Online Appendix

The Impacts of Physician Payments on Patient Access, Use, and Health

Alexander and Schnell (2023)

A Data appendix

A.1 Medicaid reimbursement rates

We collected data on fee-for-service reimbursement rates for E&M services directly from state Medicaid offices. The raw data have two components: (1) standard fee-for-service rates applicable in 2009–2015 for all providers, and (2) augmented fee-for-service rates applicable in 2013–2014 (and 2015, depending on the state) for qualifying physicians in family medicine, general internal medicine, and pediatric medicine. In constructing our state-quarter panel of payments, we use standard rates in 2009–2012, augmented rates in 2013–2014, and either the standard or augmented rates in 2015 depending on whether a given state extended the primary care rate increase.

A.1.1 Data completeness

We obtained complete rate information used to construct this panel from 44 states and the District of Columbia. For the remaining six states, we use the following procedures to impute missing rate information:

- California: We only have the standard rates for 2009 and 2015. As the standard rates were the same in 2009 and 2015, we assume that they did not change over this period and pull forward the standard rates to 2012.

- Hawaii: We only have the standard rates for 2009, 2012, and 2015. As the standard rates were the same in 2009 and 2012, we assume that they did not change over this period and pull forward the standard rates to 2011.

- New Mexico: We are missing standard rates for January–November 2009. The rates changed over this period; we impute the missing months with the rate in the nearest month with non-missing rate information.

- Utah: We are missing standard rates for January–May 2009 and July–December 2012. We impute the missing months with the rate in the nearest month with non-missing rate information.

- South Dakota: Standard rates are not archived, so we only have standard rates for 2015. We impute standard rates from 2009–2012 such that the change in reimbursement rates between each quarter and 2015 reflects the average change in reimbursement rates for neighboring states (MT, ND, MN, IA, NE, and WY) over the same period.

- Tennessee: We have no micro-data on reimbursement rates, as the state only uses Medicaid managed care. However, the state told us that average reimbursements increased by 44 percent as a result of the primary care rate increase. We impute reimbursement rates for Tennessee in 2013 and 2014 by averaging the 2013 and 2014 augmented rates for neighboring states (MO, KY, VA, NC, GA, AL, MS, and AR). We then apply the 44 percent increase from 2012 to 2013 to impute the rates for 2012. For 2009–2012 and 2015, we calculate the average change in physician payments across neighboring states in the relevant period and apply this rate change to Tennessee over the same window.

Given that only a few imputations are required, our results are robust to only using non-imputed data and to using alternative imputation strategies.

A.1.2 Medicaid managed care

The primary care rate increase applied to both Medicaid fee-for-service and Medicaid managed care programs. While states could simply increase fee-for-service reimbursement rates for the covered services to comply with the mandated higher rates, determining how to increase reimbursement rates for physicians treating patients enrolled in Medicaid managed care was more complicated. To ensure that Medicaid managed care programs complied with the rate increase, each state's Medicaid program was required to submit proposals to CMS that outlined methodologies for:

1. Identifying the proportion of the capitation payments made by the state to its contracted MCOs in 2009 that was spent on each of the applicable primary care services, as well as the per-unit cost of each of these services. These baseline costs were used to calculate the refunds that each state's Medicaid program was eligible to receive from the federal government in 2013 and 2014.

2. Developing a "model" that incorporated the increased fees for primary care services into the state's 2013 and 2014 capitation payments to MCOs. It was recommended that states implement one of three types of models:

   - Model 1: "Full-risk prospective capitation" in which states incorporated increased fees directly into their capitation payments to MCOs for 2013 and 2014.
   - Model 2: "Prospective capitation with risk-sharing that incorporates retrospective reconciliation" in which increased fees were built into states' capitation payments for 2013 and 2014 (similar to Model 1), but capitation payments were to be adjusted at the end of an agreed-upon time period to reflect actual utilization and costs (states and MCOs engage in "retrospective reconciliation").
   - Model 3: "Non-risk reconciled payments for enhanced rates" in which states' initial capitation payments to MCOs for 2013 and 2014 did not incorporate increased fees. Instead, MCOs submitted encounter data to the state at the end of the quarter, year, etc., and the state sent an additional payment to the MCOs to cover the costs of the increased fees.

CMS had to sign off on each state's methodology for determining the 2009 rates and on its plan for implementing the rate increase for eligible physicians treating managed care enrollees. According to CMS, at least 21 states opted to receive the increased funding in lump-sum payments based on encounter data (Model 3). The rest of the states incorporated the increased fees directly into their capitation payments (Models 1 and 2); most of these states did not engage in any retrospective reconciliation based on actual utilization data.

Additional payments were required to be passed through to qualified physicians regardless of the payment scheme used by MCOs for provider reimbursement. If MCOs did not pass through the increased payments to providers due to limited scope for enforcement, the rate increase would have created incentives for MCOs to attract additional enrollees. As shown in Table 1, we find no evidence that the rate increase led to increases in Medicaid managed care enrollment. Moreover, combining our payment variation with administrative tax records, Gottlieb et al. (2020) demonstrate that the primary care rate increase indeed led to increases in take-home pay for primary care physicians.

A.1.3 Primary payment variable

As outlined in Section II.A, we take managed care into account by creating an expected Medicaid payment measure. This measure combines state-level fee-for-service data with: (1) state-level managed care to fee-for-service payment ratios from the GAO, and (2) state-level Medicaid managed care enrollment shares from CMS. Letting R_{sqy}^{FFS} denote the Medicaid fee-for-service reimbursement rate in state s in quarter q of year y, $\left(\frac{R^{MC}}{R^{FFS}}\right)_{s,2010}$ denote the managed care to fee-for-service payment ratio under Medicaid in state s in 2010, and $\%B_{sy}^{MC}$ denote the fraction of Medicaid beneficiaries enrolled in a managed care plan in state s in year y, the expected Medicaid reimbursement rate in each state-quarter before and after the primary care rate increase is approximated by

$$\tilde{R_{sqy}} = (1 - \%B_{sy}^{MC}) \cdot R_{sqy}^{FFS} + \%B_{sy}^{MC} \cdot R_{sqy}^{FFS} \cdot \left(\frac{R^{MC}}{R^{FFS}}\right)_{s,2010}.$$

Although the federal government mandated that states increase select Medicaid payments to primary care providers starting on January 1, 2013, many states experienced implementation delays (MACPAC, 2015). We do not incorporate state-level variation in the implementation of the primary care rate increase into our Medicaid payment variable; that is, we use the payment rates reported by the state as effective in each quarter. Because states with implementation delays were required to retroactively pay physicians the difference between the amount paid and the enhanced Medicaid rate, the behavior of physicians should have responded at the start of the rate increase rather than when the higher payments were actually released. This assumption is confirmed in our event study designs, which show that physicians responded similarly to the increased payments in 2013 and 2014. Incorporating implementation delays, as in Decker (2018) and Mulcahy et al. (2018), therefore biases results toward zero because some of the "pre-period" in such specifications was actually treated.

A.2 National Health Interview Survey

Our primary outcome measures come from the NHIS. Although much of the NHIS data is publicly available, geographic identifiers for areas smaller than census regions are restricted. To link our outcome measures to state-level variation in Medicaid reimbursement rates, we obtained access to confidential state identifiers. We further use confidential county identifiers to control for county characteristics in some analyses. All of our analyses using the NHIS data were therefore conducted in a Census Research Data Center.

Although many data sets measure health patterns, the NHIS is well suited for our study for a number of reasons. First, while health insurance claims data provide information on the use of health care services, they provide no information on the difficulties that patients face accessing care. Furthermore, as the United States does not have a national all-payer claims database, nearly all claims data cover only a subset of patients with a specific insurance type in often limited geographic areas.[1] Finally, most other surveys only collect information on insurance status, not insurance provider, and are not large enough to be used for state-level estimates.[2] In contrast, the NHIS allows us to exploit state-level variation in Medicaid reimbursement rates over time to measure the effects of changing payments on access, use, and health separately among patients with private insurance and Medicaid beneficiaries.

A.2.1 Survey questions

We use responses to the following eight questions in our analysis:

- Full sample (from family file)
  - During the last two weeks, did {person} see a doctor or other health care professional at a doctor's office, a clinic, an emergency room, or some other place? (Do not include times during an overnight hospital stay.)
  - Would you say {person's} health in general is excellent, very good, good, fair, or poor?

[1] While using the Medicaid Analytic eXtract (MAX) data to corroborate our findings surrounding use of health care services would be a fruitful area for future research, we stress that the MAX data are not a substitute for the NHIS. In addition to providing no information on access or outcomes for patients with private insurance, the MAX data do not cover the entire United States. According to CMS, over 20 states have not submitted sufficient information to be included in data extracts for the entirety of our sample period, which limits the variation in payments that can be exploited. Although additional state-years are continuously being added, the transition from MAX to T-MSIS Analytic Files further complicates efforts to use comprehensive Medicaid claims data over this time period.

[2] The NHIS is very thorough with eliciting and coding insurance type. Rather than relying solely on patient reports of insurance type, which would lead to misclassification if Medicaid beneficiaries with private, managed care plans do not recognize that they are covered by Medicaid, the NHIS asks patients to report the name of their health insurance plan (e.g., Aetna Better Health of Illinois). The NHIS then uses this information to code insurance type based on their own categorization of over 4,000 plans.

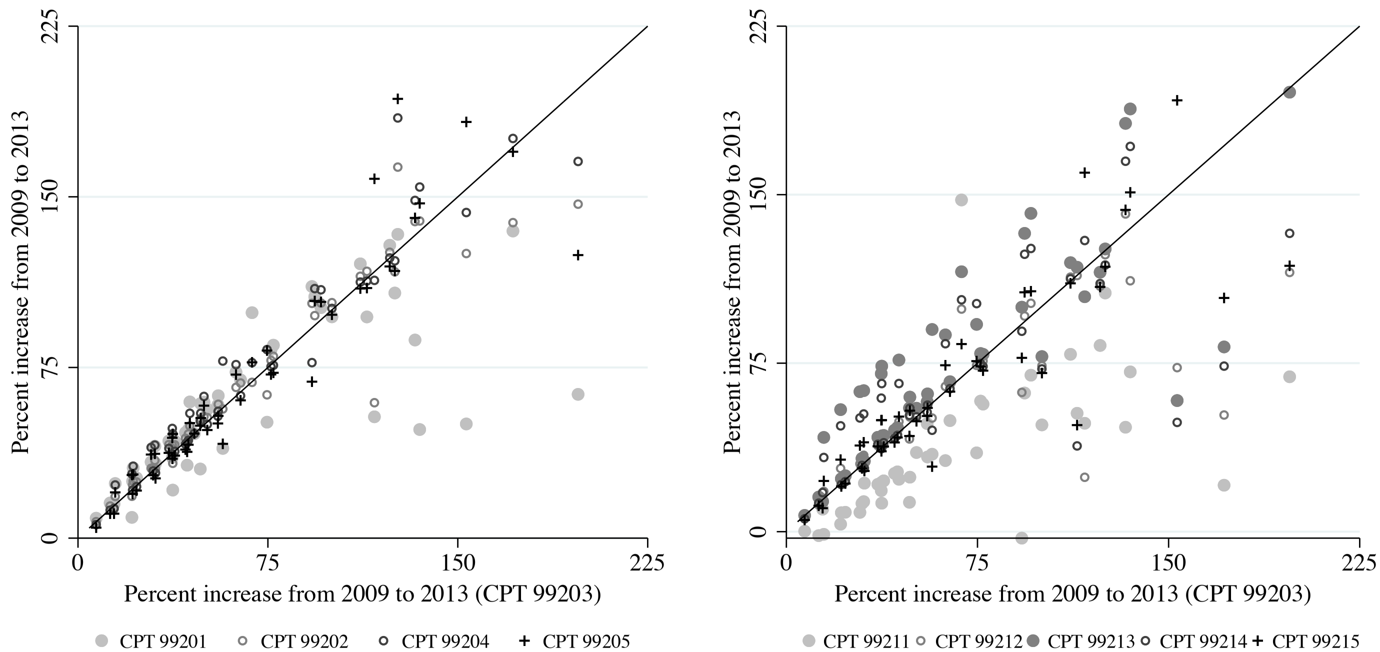
- Child subsample
  - During the past 12 months, did you have any trouble finding a general doctor or provider who would see {sample child}?
  - Is there a place that {sample child} usually goes when {he/she} is sick or you need advice about {his/her} health?
  - During the past 12 months, that is, since {12-month ref. date}, about how many days did {sample child} miss school because of illness or injury?
- Adult subsample
  - During the past 12 months, were you told by a doctor's office or clinic that they would not accept {sample adult} as a new patient?
  - During the past 12 months, were you told by a doctor's office or clinic that they would not accept {sample adult}'s health care coverage?
  - During the past 12 months, about how many days did {sample adult} miss work?

B Supplementary figures

Figure A1: Increases in Medicaid payments for E&M codes from 2009 to 2013

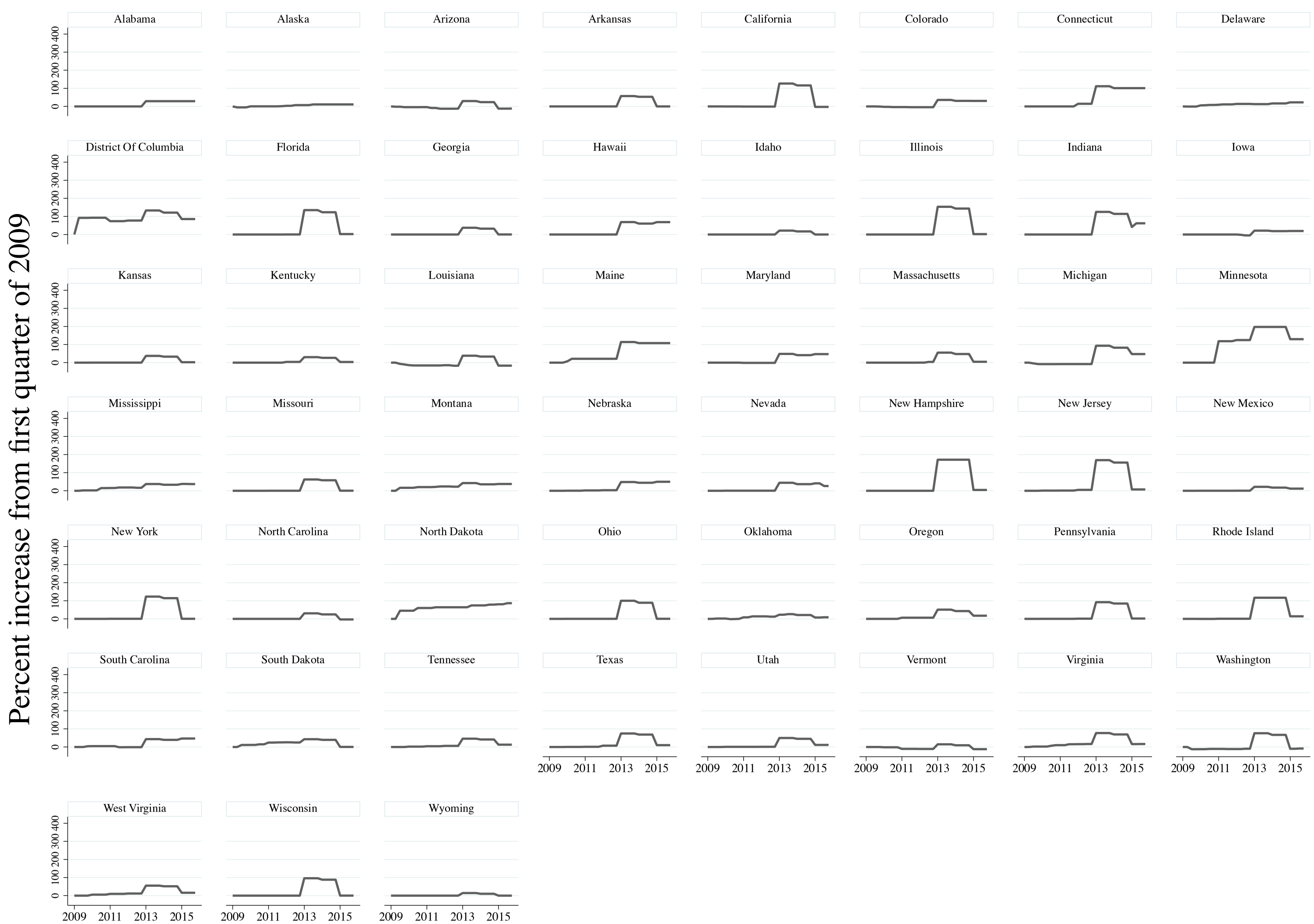
(a) New patient codes

(b) Established patient codes



Notes: The above figures display state-level percent changes from 2009 to 2013 in Medicaid payments for CPT code 99203 (the CPT code used in the majority of our analyses) versus analogous changes in other new patient codes (subfigure (a)) and established patient codes (subfigure (b)). As defined in Section II.A, the payments are beneficiary-weighted averages of Medicaid fee-for-service and managed care payments for each payment code. The black line in each subfigure is the 45-degree line. Subfigure (a) excludes CPT codes 99204 and 99205 for New Jersey; payments for these codes increased by 308 percent and 404 percent, respectively, while payment for CPT code 99203 increased by 169 percent. Subfigure (b) excludes CPT codes 99214 and 99215 for New Jersey and CPT code 99214 for California; payments for these codes increased by 265 percent, 388 percent, and 241 percent, respectively. CPT code 99203 increased by 126 percent in California.

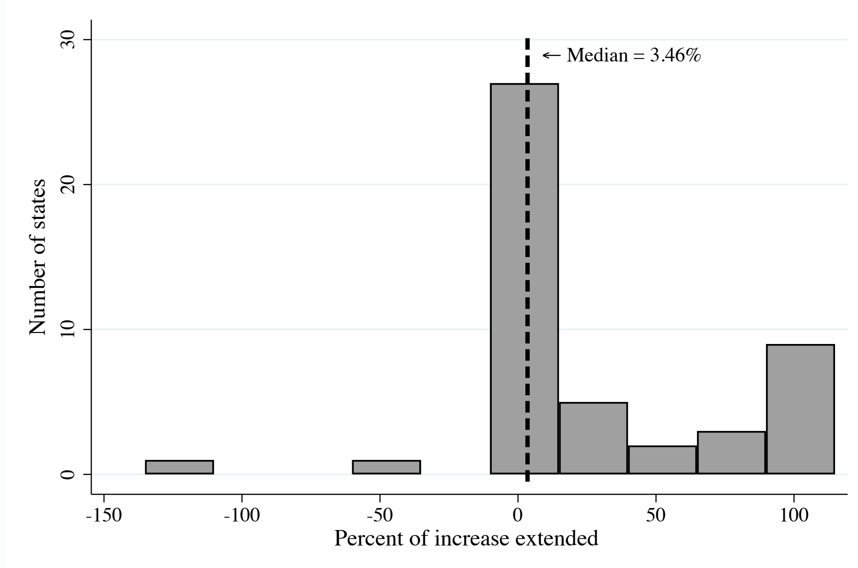
Figure A2: Primary Medicaid payment variable from 2009 to 2015 by state



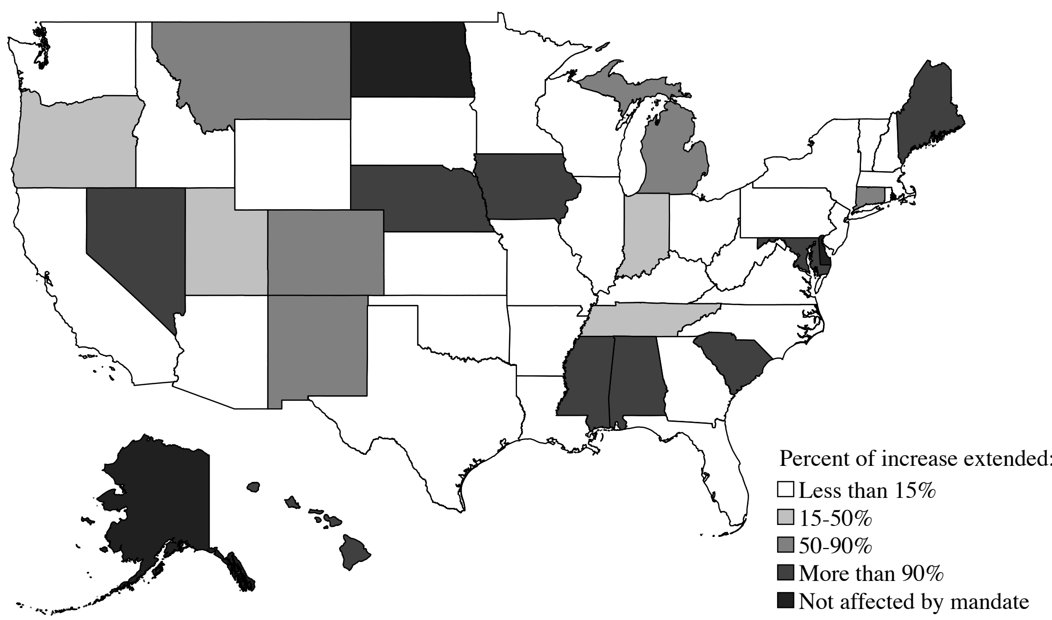
Notes: The above figure depicts the Medicaid payment variable used in the majority of our analyses at the state-quarter level from 2009 to 2015 relative to the relevant state-level rate in the first quarter of 2009. As defined in Section II.A, the payments are beneficiary-weighted averages of Medicaid fee-for-service and managed care payments for new patient office visits of mid-level complexity (CPT 99203); similar patterns are observed for other E&M codes.

Figure A3: Percent of payment increases maintained following mandate expiration

(a) Histogram of percent maintained



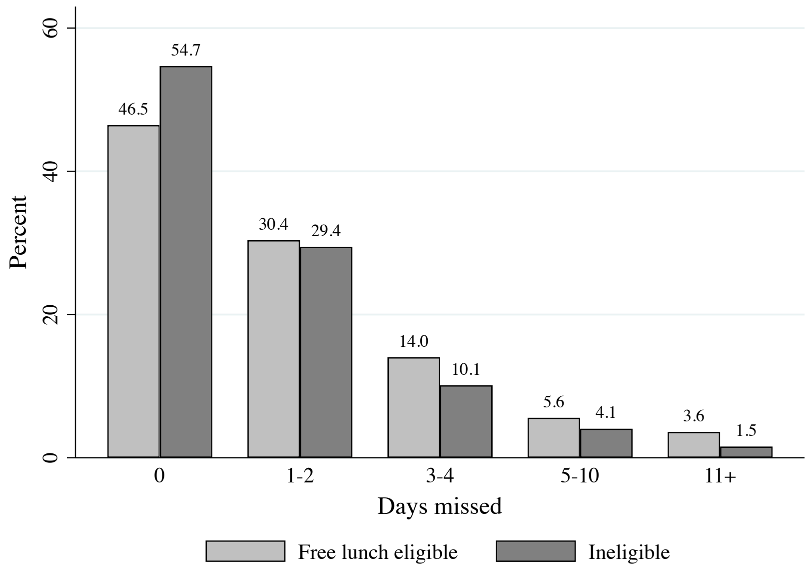
(b) Map of percent maintained



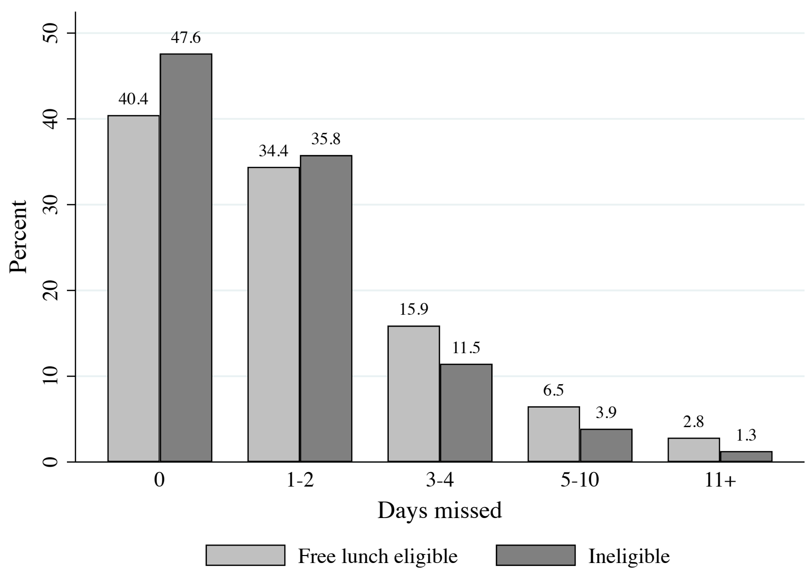
Notes: The above figures show the percent of payment increases from 2012 to 2013 that were maintained after the federal mandate expired at the end of 2014. Subfigure (a) presents a histogram of the percent maintained across states, and subfigure (b) presents a map showing which states chose to maintain payment increases into 2015. Alaska, Delaware, and North Dakota are excluded from subfigure (a). Alaska and North Dakota were unaffected by the mandate because their Medicaid payments exceeded the federally mandated Medicare level over the sample period. Although Delaware saw a slight increase in fee-for-service Medicaid payments as a result of the mandate (a 3.0 percent increase over the baseline rate, the lowest percent increase among all states other than Alaska and North Dakota), Medicaid payments in Delaware in 2012 were essentially equivalent to the 2013 Medicare rate when Medicaid managed care is taken into account.

Figure A4: Distribution of school absences by free lunch eligibility (NAEP)

(a) Grade 4

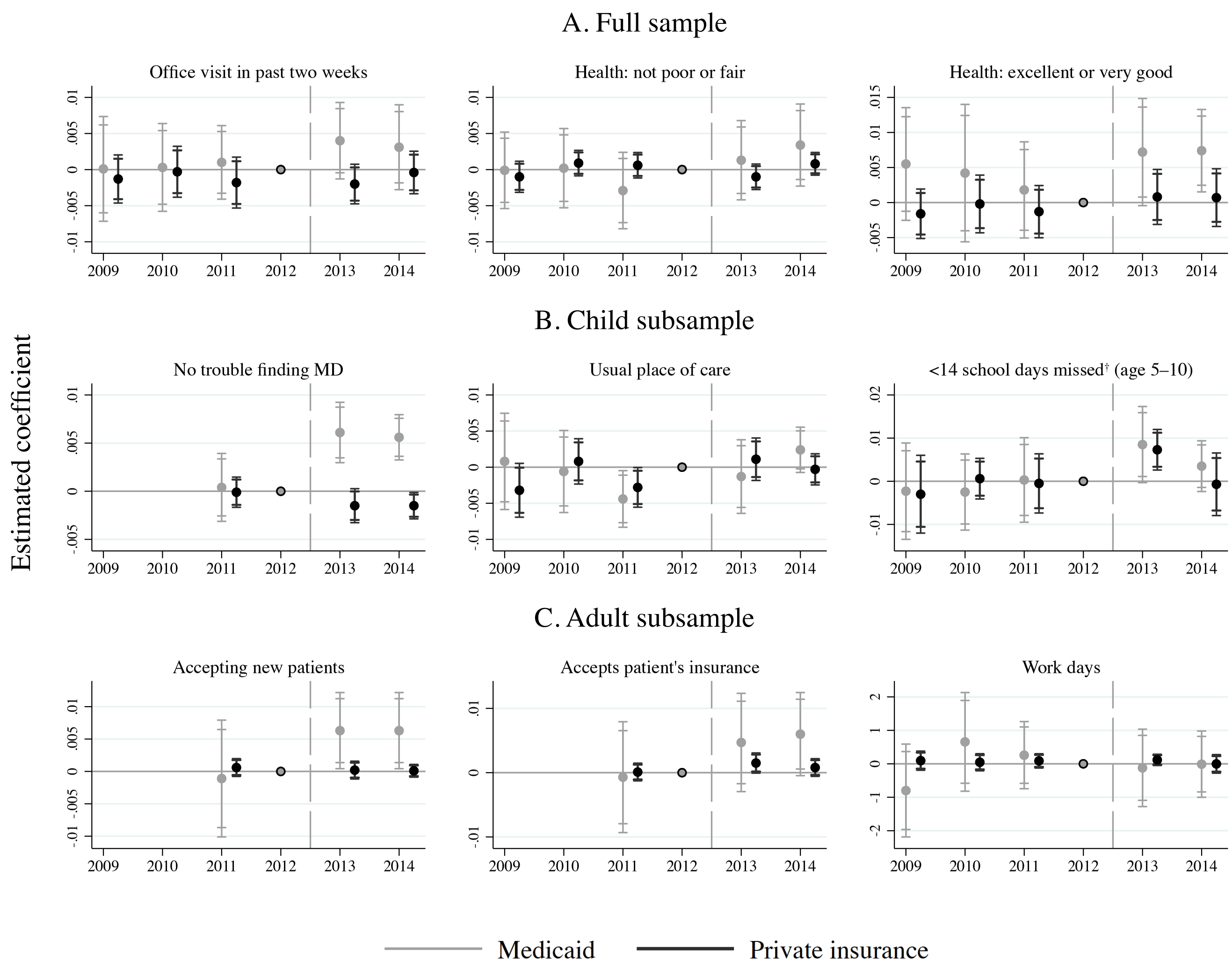


(b) Grade 8



Notes: The above figures display the average percent of students in grade 4 (subfigure (a)) and grade 8 (subfigure (b)) who missed 0, 1–2, 3–4, 5–10, or 11+ days in the month preceding their national math and reading assessments in 2009 and 2011. Observations are at the state-year level and are weighted by population. Data come from the NAEP.

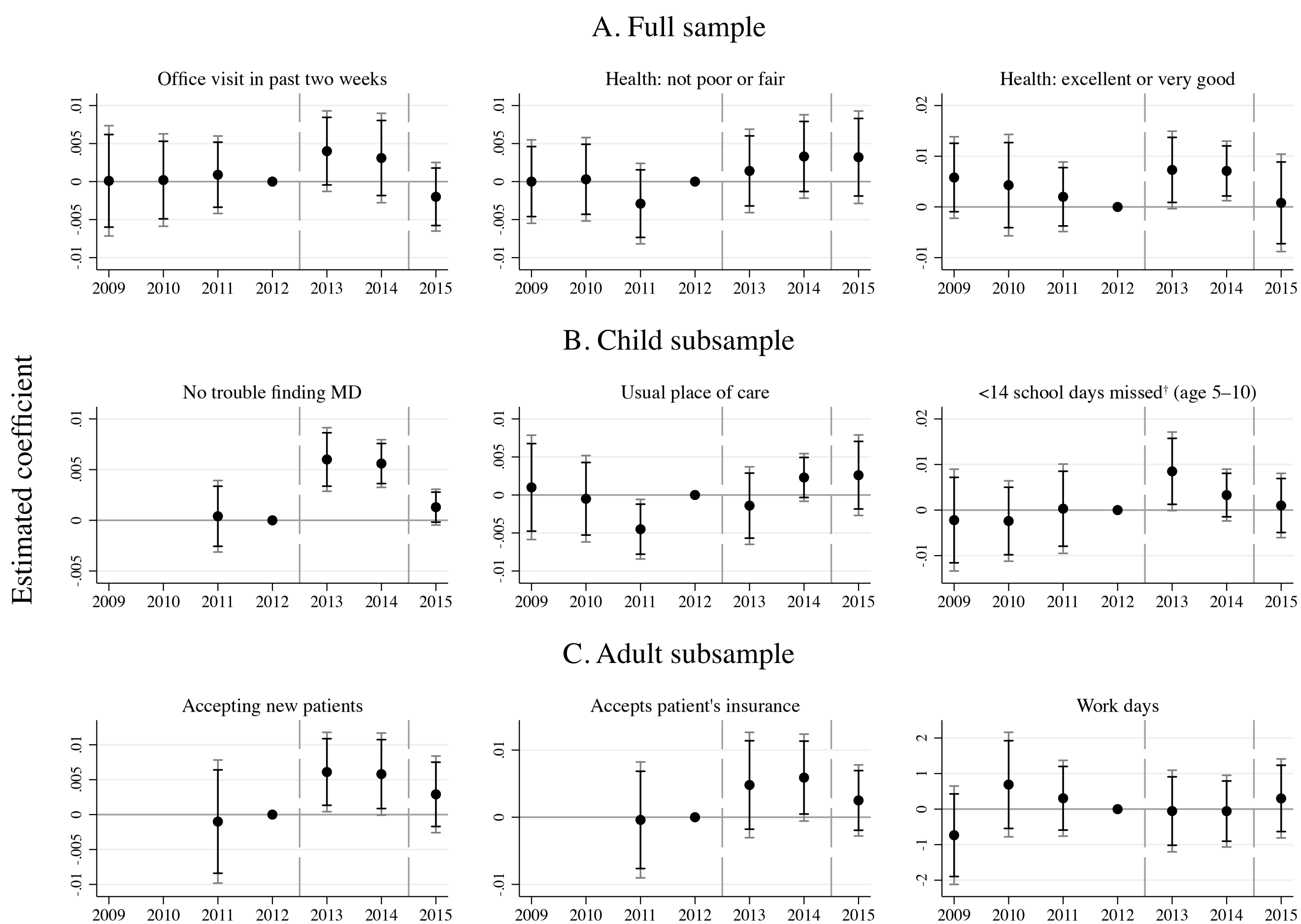
Figure A5: Event study: Effects among Medicaid beneficiaries versus the privately insured



† Reflects absenteeism due to illness or injury over the previous year.

Notes: The above figures plot the coefficients, 90% confidence intervals (short bars), and 95% confidence intervals (wide bars) on year indicators interacted with state-level changes in Medicaid payments in dollars induced by the primary care rate increase from estimation of equation (1). We run separate regressions for patients with Medicaid and patients with private insurance. Outcomes come from the NHIS and are adjusted such that higher values denote better outcomes; Appendix A.2.1 outlines the exact survey questions and corresponding reference windows. Outcomes with missing coefficients in 2009 and 2010 were added to the NHIS in 2011.

Figure A6: Event study: Effects following mandate expiration

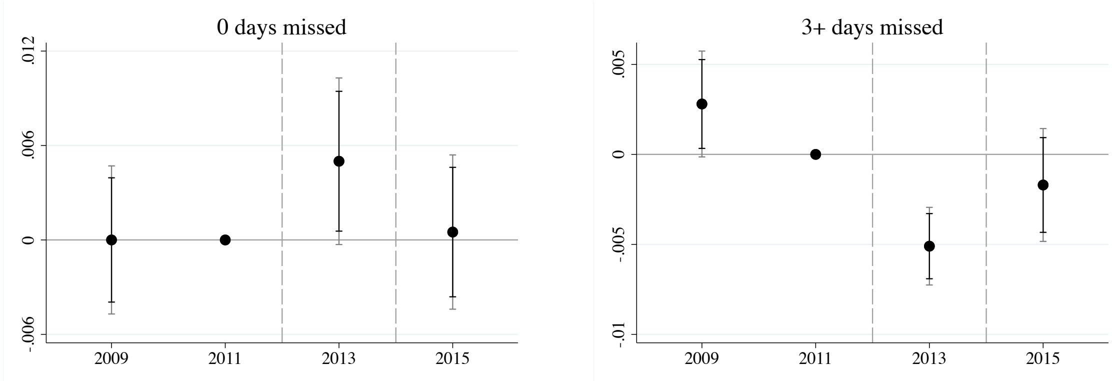


† Reflects absenteeism due to illness or injury over the previous year.

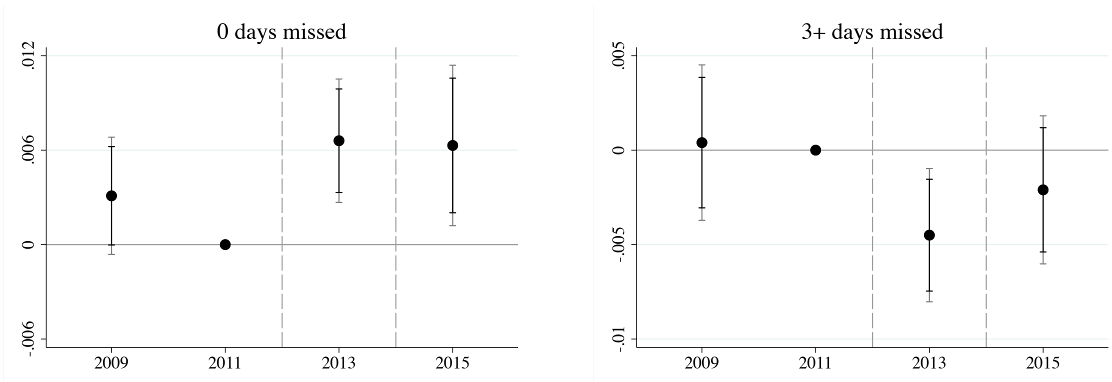
Notes: The above figures plot the coefficients, 90% confidence intervals (dark bars), and 95% confidence intervals (light bars) on year indicators interacted with state-level changes in Medicaid payments in dollars induced by the onset of the primary care rate increase from estimation of equation (1). Results for Medicaid beneficiaries are shown. The first vertical line in each subfigure marks the onset of the primary care rate increase in 2013; the second vertical line marks its expiration at the end of 2014. Because many states extended at least part of the increased payments through 2015 (see Figure A3), state-level changes in Medicaid payments stemming from the mandate's onset do not perfectly capture changes stemming from the mandate's expiration. Outcomes come from the NHIS and are adjusted such that higher values denote better outcomes; Appendix A.2.1 outlines the exact survey questions and corresponding reference windows. Outcomes with missing coefficients in 2009 and 2010 were added to the NHIS in 2011.

Figure A7: Event study: Effects on school absences (NAEP)

(a) Grade 4



(b) Grade 8



Notes: The above figures plot the coefficients, 90% confidence intervals (dark bars), and 95% confidence intervals (light bars) on year indicators interacted with state-level changes in Medicaid payments in dollars induced by the onset of the primary care rate increase from estimation of analogues of equation (1). Results for students eligible for free lunch are shown. The first vertical line in each subfigure marks the onset of the primary care rate increase in 2013; the second vertical line marks its expiration at the end of 2014. Because many states extended at least part of the increased payments through 2015 (see Figure A3), state-level changes in Medicaid payments stemming from the mandate's onset do not perfectly capture changes stemming from the mandate's expiration. Outcomes come from the NAEP.

C Supplementary tables

Table A1: Individual characteristics by insurance status

	All	Medicaid	Private
Demographics			
Male	0.489	0.439	0.489
Average age	37.3	24.3	38.4
Black	0.132	0.252	0.097
Hispanic	0.167	0.296	0.101
U.S. citizen	0.927	0.936	0.959
Education			
< High school	0.135	0.307	0.058
High school or GED	0.255	0.307	0.218
Some college	0.190	0.179	0.194
Associate's degree	0.107	0.079	0.120
Bachelor's degree	0.181	0.049	0.246
Master's, professional, or Ph.D.	0.097	0.013	0.139
Family structure			
Married	0.582	0.400	0.666
Live with partner	0.055	0.049	0.045
No children	0.479	0.229	0.503
1 child	0.176	0.193	0.179
2 children	0.191	0.243	0.197
3 children	0.099	0.185	0.086
4 children	0.036	0.090	0.025
5+ children	0.019	0.059	0.010
Income and wealth			
Other public assistance	0.127	0.483	0.035
Homeowner	0.660	0.346	0.773
Income to poverty line: <1	0.138	0.475	0.036
Income to poverty line: 1-1.99	0.166	0.285	0.097
Income to poverty line: 2-3.99	0.250	0.109	0.286
Income to poverty line: 4+	0.299	0.025	0.436
Observations	603,074	96,128	338,174

Notes: Observations are at the individual level and cover 2009–2014; reported statistics reflect weighted averages using the NHIS sample weights. Some categories do not sum to one due to missing responses. "Other public assistance" is an indicator denoting whether the individual being interviewed received food stamp benefits or assistance (cash or otherwise) from a welfare program in the previous year. All data come from the NHIS.

Table A2: State characteristics by payments at baseline

Payment quintiles:	Q1	Q2	Q3	Q4	Q5
Average baseline payment	51	65	76	83	108
Medicaid enrollment					
Per capita	0.165	0.185	0.156	0.153	0.175
Managed care per capita	0.087	0.077	0.084	0.060	0.055
*Demographics**					
Male	0.491	0.492	0.492	0.494	0.497
Under 18	0.229	0.235	0.240	0.240	0.234
Aged 18–64	0.630	0.628	0.625	0.631	0.635
Over 65	0.141	0.137	0.135	0.129	0.131
White	0.795	0.731	0.798	0.800	0.739
Black	0.099	0.108	0.113	0.111	0.126
Hispanic	0.122	0.114	0.097	0.098	0.098
U.S. citizen	0.941	0.944	0.953	0.950	0.966
*Education**					
< High school	0.127	0.131	0.134	0.122	0.118
High school graduate	0.306	0.297	0.289	0.287	0.287
Some college	0.283	0.293	0.300	0.302	0.314
College+	0.285	0.279	0.277	0.288	0.281
*Family structure**					
Married	0.487	0.494	0.501	0.505	0.477
Never married	0.323	0.311	0.302	0.303	0.330
Separated	0.190	0.194	0.197	0.191	0.193
Avg. household size	2.58	2.59	2.61	2.56	2.51
*Household income**					
Income to poverty line: <1	0.140	0.148	0.156	0.144	0.152
Income to poverty line: 1-1.99	0.177	0.185	0.195	0.188	0.189
Income to poverty line: 2+	0.683	0.667	0.649	0.668	0.658
Number of states	11	10	10	10	10

Notes: Observations are at the state-year level and cover 2009–2012; reported statistics reflect averages taken over this baseline period. Total Medicaid enrollment comes from CMS's National Health Expenditure Data, Medicaid managed care enrollment comes from CMS's Medicaid Managed Care Enrollment Reports, and sociodemographics come from the one-year ACS. Variable categories denoted with an asterisk are included as controls in the state-level regressions.

Table A3: Effects of Medicaid payments on school days missed (continuous measure)

School days missed†	Medicaid		Private	
	Age 5–10 (1)	Age 11–17 (2)	Age 5–10 (3)	Age 11–17 (4)
Medicaid payments ($10s)	-0.2021 (0.0802) [0.0150]	-0.0047 (0.2335) [0.9839]	0.0514 (0.0704) [0.4683]	0.0362 (0.0890) [0.6862]
Observations	6,662	6,762	10,049	14,905
R^2	0.040	0.056	0.031	0.028
Baseline mean	3.516	4.745	2.933	3.302

† Reflects absenteeism due to illness or injury over the previous year.

Notes: The above table shows the estimated effects of a $10 increase in Medicaid payments from estimation of equation (2). Observations are at the individual level and cover 2009–2014. All regressions include state and quarter-year fixed effects and all individual-level controls listed in Table A1 (with age in five-year bins). Regressions are weighted using the sample weights provided in the NHIS. Standard errors are clustered by state and are reported in parentheses; p-values are reported in brackets. Appendix A.2.1 outlines the exact survey question and corresponding reference window.

Table A4: Effects of Medicaid payments: Primary care shortage areas

A. Full sample	Medicaid			Private		
	Office visit (2 weeks)	Health $\leq$ fair	Health $\geq$ very good	Office visit (2 weeks)	Health $\leq$ fair	Health $\geq$ very good
	(1)	(2)	(3)	(4)	(5)	(6)
MC payments ($10)	0.0025	-0.0024	0.0044	-0.0002	0.0008	0.0010
	(0.0016)	(0.0018)	(0.0025)	(0.0010)	(0.0006)	(0.0019)
	[0.1310]	[0.1808]	[0.0871]	[0.8135]	[0.2022]	[0.5975]
$\mathbb{1}\{\text{Shortage}\}$	-0.0074	0.0152	-0.0224	0.0040	0.0072	-0.0101
	(0.0115)	(0.0131)	(0.0192)	(0.0055)	(0.0040)	(0.0062)
	[0.5203]	[0.2513]	[0.2493]	[0.4658]	[0.0787]	[0.1085]
Payments * $\mathbb{1}\{\text{Shortage}\}$	0.0009	-0.0011	0.0014	-0.0006	-0.0009	0.0011
	(0.0015)	(0.0015)	(0.0022)	(0.0007)	(0.0005)	(0.0009)
	[0.5495]	[0.4642]	[0.5077]	[0.3802]	[0.0709]	[0.2449]
Observations	95,969	96,019	96,019	336,644	337,041	337,041
R^2	0.071	0.295	0.231	0.036	0.079	0.138
Baseline mean	0.197	0.176	0.562	0.175	0.062	0.726

B. Child subsample	Medicaid				Private			
	Trouble finding MD	No usual place of care	14+ school absences† (age 5–10)	14+ school absences† (age 11–17)	Trouble finding MD	No usual place of care	14+ school absences† (age 5–10)	14+ school absences† (age 11–17)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
MC payments ($10)	-0.0055	-0.0027	-0.0037	0.0032	0.0014	0.0002	0.0036	-0.0004
	(0.0011)	(0.0015)	(0.0030)	(0.0049)	(0.0006)	(0.0012)	(0.0044)	(0.0022)
	[<0.0001]	[0.0777]	[0.2223]	[0.5140]	[0.0274]	[0.8819]	[0.4224]	[0.8686]
$\mathbb{1}\{\text{Shortage}\}$	-0.0042	0.0031	0.0157	-0.0084	0.0017	0.0006	0.0160	-0.0034
	(0.0125)	(0.0111)	(0.0279)	(0.0307)	(0.0051)	(0.0066)	(0.0114)	(0.0110)
	[0.7394]	[0.7775]	[0.5755]	[0.7863]	[0.7434]	[0.9235]	[0.1653]	[0.7593]
Payments * $\mathbb{1}\{\text{Shortage}\}$	0.0003	-0.0002	-0.0032	0.0020	0.0002	-0.0000	-0.0015	0.0001
	(0.0014)	(0.0012)	(0.0029)	(0.0037)	(0.0006)	(0.0008)	(0.0015)	(0.0014)
	[0.8041]	[0.8366]	[0.2698]	[0.5823]	[0.7958]	[0.9641]	[0.2988]	[0.9280]
Observations	16,745	21,211	6,662	6,762	26,229	33,911	10,049	14,905
R^2	0.015	0.021	0.034	0.045	0.006	0.029	0.024	0.020
Baseline mean	0.022	0.034	0.046	0.070	0.008	0.022	0.023	0.034

C. Adult subsample	Medicaid			Private		
	Not accepting new patients	Not acc. patient's insurance	Work days missed	Not accepting new patients	Not acc. patient's insurance	Work days missed
	(1)	(2)	(3)	(4)	(5)	(6)
MC payments ($10)	-0.0069	-0.0064	0.1327	0.0002	-0.0006	-0.0725
	(0.0021)	(0.0024)	(0.3257)	(0.0007)	(0.0007)	(0.1151)
	[0.0017]	[0.0101]	[0.6855]	[0.7940]	[0.3680]	[0.5316]
$\mathbb{1}\{\text{Shortage}\}$	-0.0116	0.0078	1.8325	-0.0021	0.0020	-0.6126
	(0.0131)	(0.0157)	(2.9538)	(0.0055)	(0.0068)	(0.7489)
	[0.3805]	[0.6220]	[0.5378]	[0.6956]	[0.7674]	[0.4173]
Payments * $\mathbb{1}\{\text{Shortage}\}$	0.0002	-0.0022	-0.2167	0.0002	-0.0001	0.1120
	(0.0014)	(0.0016)	(0.3242)	(0.0007)	(0.0008)	(0.0851)
	[0.8925]	[0.1830]	[0.5069]	[0.7764]	[0.9457]	[0.1945]
Observations	14,800	14,799	6,293	79,692	79,682	76,792
R^2	0.036	0.037	0.074	0.006	0.008	0.009
Baseline mean	0.062	0.082	5.010	0.017	0.025	3.711

† Reflects absenteeism due to illness or injury over the previous year.

Notes: The above table shows the estimated effects of a $10 increase in Medicaid payments from estimation of an augmented version of equation (2). Observations are at the individual level and cover 2009–2014. All regressions include state and quarter-year fixed effects and all individual-level controls listed in Table A1 (with age in five-year bins). Regressions are weighted using the sample weights provided in the NHIS. Standard errors are clustered by state and are reported in parentheses; p-values are reported in brackets.

Table A5: Effects of Medicaid payments: 2009–2015

A. Full sample	Medicaid			Private		
	Office visit (2 weeks) (1)	Health $\leq$ fair (2)	Health $\geq$ very good (3)	Office visit (2 weeks) (4)	Health $\leq$ fair (5)	Health $\geq$ very good (6)
Medicaid payments ($10s)	0.0017	-0.0011	0.0039	-0.0002	0.0000	0.0009
	(0.0013)	(0.0010)	(0.0023)	(0.0009)	(0.0005)	(0.0014)
	[0.2210]	[0.2536]	[0.0920]	[0.8395]	[0.9793]	[0.5213]
Observations	115,663	115,720	115,720	397,479	397,909	397,909
R^2	0.070	0.287	0.229	0.036	0.077	0.137
Baseline mean	0.197	0.176	0.562	0.175	0.062	0.726

B. Child subsample	Medicaid				Private			
	Trouble finding MD (1)	No usual place of care (2)	14+ school absences† (age 5–10) (3)	14+ school absences† (age 11–17) (4)	Trouble finding MD (5)	No usual place of care (6)	14+ school absences† (age 5–10) (7)	14+ school absences† (age 11–17) (8)
Medicaid payments ($10s)	-0.0040	-0.0029	-0.0041	0.0054	0.0006	0.0004	0.002	-0.0014
	(0.0010)	(0.0018)	(0.0021)	(0.0037)	(0.0005)	(0.0008)	(0.0032)	(0.0016)
	[0.0003]	[0.1137]	[0.0553]	[0.1565]	[0.2836]	[0.6192]	[0.5346]	[0.3589]
Observations	21,044	25,515	8,049	8,276	32,669	40,353	11,961	17,694
R^2	0.013	0.020	0.032	0.041	0.005	0.028	0.022	0.020
Baseline mean	0.022	0.034	0.046	0.070	0.008	0.022	0.023	0.034

C. Adult subsample	Medicaid			Private		
	Not accepting new patients (1)	Not accepting patient's insurance (2)	Work days missed (3)	Not accepting new patients (4)	Not accepting patient's insurance (5)	Work days missed (6)
Medicaid payments ($10s)	-0.0057	-0.0064	-0.3187	-0.0004	-0.0008	0.0632
	(0.0016)	(0.0022)	(0.3266)	(0.0005)	(0.0006)	(0.0687)
	[0.0008]	[0.0063]	[0.3338]	[0.4142]	[0.1920]	[0.3624]
Observations	19,230	19,226	8,065	99,976	99,963	92,205
R^2	0.030	0.034	0.057	0.006	0.008	0.009
Baseline mean	0.062	0.082	5.010	0.017	0.025	3.711

† Reflects absenteeism due to illness or injury over the previous year.

Notes: The above table shows the estimated effects of a $10 increase in Medicaid payments from estimation of equation (2). Observations are at the individual level and cover 2009–2015. All regressions include state and quarter-year fixed effects and all individual-level controls listed in Table A1 (with age in five-year bins). Regressions are weighted using the sample weights provided in the NHIS. Standard errors are clustered by state and are reported in parentheses; p-values are reported in brackets. Appendix A.2.1 outlines the exact survey questions and corresponding reference windows. Only adults with employment histories are asked to report days of missed work in the past year.

Table A6: Balancing regressions of FQHC presence and use on Medicaid payments

	Grantees		Sites		Encounters	
	Per million	Logs	Per 100,000	Logs	Per capita	Logs
	(1)	(2)	(3)	(4)	(5)	(6)
Medicaid payments ($10s)	0.0073	-0.0058	0.0397	0.0121	0.0018	0.0024
	(0.0272)	(0.0086)	(0.0239)	(0.0107)	(0.0016)	(0.0069)
	[0.7889]	[0.5043]	[0.1027]	[0.2643]	[0.2677]	[0.7310]
Observations	303	303	303	303	300	300
R^2	0.962	0.991	0.982	0.989	0.992	0.998
Baseline mean	3.604	3.452	2.626	5.412	0.249	14.60

Notes: The above table shows the estimated effects of a $10 increase in Medicaid payments from estimation of a state-level analogue of equation (2). Observations are at the state-year level and cover 2009–2014. All regressions include state and year fixed effects and all state-level controls denoted with an asterisk in Table A2. Regressions are weighted by state population. Standard errors are clustered by state and are reported in parentheses; p-values are reported in brackets. Outcomes were provided by the NACHC and are based on information from the HRSA's Uniform Data System; data are missing for New Mexico in 2011 and Nevada and Virginia in 2012.

Table A7: Effects of Medicaid payments: Triple difference model with interacted controls

A. Full sample	Office visit (2 weeks) (1)	Health: poor or fair (2)	Health: excellent or very good (3)
Medicaid payments ($10s)	-0.0006	0.0004	0.0015
	(0.0011)	(0.0007)	(0.0019)
	[0.5853]	[0.5275]	[0.4327]
𝟙{Medicaid}	-0.0642	0.0841	-0.2551
	(0.0361)	(0.0365)	(0.0599)
	[0.0811]	[0.0254]	[0.0001]
Medicaid payments * 𝟙{Medicaid}	0.0034	-0.0031	0.0032
	(0.0020)	(0.0018)	(0.0032)
	[0.0953]	[0.0932]	[0.3245]
Observations	429,894	430,338	430,338
R^2	0.044	0.178	0.174
Baseline mean	0.179	0.082	0.698

B. Child subsample	Trouble finding MD (1)	No usual place of care (2)	14+ school days missed† (age 5–10) (3)	14+ school days missed† (age 11–17) (4)
Medicaid payments ($10s)	0.0016	0.0001	0.0036	-0.0002
	(0.0006)	(0.0011)	(0.0042)	(0.0020)
	[0.0093]	[0.9452]	[0.3956]	[0.9306]
𝟙{Medicaid}	0.1492	-0.0692	0.0547	-0.0894
	(0.0215)	(0.0371)	(0.0928)	(0.0566)
	[<0.0001]	[0.0679]	[0.5586]	[0.1206]
Medicaid payments * 𝟙{Medicaid}	-0.0070	-0.0028	-0.0087	0.0045
	(0.0012)	(0.0021)	(0.0052)	(0.0036)
	[<0.0001]	[0.1749]	[0.1042]	[0.2140]
Observations	42,486	54,509	16,511	21,437
R^2	0.015	0.027	0.034	0.036
Baseline mean	0.013	0.026	0.029	0.042

C. Adult subsample	Not accepting new patients (1)	Not accepting patient's insurance (2)	Work days missed (3)
Medicaid payments ($10s)	0.0004	-0.0006	-0.0067
	(0.0006)	(0.0006)	(0.1008)
	[0.5028]	[0.3229]	[0.9469]
𝟙{Medicaid}	0.1264	0.0922	6.5047
	(0.0344)	(0.0448)	(7.3522)
	[0.0006]	[0.0448]	[0.3805]
Medicaid payments * 𝟙{Medicaid}	-0.0075	-0.0070	0.0674
	(0.0019)	(0.0026)	(0.4158)
	[0.0002]	[0.0092]	[0.8720]
Observations	94,037	94,025	82,870
R^2	0.024	0.028	0.017
Baseline mean	0.022	0.031	3.785

† Reflects absenteeism due to illness or injury over the previous year.

Notes: The above table shows the estimated effects of a $10 increase in Medicaid payments from estimation of an augmented version of equation (2). Observations are at the individual level and cover 2009–2014. All regressions include state and quarter-year fixed effects and all individual-level controls listed in Table A1 (with age in five-year bins). We allow the associations between the controls and each outcome to differ for Medicaid beneficiaries and patients with private insurance; refer to Table A8 for results from specifications without interacted controls. Regressions are weighted using the sample weights provided in the NHIS. Standard errors are clustered by state and are reported in parentheses; p-values are reported in brackets.

Table A8: Effects of Medicaid payments: Triple difference without interacted controls

A. Full sample	Office visit (2 weeks) (1)	Health: poor or fair (2)	Health: excellent or very good (3)
Medicaid payments ($10s)	0.0002	0.0004	0.0014
	(0.0009)	(0.0006)	(0.0017)
	[0.8705]	[0.5712]	[0.4159]
$\mathbb{1}${Medicaid}	0.0669	0.1141	-0.1357
	(0.0108)	(0.0076)	(0.0140)
	[<0.0001]	[<0.0001]	[<0.0001]
Medicaid payments * $\mathbb{1}${Medicaid}	-0.0005	-0.0024	0.0034
	(0.0008)	(0.0007)	(0.0015)
	[0.5032]	[0.0017]	[0.0273]
Observations	429,894	430,338	430,338
R^2	0.040	0.128	0.163
Baseline mean	0.179	0.082	0.698

B. Child subsample	Trouble finding MD (1)	No usual place of care (2)	14+ school days missed† (age 5–10) (3)	14+ school days missed† (age 11–17) (4)
Medicaid payments ($10s)	-0.0004	-0.0009	0.0009	0.0022
	(0.0005)	(0.0008)	(0.0028)	(0.0021)
	[0.4276]	[0.2953]	[0.7484]	[0.2932]
$\mathbb{1}${Medicaid}	0.0262	0.0026	0.0386	0.0520
	(0.0055)	(0.0065)	(0.0117)	(0.0160)
	[<0.0001]	[0.6920]	[0.0017]	[0.0020]
Medicaid payments * $\mathbb{1}${Medicaid}	-0.0017	-0.0007	-0.0024	-0.0030
	(0.0005)	(0.0007)	(0.0012)	(0.0016)
	[0.0020]	[0.3179]	[0.0528]	[0.0703]
Observations	42,486	54,509	16,511	21,437
R^2	0.009	0.021	0.021	0.025
Baseline mean	0.013	0.026	0.029	0.042

C. Adult subsample	Not accepting new patients (1)	Not accepting patient's insurance (2)	Work days missed (3)
Medicaid payments ($10s)	0.0001	-0.0008	-0.0191
	(0.0006)	(0.0007)	(0.0943)
	[0.8506]	[0.2811]	[0.8399]
$\mathbb{1}${Medicaid}	0.0676	0.0870	-1.9492
	(0.0123)	(0.0119)	(1.1443)
	[<0.0001]	[<0.0001]	[0.0947]
Medicaid payments * $\mathbb{1}${Medicaid}	-0.0041	-0.0044	0.1242
	(0.0011)	(0.0011)	(0.1117)
	[0.0006]	[0.0002]	[0.2718]
Observations	94,037	94,025	82,870
R^2	0.016	0.020	0.009
Baseline mean	0.022	0.031	3.785

† Reflects absenteeism due to illness or injury over the previous year.

Notes: The above table shows the estimated effects of a $10 increase in Medicaid payments from estimation of an augmented version of equation (2). Observations are at the individual level and cover 2009–2014. All regressions include state and quarter-year fixed effects and all individual-level controls listed in Table A1 (with age in five-year bins). In contrast to the specification used in Table A7, we do not interact the time fixed effects or the demographic controls with insurance type in these regressions; that is, we assume that the associations between these variables and each outcome are the same for Medicaid beneficiaries and patients with private insurance. Regressions are weighted using the sample weights provided in the NHIS. Standard errors are clustered by state and are reported in parentheses; p-values are reported in brackets.

D Supplementary outcomes

As school absenteeism is closely linked to test scores, it is possible that the reductions in absenteeism that we document could lead to improvements in academic performance (Gottfried, 2011; Goodman, 2014; Liu et al., 2021). We note, however, that finding effects on test scores in our setting is unlikely. In 2011, for example, the average score on the national math assessment among the 45.6 percent of free lunch–eligible fourth graders who missed 0 days in the month preceding the exam was 231.6, compared to 228.4 among the 30.6 percent who missed 1–2 days and 222.8 among the 23.8 percent who missed 3+ days. If a \$10 increase in Medicaid payments shifts approximately 0.4 percentage points of students from missing 3+ days to missing 0 days, as is suggested by the results in Table 5, then this would change the average test score among free lunch–eligible fourth graders from 228.51 to only 228.55. This increase is less than one percent of the standard deviation in average state-level math scores among free lunch–eligible fourth graders.

Nevertheless, to examine the effects of increased Medicaid payments on test scores, we use information from the publicly available, state-level files and estimate an analogue of equation (3) using data from 2009, 2011, 2013, and 2015:

$$Outcome_{sy} = \beta \cdot Payment_{sy} + \gamma X_{sy} + \lambda_s + \lambda_y + \epsilon_{sy} \tag{A1}$$

where $Outcome_{sy}$ denotes an average schooling outcome in state s in year y, and all other variables are defined as in equation (3). We weight the regressions by state population and cluster standard errors by state.

Results from this analysis are shown in Table A9. Panel A begins by showing effects of Medicaid payments on average state-level absences. When aggregating to the state level, we find evidence of improvements in attendance that are generally slightly smaller and less precise than in the individual-level data. This is to be expected for two reasons. First, we are able to include individual-level controls for key demographics (i.e., age, sex, race, and ethnicity) in the individual-level regressions, whereas we can only include state-level aggregates of these controls from the ACS in the state-level analogues. Second, in the individual-level data we can observe students who are individually eligible for free lunch whereas the flag for free lunch in the state-level aggregates includes students whose eligibility was determined at the school level (that is, children whose household income is above the threshold for individual eligibility but who attend schools in which everyone qualifies for free lunch due to a high number of individually eligible students). Because students whose eligibility is determined at the school-level are less likely to qualify for Medicaid than those who are individually eligible, our proxy for Medicaid coverage in the state-level NAEP is less precise than in the individual-level NAEP.

Panel B of Table A9 provides results for test scores. As expected, we find no effects of increased physician reimbursement under Medicaid on average state-level scores on national math and reading assessments.

Table A9: Effects of Medicaid payments on school absences and test scores (state-level NAEP)

A. School absences	Free lunch eligible				Free lunch ineligible			
	0 days missed (%)		3+ days missed (%)		0 days missed (%)		3+ days missed (%)	
	Grade 4 (1)	Grade 8 (2)	Grade 4 (3)	Grade 8 (4)	Grade 4 (5)	Grade 8 (6)	Grade 4 (7)	Grade 8 (8)
Medicaid payments ($10s)	0.0036	0.0013	-0.0042	-0.0013	0.0027	0.0000	-0.0005	-0.0002
	(0.0016)	(0.0014)	(0.0009)	(0.0012)	(0.0020)	(0.0018)	(0.0012)	(0.0009)
	[0.0250]	[0.3837]	[0.0001]	[0.2608]	[0.1909]	[0.9977]	[0.6979]	[0.8268]
Observations	199	199	199	199	199	199	199	199
R^2	0.938	0.930	0.893	0.922	0.825	0.892	0.788	0.882
Baseline mean	0.465	0.404	0.232	0.252	0.547	0.476	0.157	0.166

B. Test scores	Free lunch eligible				Free lunch ineligible			
	Math		Reading		Math		Reading	
	Grade 4 (1)	Grade 8 (2)	Grade 4 (3)	Grade 8 (4)	Grade 4 (5)	Grade 8 (6)	Grade 4 (7)	Grade 8 (8)
Medicaid payments ($10s)	-0.0087	0.0003	-0.0057	0.0208	-0.0602	0.0073	-0.0413	0.0390
	(0.0269)	(0.0444)	(0.0401)	(0.0514)	(0.0363)	(0.0236)	(0.0396)	(0.0409)
	[0.7491]	[0.9946]	[0.8868]	[0.6873]	[0.1040]	[0.7584]	[0.3016]	[0.3445]
Observations	199	199	199	199	199	199	199	199
R^2	0.935	0.922	0.916	0.869	0.901	0.930	0.906	0.916

Notes: The above table shows the estimated effects of a $10 increase in Medicaid payments from estimation of equation (A1). Observations are at the state-year level and cover 2009, 2011, 2013, and 2015. In Panel A, outcomes are the fraction of students missing a given amount of school for any reason in the month preceding their national math and reading assessments; in Panel B, outcomes are average test scores standardized across the population included in a given regression. All regressions include state and year fixed effects and all state-level controls denoted with an asterisk in Table A2. Regressions are weighted by state population. Standard errors are clustered by state and are reported in parentheses; p-values are reported in brackets.

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