RESEARCH ARTICLE

Does Medicaid coverage of Medicare cost sharing affect physician care for dual-eligible Medicare beneficiaries?

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Abstract

Objective: To assess changes in physicians' provision of care to duals (low-income individuals with Medicare and Medicaid) in response to a policy that required Medicaid to fully pay Medicare's cost sharing for office visits with these patients. This policy—a provision of the Affordable Care Act—effectively increased payments for office visits with duals by 0%-20%, depending on the state, in 2013 and 2014.

Data Sources: Fee-for-service claims for a 5% random sample of Medicare beneficiaries in 2010-2016.

Study Design: We conducted a difference-in-differences analysis to compare changes in office visits among Qualified Medicare Beneficiaries (QMBs)—the largest subpopulation of duals for whom payment rates were affected by this policy—to changes among other low-income Medicare beneficiaries for whom payment rates were unaffected (pooled across all states). Next, we conducted a triple-differences analysis that compared changes between QMBs and other low-income beneficiaries in 33 states with payment rate increases of approximately 20% to analogous changes in 14 states without payment increases.

Data Collection: The study included administrative Medicare enrollment and claims data for QMBs and a comparison group of other low-income Medicare beneficiaries (1 914 073 beneficiary-years from 2010 to 2016).

Principal Findings: Nationally, we did not find a differential increase in office visits among QMBs versus other low-income beneficiaries that coincided with this payment change. In the triple-differences analysis, we did not observe a greater increase in visits among QMBs vs other low-income beneficiaries in states where the policy resulted in large (approximately 20%) increases in payment rates vs states where payment rates were unaffected (triple-differences estimate: −0.12 annual visits, 95% CI: −0.28, 0.04; $P = 0.15$).

Conclusions: Physicians' provision of care to low-income Medicare beneficiaries may not be responsive to short-run payment changes.

KEYWORDS
Affordable Care Act, dual eligibles, physician incentives

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What is already known on this topic

- Low-income Medicare beneficiaries with Medicare and Medicaid (duals) are not responsible for paying Medicare's cost sharing out-of-pocket; instead, these balances are billed to Medicaid.
- However, many state Medicaid programs limit their payment of Medicare's cost sharing for duals, meaning that Medicare and Medicaid's combined payment per service for duals can be lower than the amount providers receive for other Medicare beneficiaries.
- In 2013 and 2014, the Affordable Care Act's Medicaid "fee bump" increased Medicaid payments of Medicare cost sharing for office visits with duals, ensuring that providers were paid in full for these visits.

What This Study Adds

- For duals in 33 states, this fee bump increased Medicare and Medicaid's combined payment rate for office visits by approximately 20%, but payment rates were unchanged in 14 states whose Medicaid programs previously paid Medicare's cost sharing in full and continued to do so under the fee bump.
- We found that payment increases did not lead to increases in office visits among Qualified Medicare Beneficiaries (the largest subpopulation of duals for whom payment rates were affected) compared to changes among (a) other low-income Medicare beneficiaries for whom payment rates were unaffected and (b) states without payment increases.
- Our findings suggest that efforts to increase the provision of physician services to low-income Medicare beneficiaries may need to focus on policy levers other than short-term payment increases.

1 | INTRODUCTION

Medicaid serves as a supplemental insurer to approximately 9 million low-income Medicare beneficiaries (duals) who are not responsible for paying cost sharing in Medicare Parts A and B.[1] Instead, these amounts are billed to Medicaid. For low-income Medicare beneficiaries, Medicaid helps to reduce out-of-pocket costs that would otherwise present a substantial financial barrier to care.[2,3] For providers, however, the economic incentive to serve duals varies across states due to policies that govern whether, and to what extent, state Medicaid programs pay Medicare's cost sharing to providers. Since the 1990s, states have had the option to pay providers less than Medicare's full cost sharing when Medicaid's fee schedule is less than Medicare's. Providers are prohibited from billing duals for unpaid balances. These payment rules are termed "lesser-of" policies, because Medicaid's payment equals the lesser of two amounts: (a) Medicare's cost sharing, and (b) the difference between Medicaid's fee schedule and Medicare's payment, net of cost sharing.[4]

In states with lesser-of policies and low Medicaid fee schedules, Medicare and Medicaid's combined payment rate for duals can be much lower than the amount providers receive for other Medicare beneficiaries, who are responsible for paying Medicare's cost sharing out-of-pocket or with private supplemental insurance.[4] This payment differential has raised concern that providers may avoid duals, limiting access to care in a population with substantial health risks because of its low socioeconomic status and disproportionate burden of chronic and disabling health conditions.[5] However, little research has examined whether requiring Medicaid to pay Medicare's cost sharing in full would increase the provision of care to this population.

To shed light on this question, we studied a policy change that required Medicaid programs in all states to fully pay Medicare's cost sharing for physician office visits (covered by Medicare Part B) with duals. Specifically, we analyzed a one-time increase in Medicaid payments rates for office visits resulting from the Affordable Care Act's Medicaid "fee bump." In 2013 and 2014, this federally funded policy increased Medicaid payment rates to Medicare levels for approximately 145 services—principally, office visits for evaluation and management services (hereafter referred to as office visits)—and targeted these fee increases to primary care providers.[6,7] The policy required Medicaid programs to pay 100% of Medicare's cost sharing for fee bump-eligible services provided to duals. In lesser-of states with low prevailing Medicaid fee schedules, the policy temporarily raised Medicare and Medicaid's combined payment for office visits with duals and eliminated the payment differential for these visits vs the payment rate for other beneficiaries. We studied the effects of this payment increase among Qualified Medicare Beneficiaries (QMBs), the largest subpopulation of duals whom Medicaid provides supplemental insurance coverage (7 million beneficiaries).[1]

Conceptually, the effect of this payment increase on physicians' provision of care to QMBs is ambiguous. On the one hand, increasing payment rates for office visits with QMBs might induce physicians to provide more care for these patients, either by substituting away from other populations for whom payment rates are lower

or by expanding capacity. On the other hand, this supply response may be tempered by several factors. First, income increases from higher payment rates could place downward pressure on the overall supply of physician services via income effects.[8,9] Because QMBs constitute only 11% of the total Medicare population,[1] we expect income effects to be small in general, although they could be larger for physicians whose panels include a high share of QMBs. Second, physicians might not adjust their supply of services in response to a temporary payment change. Third, lesser-of policies might not have limited QMBs' access to care, in which case a payment rate increase might not lead to a change in provider visits. However, prior evidence that low-income Medicare beneficiaries have difficulty obtaining care suggests that supply constraints are salient for at least some QMBs.[10-12]

Therefore, we empirically examined the effects of this payment increase among QMBs by leveraging variation in the fee bump's effect on payments across populations and states. We conducted two analyses. First, we performed a difference-in-differences analysis to compare changes in office visits among QMBs to changes among other low-income Medicare beneficiaries for whom payment rates were unaffected. Second, we exploited cross-state variation in payment changes in a triple-differences design. We assessed whether there were larger differential increases in office visits among QMBs versus other low-income beneficiaries in states where the fee bump had a sizeable impact on payment rates, compared to analogous changes in states with no payment increases for QMBs. We used a new national database of Medicaid payment policies[4] to measure combined Medicare and Medicaid payment rates for office visits with duals (including QMBs) prior to the fee bump, and thus the payment changes this policy produced in each state.

Our study contributes to research on payment policy in Medicare and Medicaid in several ways. First, we add to a growing body of research on the effects of the Affordable Care Act's Medicaid fee bump—one of the largest payment changes in the history of the Medicaid program.[6] To our knowledge, only one other study by Fung et al[13] examined the effects of this fee bump among duals, while other studies examined the policy's effects in populations for which Medicaid was the primary (rather than the supplemental) insurer.[14-17] Second, we add to a limited literature on payment policy for duals. With the exception of Fung and colleagues' study, prior research in this area has been limited to cross-sectional designs or analyses of policy changes in a small number of states.[18-21] Third, our work adds to a large literature on the effects of payment policy changes on the supply of physician services to Medicare beneficiaries.[8,9,22-24] While much of this research examines physician responses to price changes on average,[8,22-24] few studies investigate responses for specific populations of Medicare beneficiaries. Understanding the effects of payment changes on the provision of care to low-income Medicare beneficiaries is important because these patients often face barriers accessing care and may be more costly to treat on the margin, due to their greater medical complexity, than other populations.[5] Thus, evidence on how providers respond to payment changes for low-income beneficiaries can guide reforms to optimize the supply

of care to individuals who may derive substantial benefits from care. Fourth, our analyses isolate provider (supply-side) responses to payment rate changes since the dual population we study is not subject to cost sharing.[8,22,23,25] Because non-dual Medicare beneficiaries may be partially exposed to payment rate changes via cost sharing, studies in the general Medicare population may be limited in the extent to which they isolate provider responses from patient responses.

1.1 | Medicaid eligibility and payment policies for duals

Medicaid serves as a supplemental insurer by covering cost sharing in Medicare Parts A and B for approximately 9 million low-income Medicare beneficiaries, of whom 7 million are Qualified Medicare Beneficiaries (QMBs).[1] QMBs have incomes below 100% of the Federal Poverty Level (FPL) and assets below an inflation-indexed limit. These eligibility rules remained essentially unchanged during our study period and were unaffected by the Affordable Care Act's Medicaid expansion, which targeted nonelderly and nondisabled adults.[26-29] A subset of QMBs who meet state-specific eligibility rules may also receive full Medicaid, which pays for services such as long-term care that are not covered by Medicare. Because Medicaid cost sharing assistance is identical for QMBs with and without full Medicaid, we include both groups of QMBs in our analyses.

We excluded Medicare beneficiaries who receive Medicaid benefits that cover Medicare's cost sharing through pathways other than the QMB program. These pathways require individuals to meet special eligibility criteria applicable to nursing home residents or to qualify for Medicaid via a Medically Needy program (for people with high medical spending).[30,31] We excluded these groups because the fee bump affected payments to physicians in the community (not in nursing homes) and we wanted to examine the effects of payment changes among beneficiaries who qualified for Medicaid based on plausibly exogenous rules (income and asset limits) rather than endogenous factors (use of care).

QMBs have no out-of-pocket costs for Medicare-covered services, yet states have latitude to determine what amount—if any—of Medicare's cost sharing that their Medicaid programs will pay providers. This latitude was formalized by the 1997 Balanced Budget Act, which permitted states to limit Medicaid payments to the lesser-of Medicare's cost sharing or the difference between the state's Medicaid fee schedule and Medicare's payment (net of cost sharing).[3] Balance-billing of patients is prohibited. In states with lesser-of policies (there were 37 in 2012), a provider's total reimbursement from Medicare and Medicaid will be less than Medicare's full allowed amount when a state's Medicaid fee schedule is lower than Medicare's. In states without lesser-of policies (there were 14 in 2012), providers generally are paid the full amount of Medicare's cost sharing regardless of the state's prevailing Medicaid fee schedule.[4] When Medicaid is *not* the supplemental insurer, providers are paid the full Medicare allowed amount, since in these cases patients

must pay Medicare's cost sharing out-of-pocket or cover these costs through private supplemental (eg, Medigap) insurance.

In 2013 and 2014, the Medicaid fee bump eliminated the differential in payment rates for QMBs and other Medicare beneficiaries for office visits billed by primary care physicians, nurse practitioners, physician assistants, and some specialists.[7,16,32] The fee bump expired on January 1, 2015, causing Medicaid payments of Medicare cost sharing to revert to their 2012 levels, except in 17 states that maintained higher Medicaid fees or continued to pay Medicare's cost sharing in full.[33]

2 | METHODS

2.1 | Data

We analyzed a random 5% sample of Medicare beneficiaries from 2010 to 2016. We used the Medicare Master Beneficiary Summary File to assess beneficiaries' demographic characteristics, reason for Medicare entitlement (ie, age, disability, or end-stage renal disease), chronic disease history, and enrollment in Medicaid (including QMB). We used the Carrier file to identify office visits.

2.2 | Study sample

We analyzed Medicare beneficiaries who were continuously enrolled in the traditional fee-for-service program (ie, Medicare Parts A and B) during the study year (while alive for decedents) and preceding year. We limited our sample to (a) beneficiaries in the QMB program, and (b) a comparison group of Medicare beneficiaries who did *not* receive Medicaid supplemental cost-sharing coverage but had low incomes, as evidenced by their enrollment in other means-tested programs: the Specified Low-Income Medicare Beneficiary (SLMB) program, the Qualifying Individual (QI) program, or the Low-Income Subsidy (LIS). SLMB and QI are limited Medicaid benefits which pay for the Medicare Part B premium, but not Medicare cost sharing, for individuals with low assets and income > 100% to ≤ 135% of FPL. The LIS reduces premiums and cost sharing in Medicare Part D for individuals with low assets and income ≤ 150% of FPL.[34] Hereafter, we refer to recipients of SLMB, QI, and the LIS who do not receive Medicaid supplemental coverage as *other low-income Medicare beneficiaries*. Physician payment rates for these other low-income beneficiaries were not affected by the fee bump. Program definitions and administrative codes used to identify recipients of each are in Table S1 in Appendix S1.

We limited our analyses to beneficiaries in 47 states (including the District of Columbia) for which we had annual data on Medicaid payment policies and whose policies were stable in the 2010-2012 period (ie, the three years prior to the fee bump).[4] The excluded states were South Dakota, New Hampshire, and Tennessee (incomplete payment policy data) and Minnesota (the state amended its payment policies for QMBs in 2012).

2.3 | State variation in payment rate changes

We used a new database of state Medicaid payment policies for duals to identify states where the fee bump led to increases in payment rates for QMBs. This database integrates information on states' lesser-of policies and Medicaid payment rates for physician office visits covered by Medicare Part B to produce an annual state-level payment index (see Appendix S1 for details).[4] The index is scaled from approximately 80%-100% and represents the proportion of the Medicare allowed amount that a provider would expect to be paid, in total from Medicare and Medicaid, per office visit with duals for whom Medicaid serves as a supplemental insurer (including QMBs). An index of 80% means that a provider's expected payment per service provided to a QMB will be 20% less than the payment for the same service provided to a Medicare beneficiary without Medicaid supplemental coverage. Because the Part B coinsurance rate is 20%, an index of 80% means that a Medicaid program pays none of the coinsurance. For a medium-length office visit with an established patient (Current Procedural Terminology code 99 213), which had a mean Medicare allowed amount of $76.15 in 2020,[35] an index of 80% represents a per-service payment differential of $15.23. An index of 100% indicates parity in payment (Medicaid pays all of the coinsurance).

In 33 states, this index increased from approximately 80%–100% from 2012 to 2013, due to the fee bump's phase-in. In 14 states, the index did not change appreciably over this period, because these states previously paid Medicare's cost sharing in full and continued to do so under the fee bump.

2.4 | Outcome variables

We used the Carrier file to construct beneficiary-year counts of (a) office visits with primary care physicians, nurse practitioners, and physician assistants (we refer to these as office visits with PCPs); (b) office visits with all providers; (c) office visits with PCPs billed with procedure codes denoting a new patient visit; and (d) new patient visits with all providers. We examined new patient visits because physician decisions to accept new patients may differ from decisions to provide additional visits with established patients. The Appendix S1 provides additional information about these variables.

2.5 | Difference-in-differences model

We used a difference-in-differences model to assess changes in office visits among QMBs versus other low-income Medicare beneficiaries from before (2010-2012) to after (2013-2014) the fee bump's implementation. We estimated patient-level linear regression models of the form:

$$y_{ist} = \beta_0 + \beta_1 PostFeeBump_t \times QMB_{it} + \beta_2 QMB_{it}$$
$$+ \beta_3 PostFeeBump_t + [\beta_4 QMB_{it} \times year_t] + \theta X_{it} + \mu_s + \varepsilon_{ist}$$

(1)

where y_{ist} denotes the outcome for beneficiary i in state s and year t; QMB_{it} is an indicator for whether individual i was a QMB in year t; $PostFeeBump_t$ denotes the period after the fee bump's phase-in (equal to 1 in 2013 and 2014 and 0 in preceding years); X_{it} is a vector of beneficiary-level health and demographic characteristics and area-level attributes; μ_s are state fixed effects; and ε_{ist} is a random error term clustered on state.[36] Thus, β_1 represents an adjusted within-state differential change in y (pooled across all states) among QMBs compared to other low-income Medicare beneficiaries associated with the national phase-in of the fee bump. In a variant of this model, we included a QMB-linear time trend interaction ($QMB_{it} \times year_t$) to adjust for any differential pre-fee bump trends in outcomes between QMBs and other low-income beneficiaries.

2.6 | Triple-differences model

To investigate whether any changes in office visits among QMBs were concentrated in the 33 states in which the fee bump's phase-in increased provider payment rates for QMBs, versus the 14 states where it did not, we estimated patient-level linear triple-differences models of the form:

$$y_{ist} = \beta_0 + \beta_1 PostFeeBump_t \times QMB_{ist} \times Increase_{is} + \beta_2 PostFeeBump_t$$
$$\times QMB_{ist} + \beta_3 QMB_{ist} \times Increase_{is} + \beta_4 PostFeeBump_t \times Increase_{is} \qquad (2)$$
$$+ \beta_5 QMB_{its} + \beta_6 PostFeeBump_t + \theta X_{it} + \mu_s + \varepsilon_{ist}$$

(The main effect of a payment increase state is absorbed by the state fixed effects.) We estimated these models on 2010-2014 data. Here, $Increase_{is}$ is a binary indicator that person i lived in a state where the fee bump's phase-in led to an increase in provider payment rates for QMBs. Thus, β_1 is a difference in differential changes, comparing QMBs to other low-income Medicare beneficiaries (first difference) before and after the fee bump's implementation (second difference), in states where the fee bump's phase-in increased office visit payments for QMBs versus states where it did not (third difference).

2.7 | Supplementary analyses

We conducted five supplementary analyses. First, we estimated event-study models to compare annual changes in office visits between QMBs and other low-income Medicare beneficiaries in the 33 states where the fee bump's phase-in lead to payment rate increases and the 14 states where it did not. We extended these event-study models through 2016 to examine changes during fee bump's phase-in and after its phase-out.

Second, we re-estimated model (2) using the continuous change in each state's payment index from 2012-13 instead of the binary indicator $Increase_{is}$. To facilitate interpretation, we scaled estimates of the triple interaction term by 0.20, which represents the mean increase in the payment index from 2012 to 2013 in the 33 states where the fee bump increased payment rates for QMBs.

Third, we examined whether the more salient margin of payment rate changes was on Medicaid payment rates rather than the payment index, which is a function of *both* Medicaid payment rates and lesser-of policies. We re-estimated model (2) using a continuous measure of the change in the ratio of Medicaid to Medicare payment rates for office visits from 2012 to 2013 instead of $Increase_{is}$, which we measured using state-level fee ratios compiled by the Urban Institute.[37] We scaled this triple-difference estimate by 0.3, which approximates the mean increase in the fee ratio across states due to the fee bump.

Fourth, we assessed potential bias from endogenous Medicaid enrollment related to the fee bump. Low-income individuals must apply to receive Medicaid, including QMB. As has been found in other research,[38,39] individuals may be more likely to take up Medicaid benefits when their perceived value to patients or their providers is higher, which could be affected by payment rates. For example, providers may have stronger incentives to refer patients to QMB if payment rates are higher, and patients may be more likely to apply if higher payment rates increase providers' willingness to schedule appointments with them. Selection into QMB that is related to payment rate changes and use of care will bias our estimates. To assess bias from potentially endogenous enrollment, we re-estimated our triple-differences models on 2010-14 data but compared changes in office visits in each year t between (a) Medicare beneficiaries who were QMBs as of year t-2 and (b) other low-income beneficiaries as of t-2. (We used 2008 and 2009 Medicare data to assess lagged QMB enrollment status for Medicare beneficiaries in 2010 and 2011, respectively.) Because this "lagged treatment" group comprises only individuals who were QMBs prior to the fee bump, it should be immune to any fee bump-related selection effects.[40]

Fifth, we compared changes among QMBs to changes in an alternate comparison group of Medicare beneficiaries who did not receive any Medicaid benefits or the LIS in a year. We used this alternative comparison to check whether our main effect estimates could have been attenuated if providers did not distinguish between QMBs and low-income Medicare beneficiaries receiving partial Medicaid benefits or prescription drug subsidies.

3 | RESULTS

Table 1 reports characteristics of QMBs and other low-income Medicare beneficiaries. Compared to other low-income Medicare beneficiaries, QMBs had a greater burden of chronic disease, and higher proportions were disabled and non-white. Differences between these populations, to the extent that they are fixed over time, do not bias our analyses. However, changes in the characteristics of these populations could bias our estimates if these changes were related to health care use, correlated with the reimbursement changes

TABLE 1 Study population characteristics

Characteristic	Qualified Medicare Beneficiaries	Other low-income Medicare beneficiaries	P-value[a]
	(n = 1 367 467)	(n = 546 606)	
Male, %	37.8	39.7	0.04
Age, % in category			
<65	45.5	37.8	<0.001[b]
65-69	12.1	14.8	
70-74	11.8	13.8	
75-79	10.4	11.9	
80-84	8.7	10.0	
>84	11.5	11.7	
Race/ethnicity, % in category			
White	55.6	69.7	<0.001[c]
Black	20.4	18.9	
Hispanic	15.3	8.2	
Asian	6.2	1.6	
Other	2.5	1.6	
Disabled, %[d]	55.8	50.9	0.02
End-stage renal disease, %[e]	1.3	1.2	0.26
Count of chronic conditions, mean[f]	4.0	3.7	<0.001
ZCTA-level characteristics (% among those age ≥ 65)[g]			
Living in poverty	12.7	12.2	0.34
With household income <$50k	67.0	67.5	0.52
With less than a high school education	26.2	24.7	0.02
Living alone	28.7	28.5	0.55

Note: This table displays characteristics of QMBs and other low-income Medicare beneficiaries, pooled over the study period (2010-2016).

[a]*P*-value for the difference in means or proportions between Qualified Medicare Beneficiaries and other low-income Medicare beneficiaries. See the methods and Appendix S1 for population definitions. *P*-values are adjusted for clustering within state.

[b]*P*-value for difference between age categories.

[c]*P*-value for difference between white vs non-white beneficiaries.

[d]Disability status assessed from Medicare enrollment data indicating beneficiaries' original reason for Medicare entitlement.

[e]Presence of end-stage renal disease assessed from Medicare enrollment data indicating beneficiaries' current reason for Medicare entitlement.

[f]Number of chronic conditions from the Medicare Chronic Conditions Data Warehouse (CCW), which draws from claims since 1999 to capture beneficiaries' cumulative burden of chronic disease. We assessed presence of 21 chronic conditions in the CCW.

[g]Characteristics of ZIP Code Tabulation Areas (ZCTAs) assessed from the American Community Survey 5-year (2010-2014) pooled estimates file.

we study, and not measured among our covariates. We examine potential bias in supplementary analyses reported below.

Table 2 reports differences-in-differences estimates from model (1). Among QMBs, the phase-in of the fee bump was not associated with differential changes in office visits with primary care providers. Though we observe a differential increase in office visits with all providers, the estimate was small and only marginally statistically significant in models that adjusted for pre-trends (difference-in-differences estimate: 0.08 annual visits; 95% CI: −0.02, 0.18; $P = 0.08$). We found a differential decline in new patient visits among QMBs, although these estimates became smaller in magnitude after we adjusted for pre-trends, suggesting that changes during the fee bump period partly reflected a continuation of pre-trends. Event-study plots, which compare annual changes in office visits between

QMBs and other low-income Medicare beneficiaries relative to 2012, confirm these findings (see Figure S4 in Appendix S1).

Table 3 presents our main triple-differences estimates from model (2). The coefficient of interest is on the triple interaction term (β_1). If the fee bump led to greater increases in office visits in states where payment rates increased for QMBs, then we expect $\beta_1 > 0$. However, our estimates indicated that changes in overall office visits were *not* greater in states where the fee bump increased provider payments for QMBs versus other states. For example, while we found an increase in annual office visits in states without payment increases ($\hat{\beta}_2 = 0.17$; 95% CI: 0.05, 0.29; $P = 0.01$), this increase was actually smaller in the states where the fee bump increased provider payment rates for QMBs vs the states where it did not ($\hat{\beta}_1 = -0.12$, 95% CI: −0.28, 0.04; $P = 0.15$).

TABLE 2 Difference-in-differences estimates of changes in physician office visits among QMBs versus other low-income Medicare beneficiaries from before to after the phase-in of the ACA fee bump

	Office visits (all)				Office visits for new patients			
	Primary care providers		All providers		Primary care providers		All providers	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
β_1: QMB x Post fee bump (2013-14)	−0.012	−0.008	0.061	0.081*	−0.009***	−0.004**	−0.021***	−0.003
	(0.026)	(0.021)	(0.050)	(0.049)	(0.002)	(0.002)	(0.004)	(0.007)
β_2: QMB	0.045	0.048	0.022	0.034	0.003	0.005	0.015**	0.022***
	(0.060)	(0.066)	(0.098)	(0.104)	(0.002)	(0.003)	(0.007)	(0.007)
β_3: Post fee bump (2013-2014)	−0.158***	0.059***	−0.173***	0.206***	0.003	0.001	−0.016***	−0.006
	(0.018)	(0.019)	(0.031)	(0.035)	(0.002)	(0.003)	(0.005)	(0.007)
β_4: QMB x linear time trend		−0.003		−0.010		−0.002*		−0.007**
		(0.011)		(0.016)		(0.001)		(0.003)
Dep. var. mean among QMBs (2010-2012)	3.23		6.39		0.13		0.65	
Adjusted R^2	0.114	0.114	0.180	0.180	0.018	0.018	0.057	0.057

Note: Heteroskedasticity-robust standard errors clustered on state are in parentheses. Analyses based on 1 399 073 beneficiary-years from 2010 to 2014 in 47 states. We excluded observations in New Hampshire and South Dakota, for which we did not have complete data on payment policies for our study period; Tennessee, which does not have a fee-for-service component in is Medicaid program; and Minnesota, because the state amended its payment policies for QMBs in 2012. To limit the influence of outliers, we Winsorized each dependent variable at the 99th percentile of the unadjusted person-year distribution of that variable. We adjusted for state fixed effects, Medicare beneficiaries' age, sex, disability status (original reason for Medicare entitlement), presence of end-stage renal disease, indicators of 21 chronic conditions reported in the Medicare CCW, indicators for the presence of ≥ 6 and ≥ 9 CCW conditions, and area-level characteristics of individuals age 65 and older, measured by ZIP code tabulation area (education, poverty, annual household income <$50 000, and the proportion of individuals living alone) and county (number of primary care physicians per 1000 residents and urbanicity).

Statistical significance is indicated as follows: * $P < 0.1$, ** $P < 0.05$, *** $P < 0.01$.

Figure 1 plots estimates of annual differential changes between QMBs and other low-income Medicare beneficiaries (relative to 2012) for states in which payment rates did versus did not increase under the fee bump (an event-study representation of our triple-differences analysis). Among QMBs, we did not see greater differential increases in office visits in states with substantial payment increases. Office visits with all providers (Panel B) increased to a greater extent among QMBs in states *without* payment increases, consistent with the triple-interaction estimate we obtained for this outcome in Table 3.

Table 4 displays estimates from our other sensitivity analyses. Our results were substantively unchanged when we used a continuous measure of the change in the payment index for QMBs (Panel A); analyzed changes in a ratio of Medicaid to Medicare payment rates rather than the payment index (Panel B); and compared outcomes in year *t* as a function of QMB status (versus other low-income status) as of year *t-2* (Panel C). In each sensitivity analysis, our triple-differences estimate of interest was within 1 standard error of the triple-differences estimates in Table 3. The similarity of estimates in Panel C to those of our main models suggests that our findings were not biased by selection effects.

Finally, our results using non-dual, non-LIS Medicare beneficiaries as controls were consistent with the main results (Table S4 in Appendix S1).

3.1 | Extensions

We pursued two extensions to our analyses, results of which are in the Appendix S1. First, we examined effects of the fee bump's phase-out using a triple-differences analysis and 2013-2016 data. We did not find evidence of reductions in office visits among QMBs versus other low-income Medicare beneficiaries in states where the fee bump's phase-out reduced payment rates for QMBs compared to states where it did not (Table S5 in Appendix S1).

Second, we conducted physician-level analyses to compare changes in office visit volume for QMBs and other low-income beneficiaries before and after the fee bump's phase-in. Because income effects resulting from a rate increase may be more prominent among providers serving higher proportions of duals, we stratified our analyses according to whether physicians had above- versus below-median shares of QMBs in their Medicare patient panels at baseline (2010-2012). We did not find effects of payment rate increases on office visit volume for QMBs in either stratum (Table S6 in Appendix S1).

4 | DISCUSSION

We did not find evidence that physicians' provision of care to low-income Medicare beneficiaries with Medicaid was affected by a

TABLE 3 Triple-difference estimates, using states without substantive payment changes under the fee bump's phase-in as an additional control

	Office visits (all)		Office visits for new patients	
	Primary care providers	All providers	Primary care providers	All providers
β_1: QMB x Payment increase state x Post fee bump (2013-14)	−0.064	−0.124	0.001	0.004
	(0.047)	(0.081)	(0.005)	(0.010)
β_2: QMB x Post fee bump (2013-14)	0.042	0.171**	−0.009*	−0.024**
	(0.037)	(0.054)	(0.005)	(0.009)
β_3: QMB x Payment increase state	0.074	0.0439	0.001	−0.001
	(0.091)	(0.151)	(0.004)	(0.012)
β_4: Payment increase state x Post fee bump (2013-14)	0.015	0.116*	−0.006	0.005
	(0.065)	(0.068)	(0.006)	(0.011)
β_5: QMB	−0.018	−0.015	0.002	0.016
	(0.046)	(0.085)	(0.003)	(0.010)
β_6: Post fee bump (2013-2014)	−0.171***	−0.269***	0.008	−0.020**
	(0.062)	(0.057)	(0.006)	(0.009)
Dep. var. mean among QMBs (2010-2012)	3.23	6.39	0.13	0.65
Adjusted R-squared	0.114	0.179	0.018	0.057

Note: Heteroskedasticity-robust standard errors clustered on state are in parentheses. Analyses based on 1 399 073 beneficiary-years from 2010-2014 in 47 states. In 33 states (labeled *payment increase state* in the table), the ACA fee bump increased provider payments from < 97% to 100% of the Medicare allowed amount for physician office visits. In 14 states, the fee bump had no substantive impact on provider payments. The triple-differences models compared the differential change in each outcome (QMBs versus other low-income Medicare beneficiaries from 2010-2012 to 2013-2014) in the 33 states where the fee bump increased provider payments to analogous changes in the 14 unaffected states. To limit the influence of outliers, we Winsorized each dependent variable at the 99th percentile of the unadjusted person-year distribution of that variable. We adjusted for state fixed effects, characteristics of Medicare beneficiaries, and attributes of beneficiaries' ZIP code tabulations areas and counties as described in the notes to Table 2.

Statistical significance is indicated as follows: * $P < 0.1$, ** $P < 0.05$, *** $P < 0.01$.

2-year Medicaid fee bump that led to large increases in physician payment rates only for these beneficiaries. Our results imply that the short-run supply of physician services to low-income Medicare beneficiaries may not be responsive to payment rate changes and suggest that efforts to increase the provision of physician services to this vulnerable population may need to focus on policy levers other than temporary payment adjustments.

Several factors may explain why we did not detect an effect of the fee bump. First, while payment increases under the fee bump were large in many states, higher prices may have not been sufficient to elicit a supply response if, for example, low-income Medicare beneficiaries were more costly to treat on the margin than higher-income beneficiaries. Second, temporary payment rate increases might have influenced practice patterns given expectations that payment rates would revert to their former levels after two years. Third, to the extent duals already have a usual source of care, a fee change may have little effect on practice patterns with established patients. However, we saw no effect of the fee bump on office visits with new patients.

Our results differ from several prior studies which found positive supply elasticities ranging from 0.5 to 2 in response to Medicare price changes in the full Medicare population.[8,22,23] However, our findings are consistent with a recent study by Fung and colleagues, which did not find any increase in office visits among duals due to the fee bump, either overall or in states with larger or more

sustained payment increases.[13] Our findings also resonate with Chen and Lakdawalla,[25] who found that separate Medicare payment changes led to smaller changes in physician visits among low-income beneficiaries than those with higher incomes. Chen and Lakdawalla hypothesize that this more muted response reflects physicians' recognition that higher prices will result in higher out-of-pocket costs for individuals without supplemental insurance, and that these out-of-pocket costs may be more burdensome to low-income patients. Findings from our setting, in which low-income patients were not exposed to out-of-pocket costs, suggest that smaller supply responses could also be driven by other factors, potentially including the lower marginal profitability of treating duals.

Our study had limitations. First, our estimates could have been biased by unobserved shocks that coincided with the fee bump and differentially affected QMBs and other low-income Medicare beneficiaries or states with substantial versus no payment rate changes. Second, we saw a national trend of increasing office visits (with all provider types) among QMBs that coincided with the period of the fee bump. However, our triple-differences analyses suggest that these utilization increases did not occur in states where provider payment rates increased, suggesting that these changes may be the result of other factors. We are unaware of other policy changes that would have coincided with the timing of the fee bump and produced this pattern of state-level changes. Nevertheless, our study
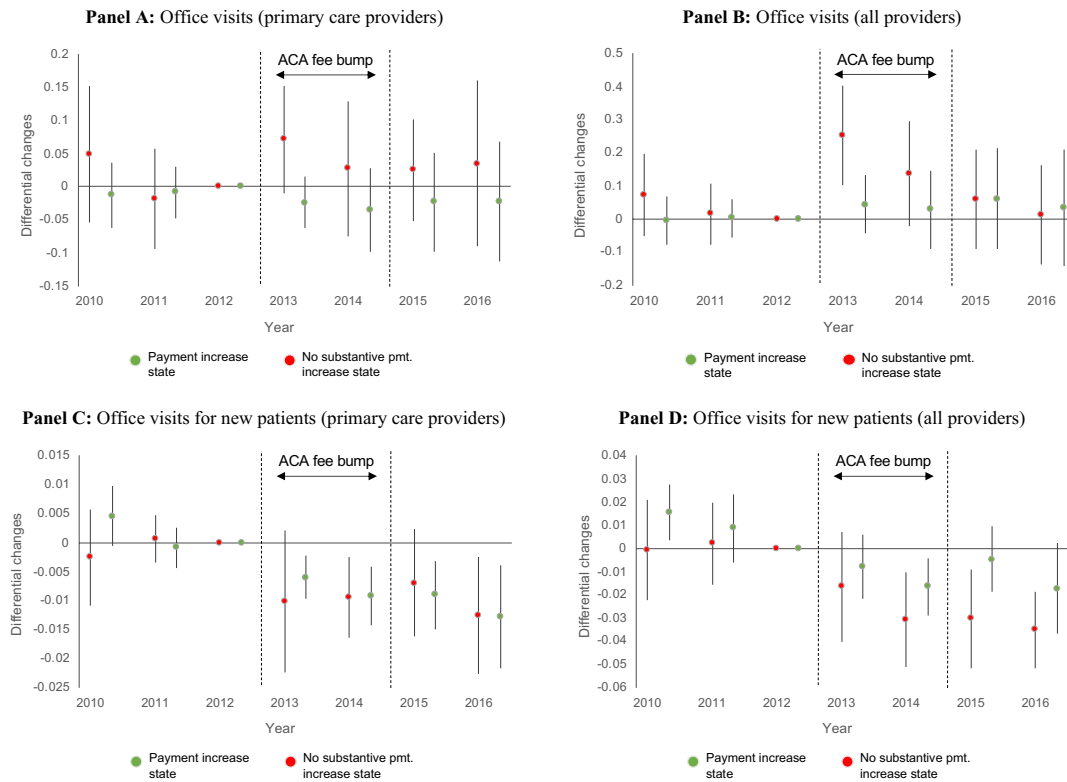
Panel A: Office visits (primary care providers)

Panel B: Office visits (all providers)

Panel C: Office visits for new patients (primary care providers)

Panel D: Office visits for new patients (all providers)

FIGURE 1 Triple-differences event-study estimates. This figures display differential changes in outcomes among QMBs versus other low-income Medicare beneficiaries in each year relative to 2012 between two groups of states: (1) 33 states in which the implementation of the ACA fee bump increased provider payments from < 97% to 100% of the Medicare allowed amount for physician office visits *(plotted in green)*, and (2) 14 states in which the fee bump had no substantive impact on provider payments (payments from Medicare and Medicaid equaled ≥ 97% of the Medicare allowed amount for physician office visits in each year from 2010 to 2012; *plotted in red*). Analyses based on 1 914 073 beneficiary-years from 2010 to 2016 in 47 states. The solid dots are regression estimates and solid vertical bars are 95% confidence intervals, which were estimated using heteroskedasticity-robust standard errors clustered on state. To limit the influence of outliers, we Winsorized each dependent variable at the 99th percentile of the unadjusted person-year distribution of that variable. We adjusted for state fixed effects, characteristics of Medicare beneficiaries, and attributes of beneficiaries' ZIP code tabulations areas and counties as described in the notes to Table 2 [Color figure can be viewed at wileyonlinelibrary.com]

highlights the importance of examining policy changes at a granular level to isolate policy effects from secular trends. Third, our analyses might not capture the effects of nonmonetary factors, such as the administrative burden to providers of separately billing Medicaid for Medicare's cost sharing that could affect the provision of care to QMBs.[41] To the extent nonmonetary costs were constant within states over the duration of our study period (which we regard as plausible), these factors should not bias our estimates as we control for state fixed effects in our regression models. Fourth, because of differences in provider networks, negotiated rates, and the use of copayments (vs coinsurance) in Medicare Advantage and traditional Medicare, our analyses may not generalize to the growing share of duals in Medicare Advantage.

Our findings have policy implications for the coordination and financing of Medicare and Medicaid services for duals. A recurring concern about the structure of these programs is that states, which administer Medicaid and finance a large share of this program's costs, internalize little of the costs of inpatient and outpatient care for duals, which accrue primarily to the federal Medicare program.[42] An implication of this bifurcated structure is that states can adjust

Medicaid payments for duals in response to budget or policy circumstances but are largely insulated from the effects of these changes because *Medicare* bears the preponderance of risk for duals while *Medicaid* is the residual claimant. One policy proposal to avoid these cross-program externalities is to "federalize" Medicaid for duals—that is, to finance Medicaid at the federal level and establish programmatic uniformity in policies for this population.[42]

Our results provide evidence about the effects of Medicaid federalization on the provision of care to duals. This is because the fee bump, which was federally financed and ensured providers were paid at parity with Medicare rates for fee bump-eligible services in all states, in effect represented a limited instance of Medicaid federalization. Our findings imply that federalization, at least of the scope and duration achieved by the fee bump, might not have produced sufficient incentives for physicians to change their provision of care to duals. Moreover, the absence of a first-order effect on the supply of physician services renders unlikely the possibility that this payment change had any downstream effects on care patterns or costs among duals that might have accrued to Medicare (eg, lower Medicare spending on hospitalizations for conditions sensitive to

TABLE 4 Sensitivity analyses of triple-differences model

	Office visits (all)		Office visits for new patients	
	Primary care providers	All providers	Primary care providers	All providers
Panel A: Use continuous measure of payment index[a]				
β_1: QMB x (0.20 x Δ Pmt increase) x Post fee bump (2013-2014)	−0.073	−0.135*	0.000	0.003
	(0.044)	(0.080)	(0.005)	(0.009)
β_2: QMB x Post fee bump (2013-2014)	0.052	0.174**	−0.009*	−0.023**
	(0.043)	(0.059)	(0.005)	(0.008)
Adjusted R-squared	0.114	0.179	0.018	0.057
Panel B: Use change in ratio of Medicaid to Medicare payments for physician office visits[a]				
β_1: QMB x (0.30 x Δ Medicaid to Medicare fee ratio) x Post fee bump (2013-2014)	−0.111**	−0.191**	−0.003	0.005
	(0.042)	(0.071)	(0.005)	(0.008)
β_2: QMB x Post fee bump (2013-2014)	0.136**	0.299***	−0.003	−0.025**
	(0.062)	(0.106)	(0.006)	(0.011)
Adjusted R-squared	0.114	0.179	0.018	0.057
Panel C: Compare outcomes among established QMBs vs other low-income Medicare beneficiaries (enrollment status in year t-2)[b]				
β_1: Established QMB x Payment increase state x Post fee bump (2013-2014)	−0.109*	−0.170*	0.002	0.007
	(0.056)	(0.107)	(0.004)	(0.008)
β_2: Established QMB x Post fee bump (2013-2014)	0.109**	0.220**	−0.008*	−0.015**
	(0.049)	(0.086)	(0.004)	(0.007)
Adjusted R-squared	0.118	0.187	0.018	0.062

Note: Heteroskedasticity-robust standard errors clustered on state are in parentheses. For brevity, this table shows only the triple-differences estimate (β_1 in model 2, the main estimate of interest) and the difference-in-differences estimate for the change in the outcome in states where implementation of the fee bump did *not* increase provider payment rates (β_2 in model 2). To limit the influence of outliers, we Winsorized each dependent variable at the 99th percentile of the unadjusted person-year distribution of that variable. We adjusted for state fixed effects, characteristics of Medicare beneficiaries, and attributes of beneficiaries' ZIP code tabulations areas and counties as described in the notes to Table 2. Statistical significance is indicated as follows: * $P < 0.1$, ** $P < 0.05$, *** $P < 0.01$.

[a]Analyses in Panels A and B based on 1 399 073 beneficiary-years from 2010 to 2014 in 47 states.

[b]Analyses in Panel C based on 1 129 582 beneficiary-years from 2010 to 2014 in 47 states.

ambulatory care management)—one policy rationale for federalization. However, our findings do not rule out the possibility that other potentially more expansive or lasting payment changes would have more substantial effects on care patterns or expenditures for this population.

In summary, we did not find that a one-time roughly 20% increase in payments for physician office visits for low-income Medicare beneficiaries with Medicaid affected the provision of care to these patients. Our results imply that the supply of physician services to low-income Medicare beneficiaries may not be responsive to short-run price changes. Efforts to increase the provision of physician services to this population may need to focus on policy levers other than temporary payment adjustments.

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SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section.