 7 moves to our area of focus in this study, examining measures of mental health care utilization (both number of visits and "any visit"). In contrast to general health care, we see no evidence of increased utilization of mental health care in the full or ANF samples. Moreover, an analysis that breaks down the effects by age group and income group does not suggest an effect on any subgroup in the population except the youngest, for whom utilization falls statistically significantly in the ANF group. A decline in utilization could have many causes. One possibility is substitution (i.e. receiving some mental-health-improving services through other medical appointments, for which we saw a large increase) or reduction in quality of coverage for families that moved from private insurance to Medicaid (though it is common for Medicaid to have better, not worse, mental health coverage). It may also be the case that families with access to public health insurance experience reductions in stress levels and increased access to income for non-medical purposes (i.e. the "income effect" of assistance) and so have a general increase in well-being that translates into less need for child mental health services for the youngest children in the household. However, it is not clear why older children would remain unaffected.

Table 7
The effect of SCHIP on mental health care utilization

	(1) Mental health visit	(2) Any mental health visit
Panel A: all states		
SCHIP threshold	-0.097	-0.004
	(0.130)	(0.009)
Different age groups		
SCHIP×Age 3-5	-0.212	-0.007
	(0.154)	(0.010)
SCHIP×Age 6-8	0.017	0.004
	(0.131)	(0.009)
SCHIP×Age 9-11	-0.120	-0.004
	(0.135)	(0.012)
SCHIP×Age 12-14	-0.072	-0.011
	(0.133)	(0.012)
SCHIP×Age 15-17	-0.217	-0.005
	(0.223)	(0.014)
N	52,613	52,613
Panel B: 13 ANF states		
SCHIP threshold	-0.010	0.000
	(0.074)	(0.007)
Different age groups		
SCHIP×Age 3-5	-0.285**	-0.016*
	(0.115)	(0.009)
SCHIP×Age 6-8	0.010	0.002
	(0.103)	(0.009)
SCHIP×Age 9-11	0.008	0.003
	(0.131)	(0.008)
SCHIP×Age12-14	-0.064	-0.010
	(0.092)	(0.010)
SCHIP×Age 15-17	-0.000	0.007
	(0.115)	(0.011)
N	45,499	45,499

Notes: National and site level focal child full sample weights are used. Standard errors are calculated by Taylor-linearized variance estimation. PSU and strata variables are used in "svy" Stata commands to adjust for complex survey design. Observations are restricted to children 3 years of age or older. Standard errors in parentheses. * $p < 0.1$

C. Mental and Behavioral Health Outcomes

Although our estimates suggest that SCHIP coverage may not have contributed to increased mental health care utilization, it is still possible that even small effects on utilization could have

impacts on outcomes, or that expanded coverage could have a direct effect on improving mental health outcomes via enhanced family well-being (via income effects or stress reduction) as noted above. Table 8 provides estimated effects of SCHIP on the behavioral index discussed earlier (ranging from 6 to 18, where larger indices indicate more positive behaviors) as well as a binary variable indicating consistent positive behaviors (i.e. index = 18). The survey has separate index measurement methods for 6-11 and 12-17 year-old children, so we separate them in this model.

We find no measurable effect of Medicaid/SCHIP expansions in the sample including all states (Panel A). Moving to the 13-state sample does not change the conclusions much (Panel B), but there is some small indication of behavioral improvements (when measured as a binary variable: an increase in SCHIP eligibility thresholds of 100 percent of FPL is associated with a 4 percentage point increase in the predicted probability of "positive behavior" for 12-17 year olds. On a base of 28 percent, this a nearly 15% improvement.

Table 8
The effect of SCHIP on behavioral problems index score

	(1) Age 6-11 Index score	(2) Age 6-11 Positive behavior	(3) Age 12-17 Index score	(4) Age 12-17 Positive behavior
Panel A: All states				
SCHIP	0.047	0.029	0.012	0.024
	(0.136)	(0.021)	(0.125)	(0.023)
N	20,640	20,640	17,934	17,934
Panel B: 13 ANF states				
SCHIP	-0.074	-0.006	0.143	0.040*
	(0.097)	(0.021)	(0.112)	(0.021)
N	17,830	17,830	15,550	15,550

Notes: National and site level focal child full sample weights are used. Only the coefficients of interests are reported. All regressions include full set of demographic controls, year dummy variables, state dummy variables, and region by year dummy variables. The behavior index is a scale score ranging from 6 to 18. Higher score indicates better mental health. Positive behavior is an indicator for an index score of 18. Observations are limited to children 6 years of age or older.
Standard errors in parentheses.
* $p < 0.1$

As noted earlier, the behavioral problems index scores combine information from six behavioral questions, three of which overlap for both age groups: "doesn't get along with other kids," "can't concentrate for long," and "has been sad or depressed." For each of these, a higher index (on a scale of 1 to 3) indicates that the children have "never" experienced this situation in the last year, thus it indicates better outcomes. We dig deeper to see if there might be any individual emotional/behavioral problem that shows improvement upon increased access to SCHIP.

Table 9 provides the all-state and 13 ANF state sample estimated effects of SCHIP on indices for these separate questions in Panel A and Panel B respectively. There is essentially no evidence that these outcomes are affected by Medicaid/SCHIP expansions. The average for these variables is around 2.5, so even the single statistically-significant coefficient of .073 (for 9-11 years olds re: concentration) is not meaningful in magnitude. It does not appear that large increases in access to Medicaid/SCHIP for these children translated into measurable improvements in mental or behavioral health.

Table 9

The effect of SCHIP on several specific behavior and emotional problems

	(1) Doesn't get along with other kids	(2) Can't concentrate for long	(3) Has been sad for depressed
Panel A: all states			
SCHIP threshold	0.004	0.037	0.016
	(0.021)	(0.027)	(0.025)
Different age groups			
SCHIP×Age 6-8	-0.005	0.003	0.014
	(0.027)	(0.027)	(0.030)
SCHIP×Age 9-11	0.018	0.073**	0.039
	(0.025)	(0.032)	(0.027)
SCHIP×Age12-14	-0.021	0.027	0.002
	(0.025)	(0.035)	(0.032)
SCHIP×Age 15-17	0.030	0.051	0.006
	(0.027)	(0.033)	(0.029)
N	38,718	38,705	38,658
Panel B: 13 ANF states			
SCHIP threshold	0.015	0.014	-0.012
	(0.018)	(0.021)	(0.017)
Different age groups			
SCHIP×Age 6-8	0.010	0.001	-0.029
	(0.020)	(0.027)	(0.021)
SCHIP×Age 9-11	0.028	0.014	-0.018
	(0.023)	(0.024)	(0.022)
SCHIP×Age12-14	0.009	0.025	0.006
	(0.024)	(0.030)	(0.023)
SCHIP×Age 15-17	0.014	0.018	-0.004
	(0.024)	(0.029)	(0.024)
N	34,479	34,468	34,433

Notes: National and site level focal child full sample weights are used. Only the coefficients of interests are reported. All regressions include full set of demographic controls, year dummy variables, state dummy variables, and region by year dummy variables. The scores (ranging from 1-3 points) of behavior and emotional questions are used to create index scores. Higher point indicates better mental health. Observations are limited to children 6 years of age or older. Standard errors in parentheses. * $p < 0.1$

6. Robustness Checks and Extensions

To assess the sensitivity of our main results, we conduct several supplementary analyses. Two robustness checks assess the sensitivity of our results to some alternative variables, and two extensions examine the potential heterogeneity of the Medicaid/SCHIP effect across different coverage regimes and delivery systems respectively.

First, we examine the effect of lagged SCHIP eligibility threshold on mental health outcomes using the same specification as in previous regressions. In the broader literature that links health

insurance coverage to health outcomes, one potential explanation for its often small estimated impact is that an observable improvement in health outcomes may require time. Thus, we replace our variable for the concurrent public insurance eligibility threshold with the threshold in place one year or two years before the time when mental health outcomes were observed in NSAF (1997, 1999, and 2002). Table 10 shows the original output (first row of each panel) as well as the lagged versions, with a focus on the coverage measure (Medicaid/SCHIP), utilization indicator (any mental health visit), and two positive behavioral indicators (for ages 6-11 and 12-17).

Table 10: The effect of eligibility expansions on behavioral problems index score: lagged thresholds

	(1)Medicaid/ SCHIP	(2) Any mental health visits	(3) Age 6-11 Positive behavior	(4) Age 12-17 Positive behavior
Panel A: All states				
SCHIP threshold	0.034**	-0.004	0.029	0.024
	(0.014)	(0.009)	(0.021)	(0.023)
SCHIP thresh (1-yr lag)	0.021*	-0.005	0.037*	-0.008
	(0.013)	(0.011)	(0.021)	(0.023)
SCHIP thresh (2-yr lag)	0.022**	-0.006	0.043*	-0.011
	(0.011)	(0.007)	(0.024)	(0.017)
N	63,517	52,613	20,640	17,934
Panel B: 13 ANF states				
SCHIP threshold	0.072***	0.000	-0.006	0.040*
	(0.011)	(0.007)	(0.021)	(0.021)
SCHIP thresh (1-yr lag)	0.073***	0.013**	0.002	-0.014
	(0.012)	(0.006)	(0.019)	(0.023)
SCHIP thresh (2-yr lag)	0.057***	0.009	-0.022	-0.019
	(0.011)	(0.006)	(0.017)	(0.022)
N	54,932	45,499	17,830	15,550

Notes: National and site level focal child full sample weights are used. Only the coefficients of interests are reported. All regressions include full set of demographic controls, year dummy variables, state dummy variables, and region by year dummy variables. The behavior index is a scale score ranging from 6 to 18. Higher score indicates better mental health. Positive behavior is an indicator for an index score of 18. Observations are limited to children 6 years of age or older in families with incomes below 300% FPL. Standard errors in parentheses.

The lagged threshold does seem to bring out some patterns that were not there using the contemporaneous threshold; for example, the all-state sample suggests a statistically significant relationship between the SCHIP threshold and positive behavior for 6-11 year olds when using either of the lagged thresholds. However, these estimates disappear in the 13-state sample. Overall, this set of estimates does not give us confidence that lagging the threshold brings new clarity or notable results.

Concern about potential omitted variables bias leads us to another robustness check. While our estimates include controls for state and time fixed effects, it is possible that finer geographic controls would also be helpful for understanding children's health. One clear alternative influence on children's mental health care and outcomes – both formally and informally – is a child's school

environment. We gathered data from the National Center for Education Statistics (NCES) Common Core of Data to link to the counties that the NSAF identifies (only those in the ANF sample with population over 250,000). Aggregating up from the school to the county level, we established each county's overall (a) teacher-student ratio and (b) guidance counselor-student ratio and merged them into the NSAF sample.[7] Using this smaller, very urban sample, we see higher Medicaid coverage rates in counties with fewer teachers and more counselors (detailed results available upon request). This would be consistent with the idea that fewer teachers indicates lower resourced schools (where children may be more likely to be eligible for Medicaid) and that guidance counselors may serve as a conduit for connecting students with Medicaid, though we have no way to know whether these mechanisms are the ones at work. In adding these variables and (by necessity) limiting the sample to large cities, we find larger estimated effects of Medicaid/SCHIP expansions on coverage, but still little to no effect of Medicaid/SCHIP expansions (or the county-level school characteristics themselves) on mental health care utilization or mental health or behavioral outcomes.

Table 11: The effect of eligibility expansions on selected outcomes, large counties in ANF sample w/ county educ variables

	(1) Medicaid/ SCHIP	(2)Any mental health visit	(3) Age 6-11 Positive behavior	(4) Age 12-17 Positive behavior
SCHIP threshold	0.104***	0.006	0.0208	0.0313
	(0.022)	(0.014)	(0.0430)	(0.0539)
Different age groups				
SCHIP×Age 0-5	0.050	-0.003	-	-
	(0.031)	(0.018)	-	-
SCHIP×Age 6-8	0.078***	0.001	0.023	-
	(0.029)	(0.016)	(0.046)	-
SCHIP×Age 9-11	0.115***	0.006	0.018	-
	(0.025)	(0.017)	(0.045)	-
SCHIP×Age 12-14	0.127***	0.001	-	0.033
	(0.030)	(0.017)	-	(0.057)
SCHIP×Age 15-17	0.111***	0.013	-	0.028
	(0.033)	(0.018)	-	(0.057)
N	22,514	18,492	7,382	5,975

Notes: County codes are only provided for the ANF sample, and only for counties with population above 250,000. Education data are merged in from NCES Common Core.

Along with our focus on mental health and attention to age groups, we seek to push the literature forward by asking whether Medicaid/SCHIP program features (specifically, quality of coverage and delivery system) might influence its effectiveness in raising children's coverage and increasing mental health utilization and/or outcomes. For simplicity, we focus here on the ANF

[7] Note that we include these county-level variables rather than county fixed effects because we believe our samples are not large enough to argue for within-county identification of Medicaid effects.

sample in which coverage fell fairly cleanly into two categories: 6 of the 13 states either expanded Medicaid itself or created SCHIP programs with Medicaid-equivalent access to mental health services (MA, MN, MI, NJ, WA, WI) while the others provided more limited mental health coverage.

Table 12 displays results for the same sample of outcomes as Table 11, moving from coverage to utilization to health outcomes. Panel A provides results using an interaction term between SCHIP and Medicaid equivalence, and indicate no difference in the outcomes by coverage type. To allow further flexibility, we then estimate the models separately by coverage type (Medicaid equivalent in Panel B, others in Panel C) and again allow effects to vary by age. We find that Medicaid expansions in states with Medicaid coverage (or Medicaid-equivalent under SCHIP) may increase utilization among the youngest and oldest children, while the limited coverage shows no such pattern. In contrast, it appears that the more limited-coverage states strongly drive the increase in public insurance coverage observed in the overall sample. It is surprising that this wasn't picked up in the interaction term in Panel A, and we will continue to explore this puzzle.

Table 12: The effect of eligibility expansions on selected outcomes, ANF sample, by coverage type

	(1) Medicaid/ SCHIP	(2)Any mental health visit	(3) Age 6-11 Positive behavior	(5) Age 12-17 Positive behavior
Panel A: Full sample w/ Interaction term				
SCHIP threshold	0.106***	0.007	0.017	0.036
	(0.023)	(0.014)	(0.044)	(0.055)
SCHIP thresh * Medicaid Equiv	-0.011	-0.012	0.066	-0.119
	(0.027)	(0.024)	(0.076)	(0.073)
N	22,514	18,492	7,382	5,975
Panel B: Medicaid equivalent states only				
SCHIP threshold	0.012	0.022	-0.025	-0.135*
	(0.027)	(0.022)	(0.094)	(0.079)
Different age groups				
SCHIP×Age 0-5	0.027	0.074*	-	-
	(0.050)	(0.042)	-	-
SCHIP×Age 6-8	0.004	-0.001	-0.040	-
	(0.031)	(0.026)	(0.093)	-
SCHIP×Age 9-11	-0.020	0.017	-0.009	-
	(0.034)	(0.028)	(0.099)	-
SCHIP×Age 12-14	0.032	0.038	-	-0.134
	(0.038)	(0.031)	-	(0.082)
SCHIP×Age 15-17	0.052	0.066**	-	-0.136
	(0.039)	(0.029)	-	(0.083)
N	8,681	7,138	2,878	2,335
Panel C: Limited coverage states only				
SCHIP threshold	0.122***	0.005	0.035	0.044
	(0.025)	(0.017)	(0.050)	(0.064)

Different age groups				
SCHIP×Age 0-5	0.065*	-0.001		
	(0.034)	(0.021)		
SCHIP×Age 6-8	0.098***	0.004	0.038	
	(0.032)	(0.019)	(0.053)	
SCHIP×Age 9-11	0.137***	0.006	0.032	
	(0.028)	(0.020)	(0.054)	
SCHIP×Age 12-14	0.145***	-0.001		0.044
	(0.033)	(0.019)		(0.066)
SCHIP×Age 15-17	0.123***	0.009		0.043
	(0.037)	(0.022)		(0.068)
N	13,833	11,354	4,504	3,640

Notes: ANF sample (13 states) with "Medicaid equivalent" defined as a dummy variable.

Our final extension of the estimates considers the potential differences in responsiveness to coverage expansions by health care delivery type. During the years under study, many Medicaid programs had moved from traditional fee-for-service (FFS) models to some form of managed care. Managed care was intended to help control costs without reducing access to care. By 2003, 11 of the 13 ANF states had moved to managed care (Howell, 2004). The way in which mental health care was handled, however, varied across states even among those with managed care. For example, in California, Colorado, and New Jersey, mental health services were carved out to FFS. Other states incorporated mental health directly into their main managed care arrangement or had a separate mental health managed care program.

Our expectation is that providers will me more interested in supplying mental health benefits under FFS arrangements, so there may be more mental health care utilization under that scenario. On the other hand, all-inclusive managed care arrangements may make access simpler for patients. Therefore, we are not sure what the net effect on access to care might be and consider this an empirical question. We examine the same four outcomes as the previous tables, allowing for Medicaid/SCHIP thresholds to matter differently depending on health care delivery type.

Table 12: The effect of eligibility expansions on selected outcomes, ANF sample, by delivery type

	(1) Medicaid/ SCHIP	(2) Any mental health visit	(3) Age 6-11 Positive behavior	(4) Age 12-17 Positive behavior
Panel A: Full sample w/ Interaction term				
SCHIP threshold	0.105***	0.005	0.020	0.033
	(0.024)	(0.014)	(0.045)	(0.056)
SCHIP thresh * Fee-for-service	0.003	0.001	0.003	-0.013
	(0.040)	(0.022)	(0.055)	(0.058)
N	22,514	18,492	7,382	5,975
Panel B: Fee-for-service mental health coverage states only				
SCHIP threshold	0.124***	0.017	-0.083	0.109
	(0.042)	(0.032)	(0.092)	(0.107)

Different age groups				
SCHIP×Age 0-5	0.051	0.005		
	(0.055)	(0.040)		
SCHIP×Age 6-8	0.114**	0.020	-0.073	
	(0.048)	(0.034)	(0.096)	
SCHIP×Age 9-11	0.123**	0.017	-0.092	
	(0.052)	(0.038)	(0.095)	
SCHIP×Age 12-14	0.141***	-0.001		0.121
	(0.050)	(0.033)		(0.109)
SCHIP×Age 15-17	0.103*	0.004		0.089
	(0.058)	(0.037)		(0.112)
N	6,990	5,706	2,264	1,769

Panel C: Managed care w/o FFS mental health states only				
SCHIP threshold	0.099***	0.005	0.018	0.022
	(0.025)	(0.015)	(0.048)	(0.058)
Different age groups				
SCHIP×Age 0-5	0.065*	-0.011		
	(0.036)	(0.023)		
SCHIP×Age 6-8	0.048	-0.013	0.012	
	(0.033)	(0.017)	(0.052)	
SCHIP×Age 9-11	0.112***	0.004	0.024	
	(0.029)	(0.020)	(0.050)	
SCHIP×Age 12-14	0.124***	0.009		0.008
	(0.036)	(0.018)		(0.061)
SCHIP×Age 15-17	0.135***	0.026		0.045
	(0.033)	(0.020)		(0.062)
N	15,524	12,786	5,118	4,206

Notes: Sample contains ANF sample (13 states) with "Fee for service" defined as a dummy variable.

The analysis of health care delivery type does not suggest any particular advantage of one delivery arrangement over another in terms of utilization or outcomes; mental health care remains apparently unaffected by the generosity of Medicaid regardless of delivery type. The delivery type also does not seem to have any distinct influence on participation in Medicaid.

7. Conclusions and policy implications

Medicaid coverage has provided mental health coverage at parity even when many private insurers have more limited coverage. Major Medicaid expansions during the late 1990s provided an opportunity for many children – especially older children – to gain access to mental health coverage. While numerous studies have already established the impact of Medicaid expansions on public insurance coverage and general health care utilization and outcomes, the effects of these

expansions on mental health care utilization and mental health outcomes has not been established. Understanding the role of public health insurance in protecting children's mental health is important for considering the impacts of mandatory mental health coverage (an "essential benefit" under the ACA) and potentially for the consequences of its removal, as may be the case under health care reform alternatives currently under consideration by the federal government.

Our main findings, from the national sample and 13 ANF states sample of the NSAF, both show positive and statistically significant effects of Medicaid/SCHIP expansions on Medicaid/SCHIP coverage and general health care utilization, confirming previous work. All of the gain in coverage comes from poor and near poor children (less than 300% FPL) and much of it is concentrated among children older than 6. However, we find very little evidence that mental health care utilization is affected by these coverage expansions. As for mental health itself – measured alternately as a total score, a binary indicator, and specific sub-questions about depression, concentration, and getting along with others – there is very little evidence of a systematic effect of Medicaid/SCHIP expansions.

To the extent mental health outcomes may not be very affected by coverage, our analysis then looks deeper to explore whether certain policy features might drive differential effects of Medicaid/SCHIP expansions. For example, when we distinguish between samples of states with Medicaid or Medicaid-equivalent coverage vs. states with SCHIP expansions that have limited mental health coverage, we find most of the coverage increases occurred in the "limited coverage" states. However, in the Medicaid (or equivalent) coverage states, we see small but statistically significant increases in the probability of a mental health visit for the youngest and oldest children. We have yet to establish the mechanism for these improvements, given the lack of coverage increase.

In our final set of estimates, we incorporate policy data on the type of delivery system used for Medicaid/SCHIP expansions. While Medicaid was historically under a fee-for-service model, many states during the time of our study were converting the managed care models – some of which carved out mental health services to stay fee-for-service, and others of which brought mental health care under managed care. There are conflicting possible mechanisms that could make fee-for service more amendable or less amendable to successfully translating coverage into utilization. Our analysis finds effectively no difference between the two types of delivery systems in predicting coverage, utilization, or mental health outcomes; we continue to see only a coverage effect and nothing more.

Our findings thus suggest very little improvement in mental health care utilization or mental health outcomes as a result of Medicaid/SCHIP expansions. Considering the importance of mental health care access for children who need it – and the cost-effectiveness of providing care to young people to help avoid future emotional and behavioral challenges – we hope to consider other ways in which the public health insurance system can be designed to effectively provide for children's mental health care needs.

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