Spillover Effects of Adult Medicaid Expansions on Children's Use of Preventive Services

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abstract

BACKGROUND: Since the passage of the Affordable Care Act, Medicaid enrollment has increased by ~17 million adults, including many low-income parents. One potentially important, but little studied, consequence of expanding health insurance for parents is its effect on children's receipt of preventive services.

METHODS: By using state Medicaid eligibility thresholds linked to the 2001–2013 Medical Expenditure Panel Surveys, we assessed the relationship between changes in adult Medicaid eligibility and children's likelihood of receiving annual well-child visits (WCVs). In instrumental variable analyses, we used these changes in Medicaid eligibility to estimate the relationship between parental enrollment in Medicaid and children's receipt of WCVs.

RESULTS: Our analytic sample consisted of 50 622 parent-child dyads in families with incomes <200% of the federal poverty level, surveyed from 2001 to 2013. On average, a 10-point increase in a state's parental Medicaid eligibility (measured relative to the federal poverty level) was associated with a 0.27 percentage point higher probability that a child received an annual WCV (95% confidence interval: 0.058 to 0.48 percentage points, P = .012). Instrumental variable analyses revealed that parental enrollment in Medicaid was associated with a 29 percentage point higher probability that their child received an annual WCV (95% confidence interval: 11 to 47 percentage points, P = .002).

CONCLUSIONS: In our study, we demonstrate that Medicaid expansions targeted at low-income adults are associated with increased receipt of recommended pediatric preventive care for their children. This finding reveals an important spillover effect of parental insurance coverage that should be considered in future policy decisions surrounding adult Medicaid eligibility.

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WHAT'S KNOWN ON THIS SUBJECT: Cross-sectional studies have revealed inconsistent relationships between parental insurance coverage and children's health care use. To our knowledge, no studies have investigated the link between parental insurance and pediatric care by using more robust quasi-experimental methods.

WHAT THIS STUDY ADDS: We found that parental Medicaid enrollment is associated with a 29 percentage point higher probability that low-income children received annual well-child visits, highlighting a link between parents' Medicaid coverage and their children's health care use.

Since the passage of the Affordable Care Act (ACA), 31 states and the District of Columbia have expanded Medicaid to adults earning <138% of the federal poverty level (FPL).[1] Medicaid expansions have been shown to increase preventive care use, improve health outcomes, and reduce the financial burden of obtaining care.[2–5] The authors of several studies have also identified potential spillover effects in which increases in adult Medicaid coverage indirectly affect health care use in other populations, for example, by increasing insurance enrollment among children and improving family financial standing.[5–7]

One important but understudied effect of expanding access to health insurance for parents is its impact on well-child visit (WCV) use among children. Recommended annually for children 3 years of age and older, and more frequently for infants and toddlers,[8] WCVs serve as the primary platform for growth and developmental screening, vaccination, and provision of anticipatory guidance. Children who receive WCVs are more likely to complete immunization schedules and are less likely to have avoidable hospitalizations.[9,10] WCV use in the United States has been persistently suboptimal, particularly among racial and ethnic minorities and in low-income families.[11]

Although the authors of previous studies have shown that parental health care use is correlated with children's receipt of care,[12–15] evidence regarding the relationship between parental insurance coverage and pediatric care use is mixed. The authors of several cross-sectional studies found a positive correlation between parents' insurance status and children's health care use in primarily low-income families,[16–18] whereas analyses in mixed income populations did not.[14,15] A limitation of cross-sectional analyses is that insured and uninsured adults differ in unobserved ways that may be related to their child's use of care, potentially biasing the estimated relationship between these variables.[19]

To address this bias, we used a quasi-experimental design that leveraged state-level variation in adult Medicaid eligibility over the period from 2001 to 2013 to assess the relationship between parents' Medicaid coverage and children's receipt of annual WCVs. Our findings reveal how changes in federal and state policies that affect Medicaid coverage for adults could indirectly affect low-income children's use of recommended primary care services.

METHODS

Data Sources

We analyzed data from the 2001–2013 Medical Expenditure Panel Surveys (MEPS) linked to state Medicaid eligibility criteria from the Kaiser Family Foundation and county-level characteristics from the Area Health Resources File. The MEPS is a nationally representative survey of the noninstitutionalized US population and includes detailed information about family structure and demographic characteristics, health insurance status, and health care use.[20]

Our analytic sample consisted of children ages 2 through 17 linked to their biological, step, or adoptive parents living in the same household during the calendar year. We first selected children ages 2 through 17 living in the household the entire year. We then linked each child to a parent or guardian (age 20–64) living in the household for the full year. Consistent with previous research, preference was given to the selection of the mother if more than 1 parent in the household was surveyed.[15]

Because Medicaid eligibility rules differ for pregnant women, we excluded children whose mothers met inclusion criteria but were pregnant at any point during the calendar year. Because pregnancy status was not uniformly reported in all years of the MEPS, we identified pregnant women as having either a child born in the same calendar year or by September of the next calendar year, or as having any pregnancy-related inpatient visits over the same period. This measure was highly correlated with pregnancy status for the years in which this variable was included in the MEPS (Supplemental Table 5).

Consistent with the methods in previous studies,[16–18] our primary analyses were focused on low-income families, defined as those with incomes <200% of the FPL.

Measures

Outcome: WCV Use

We assessed whether a child received at least 1 WCV in the calendar year. WCVs were defined as outpatient visits for a "well-child examination," for a "general checkup," or for "immunization or shots" for children <17.[21] We controlled for changes in the recommended WCV schedule over time (such as introduction of annual visit requirements for 7- and 9-year-olds in 2007) by including year fixed effects in regression analyses.[8]

State-Level Medicaid Eligibility for Parents

We obtained state Medicaid eligibility thresholds from 2000 through 2012 from the Kaiser Family Foundation's surveys of state Medicaid programs.[22–32] Because states may change their Medicaid eligibility limits at different points in a year, we used income thresholds from the preceding year in all regression analyses. Thresholds were based on eligibility criteria for unemployed parents with dependent children, reflecting (if applicable) the higher income limits allowed under federal expansion waivers, and were

expressed in percentage points of the FPL.[33] We used linear interpolation to approximate thresholds in years in which data were not reported (2002, 2007, and 2010).

Parental Enrollment in Medicaid

We constructed a binary indicator for whether an adult had Medicaid coverage at any point in the study year.

Covariates

In our primary analyses, we controlled for parental, family, child, and county-level characteristics that are associated with children's health care use.[11,16–18,21] Parental characteristics included age, sex, race, Hispanic ethnicity, comfort speaking English, education, and smoking status. Family level variables were total income, size, and parental structure (mother and father both present in household versus not). We additionally controlled for the child's age and sex, the density of physicians in the patient's county (total active MD physicians divided by the county population), the county-level poverty rate, and an indicator for whether the family lived in an urban area (defined as a Metropolitan Statistical Area).

Statistical Analyses

We first examined the association between the changes in a state's parental Medicaid eligibility thresholds and WCV receipt. Specifically, we estimated a multivariable logistic regression model in which our outcome was the probability that a child received at least 1 WCV during the year by using parental Medicaid eligibility thresholds (lagged by 1 year) as the main independent variable. In this intention-to-treat framework, we used within-state changes in the Medicaid eligibility threshold for parents as the exposure of interest. The models controlled for state and year fixed effects, in addition to the covariates described above. We ran

models for our full sample of parent-child dyads (the unit of analysis) and stratified by category of family income (<100% of the FPL and 100% of the FPL to <200% of the FPL). We used these regression analyses to estimate the change in probability of receiving a WCV because of state Medicaid expansions for adults, holding all other covariates at their sample means.

We then examined the relationship between a parent's enrollment in Medicaid and WCV usage by using an instrumental variable (IV) analysis. This approach addresses bias from unmeasured factors that could impact a parent's insurance status and their children's health care use by using within-state changes in Medicaid eligibility for parents as an instrument for parental Medicaid enrollment. We estimated a binary probit model for the probability that a child received a WCV as a function of his/her parent's Medicaid enrollment status, which we instrumented by using within-state changes in Medicaid eligibility thresholds for parents. Our IV models controlled for state fixed effects, year fixed effects, and the covariates described above (see Supplemental Information for details). By using these models, we calculated a predicted change in the probability that a child would receive a WCV if their parent enrolled in Medicaid, holding all covariates at the sample means. The IV models were run on our full sample of families and by stratum of family income.

We performed 4 sensitivity analyses. First, because a child's insurance status may change in response to changes in parental access to insurance[34] (eg, "welcome mat" effects), and because children's insurance status is known to be an independent determinant of health care use,[11,16,18] we ran models additionally controlling for the child's Medicaid or Children's Health Insurance Program (CHIP)

status to determine if our findings could be explained by changes in children's health insurance status. Second, because states may also undergo concurrent expansions in children's Medicaid eligibility over time, which could in turn affect child insurance coverage status, we repeated our analyses for a subgroup of 29 large states (with observable state identifiers in the MEPS) whose income thresholds for child Medicaid or CHIP programs were consistently ≥200% of the FPL during the study period. In these states, low-income children in our cohort would have remained consistently eligible for Medicaid, further isolating the impact of parental Medicaid expansions on WCVs.

Third, we limited the study period to 2001 to 2009 to ensure that our results were not driven by the ACA's introduction of regulations requiring insurer coverage of preventive health care services. Fourth, we reestimated our models for families with incomes ≥400% of the FPL. Because we expected parents in these families to be relatively unaffected by Medicaid expansions, this serves as a falsification test (eg, we would not expect to see an impact of increasing parental Medicaid eligibility on children's WCV receipt for this higher income sample).

We used family survey weights provided in the MEPS and variance estimates that accounted for clustering of observations at the state level. This study was approved by the institutional review board of the Johns Hopkins School of Medicine.

RESULTS

Our analytic sample consisted of 50 622 parent-child dyads across the 13 study years, representing 266 557 804 weighted pairs through the study period (Table 1). Slightly less than half of the dyads (44.7%) had incomes <100% of the FPL. The mean age of children was 9.3 years,

and the mean age of linked parents was 35.8 years. The majority of parents were white (72.5%), non-Hispanic (67.4%), and had earned at least a high school diploma or general education diploma (67.0%). The majority of dyads consisted of children linked to mothers (95.4%).

At the beginning of the study period (2001), mean adult Medicaid eligibility (weighted for the population across states in our sample and lagged by 1 year) for unemployed parents was 73.5% of the FPL, and increased to 107.7% of the FPL by 2013 (Supplemental Table 6). The proportion of states with parental Medicaid eligibility limits ≥200% of the FPL increased from 7.8% to 29.4% over the study period (Supplemental Table 6). The percentage of children in our sample receiving an annual WCV increased from 32.7% in 2001 to 47.9% in 2013 (Table 2).

In the intention-to-treat analysis, we found that a 10-point absolute increase in a state's adult Medicaid eligibility threshold (relative to the FPL) was associated with a 0.27 percentage-point increase in the probability that low income children received an annual WCV (95% confidence interval [CI]: 0.058 to 0.48 percentage points, P = .012; Table 3). In stratified analyses, changes in adult Medicaid eligibility thresholds were positively associated with WCV use for families with incomes 100% of the FPL to <200% of the FPL (0.38 percentage points, 95% CI: 0.10 to 0.66 percentage points, P = .008) and was positively but not significantly related to WCVs in the lowest (<100% of the FPL) income group (0.13 percentage points, 95% CI: −0.11% to 0.36% points, P = .284) (Table 3).

In IV analyses, we found that parental Medicaid enrollment was associated with a 29 percentage-point (95% CI: 11 to 47 percentage points; P = .002) increase in the probability that their child would have a WCV (Table

TABLE 1 Primary Sample Characteristics

	% of N[a,b]
Child sex	
Male	51.5
Female	48.5
Child age in y (mean)	9.30
Child age in y, categories	
2–6	31.8
7–11	32.9
12–17	35.3
Parent sex	
Male	4.6
Female	95.4
Parent age in y (mean)	35.8
Parental education	
Less than HS	33.0
HS diploma or GED	35.6
Any college	30.5
Not specified	0.9
Parental race	
White	72.5
Black	19.9
Asian or Pacific Islander	4.7
Other	2.9
Parental ethnicity Hispanic	32.6
Parent comfortable with English language	85.3
Parental smoking status	
Nonsmoker	70.0
Current smoker	24.3
Not specified	5.7
Family income (in dollars; mean)	24 593.61
Family income, percentage of the FPL	
<100%	44.7
100% to <200%	55.3
Family size (no. of members)	
2	6.8
3	15.6
4	27.6
5	24.3
6	13.4
7 or more	12.3
Parental structure	
Single parent	42.5
Two parents	57.5

GED, general education diploma; HS, high school.
[a] N = 266 557 804 weighted dyads (50 622 unweighted dyads).
[b] Or mean as otherwise specified.

4). This relationship was strongest in families with incomes 100% to <200% of the FPL. For these families, there was a 45 percentage point higher probability that a child would have a WCV if a parent was enrolled in Medicaid compared with the parent not being enrolled (95% CI: 17 to 73 percentage points, P = .002). The relationship remained positive, but was not statistically significant, in the <100% of the FPL income group (11 percentage points, 95% CI: −7.4

to 30 percentage points, P = .237) (Table 4).

In sensitivity analyses (summarized in Supplemental Table 9), controlling for child Medicaid and/or CHIP enrollment did not significantly affect our results, revealing that parental Medicaid enrollment affects WCV use independently of children's insurance status. Limiting our analysis to large states in which child eligibility for Medicaid and CHIP remained ≥200% through the

TABLE 2 Proportion of Children Who Received a WCV, Overall and by Year

Year	% Children With WCV[a]	P[b]
2001	32.7	<.001
2002	34.3	
2003	34.6	
2004	35.9	
2005	35.8	
2006	33.5	
2007	35.1	
2008	35.8	
2009	39.5	
2010	38.2	
2011	41.1	
2012	40.7	
2013	47.9	
All years	37.5	

[a] Weighted percentage.

[b] Pearson's χ^2 test comparing outcome over years.

TABLE 3 The Adjusted Association Between Changes in a State's Medicaid Eligibility Threshold for Parents and Child's Receipt of a WCV

	Probability (95% CI)[a]	Stratified Analysis by FPL Income Categories	
		<100% Probability (95% CI)[a]	100% to <200% Probability (95% CI)[a]
Parental Medicaid eligibility threshold[b]	0.27 (0.058 to 0.48)	0.13 (−0.11 to 0.36)	0.38 (0.10 to 0.66)

Results represent the change in predicted probability of a WCV for every 10 percentage-point increase in the state parental eligibility threshold. Estimates are from a multivariable logistic regression of WCV receipt on Medicaid eligibility threshold. In addition to state and year fixed effects, covariates in the model included child sex, child age (y), parent sex, parent age (y), parent race, parent ethnicity, parent English-speaking status, parental smoking status, parental education level, parental structure of household, family income, family size, county poverty rate, county physician density, and county Metropolitan Statistical Area Status.

[a] Marginal predicted probability expressed in percentage points, calculated at the means of all other variables in model.

[b] In 10 percentage-point increments of FPL.

TABLE 4 The Adjusted Association of Parental Medicaid Enrollment With Child's Receipt of WCV (IV Analysis): Results Represent the Increased Probability of a WCV for a Child Whose Parent is Enrolled in Medicaid

	Probability (95% CI)[a]	Stratified Analysis by FPL Income Category	
		<100% Probability (95% CI)[a]	100%–<200% Probability (95% CI)[a]
Parental Medicaid enrollment	29 (11 to 47)	11 (−7.4 to 30)	45 (17 to 73)

Results represent the increased probability of a WCV for a child whose parent is enrolled in Medicaid. Estimates are from multivariable probit regression of WCV receipt on instrumental parental Medicaid enrollment. In addition to state and year fixed effects, covariates in the model included child sex, child age (y), parent sex, parent age (y), parent race, parent ethnicity, parent English-speaking status, parental smoking status, parental education level, parental structure of household, family income, family size, county poverty rate, county physician density, and county Metropolitan Statistical Area Status.

[a] Marginal predicted probability expressed in percentage points, calculated at the means of all other variables in model.

study period revealed a positive relationship between parental Medicaid eligibility thresholds and WCVs for our primary analytic sample and a significantly positive relationship for a subset of this sample (families with incomes 125%–200% of the FPL). Limiting our analysis to the pre-ACA period (2001–2008) also did not significantly affect our results. Finally, we did not find a significant association between parental Medicaid eligibility and WCVs in higher-income families (≥400% of the FPL), demonstrating that the effects of changes in Medicaid coverage were concentrated, as expected, among lower-income families.

DISCUSSION

Leveraging 13 years of changes in state Medicaid eligibility for adults and performing an IV analysis, we found that increases in the income threshold for adult Medicaid eligibility were associated with a greater likelihood that children in low-income families received at least 1 annual WCV. With our results, we provide evidence of an independent relationship between parental Medicaid enrollment and children's primary care use in low-income families, and we illustrate the potential for adult Medicaid expansions to have positive spillover effects on children's health care use.

We found the strongest relationship between adult Medicaid eligibility and WCVs in near-poor families (100% to <200% of the FPL). This likely reflects the fact that increases in parental Medicaid eligibility during the 2000s primarily affected families with incomes slightly >100% of the FPL, whereas states with the least generous Medicaid coverage for nonpregnant adults generally did not expand parental eligibility over the study period. Our analyses were therefore less able to detect effects of eligibility changes in the lowest-income families.

Several mechanisms may underlie this spillover effect of parental Medicaid coverage on WCV receipt. One hypothesis, supported by the Behavioral Model of Health Services Use,[35] is that insurance enhances parents' ability to navigate the health care system for themselves and for family members. This may lead to an increase in parental health-seeking behaviors for their children (eg, scheduling WCVs). It may also

function through a welcome mat effect in which eligible but previously uninsured children enroll in Medicaid after their parents gain coverage.[6,7,34] However, because our estimates were substantively unchanged after we controlled for children's Medicaid and/or /State CHIP status, our analyses indicate that such a woodwork effect was not primarily responsible for changes in WCV use.

Another potential mechanism is that parental Medicaid coverage may improve families' financial standing, freeing up resources to provide preventive services for children. Low-income families who enroll in public insurance have decreased out-of-pocket medical spending and a reduced likelihood of bankruptcy.[5,36] Studies have revealed that children's health care use is sensitive to out-of-pocket costs, particularly in low-income families.[37,38]

Our study has several limitations. First, our conclusions are not derived from a randomized controlled trial of Medicaid enrollment; however, we use a quasi-experimental design that leverages plausibly exogenous state-level policy changes to isolate the effect of parental Medicaid enrollment on WCVs from other family and person-level determinants of this relationship. Second, our analyses may not isolate the impact of changes in parental Medicaid eligibility and coverage on WCVs if states contemporaneously expanded Medicaid eligibility or increased coverage generosity for children. To address this concern, we conducted a sensitivity analysis in which we limited our analytic sample to states with CHIP or children's Medicaid eligibility thresholds consistently >200% of the FPL. In this sensitivity analysis, we continued to find a positive relationship between parental eligibility for Medicaid and WCVs, particularly in near-poor families. Third, our study period encompasses several changes in the recommended WCV schedule,

the introduction of the ACA's requirement that insurance plans cover preventive services for children, and other efforts to increase pediatric preventive care.[11] We incorporated year fixed effects into our models to control for temporal trends that may have resulted from these changes and verified that our results were unchanged when we limited the study period to years preceding these ACA mandates for pediatric care (2001–2009). Finally, many measures in the MEPS, including insurance status and health care use, are self-reported and subject to recall and social desirability bias. However, respondents are aware that health care providers may be contacted to verify self-reported use, which may mitigate reporting error.[15]

These findings are of great significance given the current uncertainty surrounding the future of the ACA and Medicaid expansions authorized by the law. Our work highlights the potential for Medicaid expansions targeting low-income adults to mitigate disparities in the receipt of WCVs between low- and high-income families. Currently, 19 states have not expanded adult Medicaid coverage to 138% of the FPL under the ACA. According to Current Population Survey data, ~5.5 million children in these 19 states live in families in which a parent would qualify for expanded Medicaid coverage. Our intention-to-treat estimates imply that the spillover effect of Medicaid expansion would result in ~135 000 additional annual WCVs for low-income children in these 19 states (see Supplemental Information for calculation).

Likewise, our results reveal the potential for reductions in adult Medicaid coverage to have unintended spillover effects on children's health care use. Recent proposals to reform the Medicaid program by using block grants or "per-capita caps" on federal financial

support have raised the concern that states could curtail Medicaid benefits or eligibility, thereby significantly reducing parental enrollment.[39,40] Given the evidence that increased access to pediatric care early in life is associated with improved health and lower hospital use in adulthood,[41–43] changes in parental coverage may have long-term impacts on children that will be important to consider when modifying the Medicaid program.

CONCLUSIONS

In our study, we demonstrate that parental Medicaid enrollment is associated with increases in pediatric primary care use in low-income families. Given the suboptimal rates of WCV use in low-income families, our findings suggest that efforts to expand Medicaid for parents may help to promote their children's receipt of recommended preventive care.

ACKNOWLEDGMENTS

ABBREVIATIONS

ACA: Affordable Care Act
CHIP: Children's Health Insurance Program
CI: confidence interval
FPL: federal poverty level
IV: instrumental variable
MEPS: Medical Expenditure Panel Survey
WCV: well-child visit

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