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RESEARCH ARTICLE

The Role of Medicare's Inpatient Cost-Sharing in Medicaid Entry

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Objective. To isolate the effect of greater inpatient cost-sharing on Medicaid entry among Medicare beneficiaries.

Data Sources. Medicare administrative data (years 2007–2010) were linked to nursing home assessments and area-level socioeconomic indicators.

Study Design. Medicare beneficiaries who are readmitted to a hospital must pay an additional deductible (\$1,100 in 2010) if their readmission occurs more than 59 days following discharge. In a regression discontinuity analysis, we take advantage of this Medicare benefit feature to test whether beneficiaries with greater cost-sharing have higher rates of Medicaid enrollment.

Data Extraction Methods. We identified 221,248 Medicare beneficiaries with an initial hospital stay and a readmission 53–59 days later (no deductible) or 60–66 days later (charged a deductible).

Principal Findings. Among beneficiaries in low-socioeconomic areas with two hospitalizations, those readmitted 60–66 days after discharge were 21 percent more likely to join Medicaid compared with those readmitted 53–59 days following their initial hospitalization (absolute difference in adjusted risk of Medicaid entry: 3.7 percent vs. 3.1 percent, $p = .01$).

Conclusions. Increasing Medicare cost-sharing requirements may promote Medicaid enrollment among low-income beneficiaries. Potential savings from an increased cost-sharing in the Medicare program may be offset by increased Medicaid participation.

Key Words. Medicare, Medicaid, cost-sharing

Several Medicare reform proposals recommend increasing beneficiaries' cost-sharing to reduce the use of unnecessary medical services and associated Medicare spending (Jacobson 2014). Such proposals, though, should consider the impact of increased cost-sharing in the Medicare program on total health care spending, including expenditures in the Medicaid program. Low-income Medicare beneficiaries could respond to higher out-of-pocket costs by seeking financial assistance from Medicaid, which is required to cover Medicare cost-sharing requirements for beneficiaries with income below the federal poverty

level (Kaiser Commission on Medicaid and the Uninsured 2010). Furthermore, if the number of Medicaid enrollees in the Medicare population increases, fewer Medicare beneficiaries will be exposed to Medicare cost-sharing, which could increase their use of Medicare services. If this combination leads to greater Medicaid and Medicare spending among low-income beneficiaries, then those expenditures would offset any potential Medicare savings from greater cost-sharing.

Greater Medicare out-of-pocket costs could boost Medicaid enrollment in two ways. First, being exposed to large medical bills might prompt eligible beneficiaries who have not yet enrolled in Medicaid to seek out and apply for financial assistance. Partial Medicaid benefits (income limit between 100 and 135 percent FPL in most states) cover Medicare premiums and, for some beneficiaries, cost-sharing. Full Medicaid benefits (income limit between 75 and 100 percent in most states) covers Medicare-related out-of-pocket costs as well as services that are not covered by Medicare, such as long-term care (Kaiser Commission on Medicaid and the Uninsured 2010). A large share of beneficiaries who are eligible for partial Medicaid do not actually enroll (Haber et al. 2003; Congressional Budget Office 2004; Medicare Payment Advisory Commission 2008; Zuckerman, Shang, and Waidmann 2009; Dorn and Shang 2012). Several factors impede enrollment, including beneficiaries' lack of awareness that these benefits exist and difficulty navigating the application process (Perry, Kannel, and Dulio 2002; Haber et al. 2003; Medicare Payment Advisory Commission 2008). The value beneficiaries place on Medicaid coverage, and its protection from out-of-pocket costs, is likely to increase if Medicare cost-sharing increases.

Second, greater Medicare cost-sharing could alter beneficiaries' eligibility for Medicaid coverage. Some beneficiaries meet the income test for Medicaid, but their total assets (other than a house and automobile) exceed the eligibility limit (Zuckerman, Shang, and Waidmann 2009; Dorn and Shang 2012). If these beneficiaries pay Medicare out-of-pocket costs from their savings, then greater cost-sharing will drain their savings at a faster rate. The majority of states allow beneficiaries to deduct medical expenses from their income to qualify for full Medicaid (Kaiser Commission on Medicaid and the

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Uninsured 2010). Because Medicare-related out-of-pocket costs can be counted as a medical expense in some states, larger Medicare cost-sharing requirements could result in greater participation in these programs.

Determining whether greater Medicare cost-sharing leads to increased Medicaid participation is challenging because of the connection between medical expenses and health. Beneficiaries with substantial health care needs typically have higher out-of-pocket spending and are also more likely to enroll in Medicaid, which makes it difficult to isolate the effect of out-of-pocket costs. There are mixed findings about whether Medicare beneficiaries in poor health are more likely to obtain supplemental coverage, such as a Medigap plan or retiree benefits, which would cover Medicare out-of-pocket costs (Wolfe and Goddeeris 1991; Ettner 1997; Atherly 2001; Fang, Keane, and Silverman 2008; Lemieux, Chovan, and Heath 2008). That possible association further complicates any examination of how Medicare cost-sharing relates to Medicaid enrollment.

This study takes the advantage of an exogenous source of variation in Medicare inpatient cost-sharing to isolate the effect of out-of-pocket costs on Medicaid enrollment. We compare Medicaid entry for beneficiaries with similar hospitalization patterns but different cost-sharing requirements. We hypothesize that low-income beneficiaries who are less likely to have supplemental coverage will have increased Medicaid enrollment in response to greater cost-sharing requirements.

BACKGROUND: PART A BENEFIT PERIOD AND ASSOCIATED DEDUCTIBLES

For Medicare Part A enrollees, hospital cost-sharing requirements depend on the timing of their inpatient stays and readmissions. The Part A deductible (\$1,288 as of 2016) is charged at the beginning of each “benefit period.” A benefit period starts when a beneficiary is admitted to the hospital and ends when a beneficiary has been home from the hospital or a postacute skilled nursing facility for at least 60 days (Center for Medicare and Medicaid Services 2014).

Because of this benefit structure, Medicare beneficiaries who are readmitted to a hospital can have very different out-of-pocket costs depending on the timing of the readmission. For example, consider the cost-sharing implications for a beneficiary with an initial hospitalization that starts a benefit period. If this beneficiary is rehospitalized 59 days after she was initially discharged from the hospital, her second hospital stay will be in the same benefit period

and thus not subject to a new deductible. However, if she is readmitted to the hospital 61 days after being discharged, her second hospital stay will be in a new benefit period and she will have to pay a second deductible.

During the time period of our study (2007–2010), the amount of the Part A deductible ranged from \$992 to \$1,100 (CMS 2014). To put this amount in context, the average monthly amount of a Social Security retirement benefit at the start of our study period was \$1,079 (U.S. Social Security Administration 2009) and the monthly income for an individual at 125 percent of the federal poverty level was \$1,064 (Office of the Assistant Secretary for Planning and Evaluation 2010). An extra deductible was equivalent to a month's income for many low-income beneficiaries. Most Medicare beneficiaries have supplemental insurance and have little or no out-of-pocket costs for a second deductible. Low-income beneficiaries, however, are less likely to have supplemental insurance (Atherly 2001) and may have difficulty affording a second deductible. About 16 and 20 percent of Medicare beneficiaries in 2011 with annual income below \$10,000 and \$20,000, respectively, had no supplemental insurance compared to 9 percent of beneficiaries with income above \$50,000 (AHIP Center for Policy and Research 2013).

The key assumption of our study is that beneficiaries readmitted to a hospital within the 7 days before or 7 days after the 60-day benefit period threshold have similar characteristics except for this difference in deductible costs. Among beneficiaries who had two hospital stays, we compare beneficiaries' probability of enrolling in Medicaid based on whether their second hospital stay was likely to have a second deductible.

METHODS

The Medicare Master Beneficiary Summary File (MBSF) provided information on beneficiaries' demographic characteristics and Medicaid participation between January 2007 and July 2011 (Chronic Condition Data Warehouse 2014). Part A claims and Minimum Data Set records identified beneficiaries' hospitalizations, skilled nursing facility (SNF) use, and non-SNF nursing home use for the years 2007–2010 (Intrator et al. 2011).

Study members lived in the 50 states and had at least a 6-month period without full Medicaid benefits, Medicare Advantage membership, or hospital use. Following that run-in period, we identified beneficiaries with an index hospitalization and readmission in the week before or after the 60-day new benefit period threshold. All hospitalizations occurred between July 2007 and

December 2010. Because SNF use affects the length of benefit periods, we excluded beneficiaries who had a SNF stay between hospitalizations.

Because Medicare administrative data do not provide information on income, we linked beneficiaries' residential zip code to multiple area-level socioeconomic (SES) indicators and applied an SES index developed for Medicare beneficiaries (Bonito et al. 2008). Based on that index, we divided the study population into quartiles to focus on the lowest and highest SES quartiles. To examine whether these quartiles were a reasonable proxy for identifying beneficiaries with fewer financial resources, we applied the same SES index to respondents for the 2007–2010 Medicare Current Beneficiary Survey (MCBS). This survey is a representative survey of Medicare beneficiaries and provides information that is not available in Medicare administrative data, such as respondents' income and supplemental coverage. MCBS survey respondents in the lower SES quartile were less likely to have supplemental coverage for Medicare benefits (26 percent) than beneficiaries in the highest SES quartile (9 percent). MCBS survey respondents in the lower SES quartile also had lower income and were more likely to have had less than a high school education. This combination of factors suggests that the SES index and associated quartiles are a reasonably proxy for identifying beneficiaries who were more likely to have difficulty affording a second inpatient deductible.

We identified 251,311 beneficiaries with two hospitalizations that met the 60-day timing requirements and had no intervening SNF stays. The first hospitalization's length of stay had to be 60 days or less. If beneficiaries had multiple hospitalizations that met the entry criteria, we only included the initial qualifying instance. We excluded beneficiaries with Medicare Advantage participation in the 6 months prior to their first hospitalization or who joined Medicaid before their second hospitalization. Additional exclusion criteria included qualifying for Medicare due to end-stage renal disease and missing Medicaid or zip code socioeconomic data. To exclude potential nursing home residents, we excluded beneficiaries who used any SNF or nursing home care prior to their first hospitalization. The final sample included 221,248 beneficiaries with 55,338 and 55,296 beneficiaries, respectively, in the lowest and highest SES quartiles.

The primary study outcome is whether beneficiaries joined Medicaid within 3 months of their second hospital admission date. The 3-month period allows time for beneficiaries to receive hospital bills and apply for Medicaid. We also examined whether Medicaid enrollment differed 6 months after the second hospitalization. We defined Medicaid entry as transitioning from no

prior Medicaid to any level of Medicaid benefits or transitioning from partial to full Medicaid.

Using logistic regression, we modeled whether beneficiaries whose second hospitalization is in a new benefit period, and therefore subject to an additional deductible, were more likely to join Medicaid. We employed a regression discontinuity approach and included trend variables (the number of days between hospitalizations and the square of that term) to adjust for any incremental differences in beneficiaries' health or other characteristics as the time between hospitalizations widened.

Our results can be interpreted as the estimated effect of being charged an extra deductible on Medicaid enrollment if the following three conditions are met (Imbens and Lemieux 2007). First, we must confirm that the percentage of beneficiaries charged a second deductible increased from approximately 0 to 100 percent when comparing readmissions before and after the 60-day benefit period threshold. Second, beneficiaries must not be purposefully timing their second hospital stay to avoid the deductible. Finally, there cannot be other abrupt shifts in beneficiaries' characteristics or health care use at the 60-day threshold that would influence Medicaid enrollment. Although we cannot directly test these latter two assumptions, we examined whether the observable characteristics of beneficiaries differed depending on the timing of readmission.

Our model included several covariates to increase precision: age, sex, race, originally qualifying for Medicare due to disability (interacted with the age variable), prescription drug coverage, and Part D Low Income Subsidy participation as of the month prior to beneficiaries' first hospitalization. Additional variables characterize a beneficiary's first hospitalization: admission year, linear and quadratic terms for length of stay, and what day of the month beneficiaries were admitted to the hospital. Standard errors are clustered at the state level. For our main variable, we calculated the adjusted risk difference and adjusted relative risk of Medicaid entry associated with having a second hospitalization in a new benefit period (Norton, Miller, and Kleinman 2013). We also present these estimates for each covariate in the model. This approach takes into account interaction terms, as well as higher order terms of continuous variables.

We estimated the model separately for individuals in the lowest and highest SES quartile. We hypothesized that beneficiaries in the lowest SES quartile had an increased likelihood of enrolling in Medicaid if their second hospitalization was in a new benefit period and subject to a new deductible. For beneficiaries in the top quartile, the 60-day threshold should have no effect

because these beneficiaries are more likely to be able to afford the deductible or have supplemental coverage.

As a sensitivity analysis, we analyzed the results separately for beneficiaries in the lowest socioeconomic quartile depending on whether they originally qualified for Medicare due to disability or aged into Medicare. We also repeated the analysis excluding any beneficiaries who enrolled in Medicaid in the same month as their second hospital stay. We only have monthly indicators of Medicaid participation, and beneficiaries may have joined Medicaid at the beginning of the month before their second hospitalization. We also tested whether our results were sensitive to excluding beneficiaries who previously had partial Medicaid or Part D LIS. These beneficiaries may already have applied for greater Medicaid benefits or may not have to pay the second deductible.

Our results would be biased if some other factor that influenced Medicaid enrollment changed abruptly on day 60. To address this limitation, we have conducted multiple sensitivity analyses to see whether there are any indications that beneficiaries readmitted before or after 60 days systematically vary other than being charged an extra deductible. These analyses are detailed in Appendix SA2. Briefly, we confirmed that the characteristics of beneficiaries were similar regardless of whether they were readmitted before or after the 60-day threshold. We tested including state fixed effects in the model, which was not our preferred specification because some states with small numbers of beneficiaries in our study sample are excluded in this approach. We also checked whether our results were also robust to limiting the number of covariates in the model and shortening the length of the window around the 60-day threshold from 7 days to 5 days. Finally, we performed falsification tests that pretended the benefit period threshold was at 30 days or 90 days.

RESULTS

Characteristics of Study Population

Several differences between beneficiaries in the lowest and highest SES quartile suggest that these groups may respond differently to Medicare cost-sharing (Table 1). Compared with beneficiaries in the highest SES quartile, beneficiaries in the lowest SES quartile were more than twice as likely to have originally qualified for Medicare due to disability (30 percent vs. 14 percent, $p < .001$). The percentage of beneficiaries participating in the Part D LIS program or partial Medicaid was four times higher in the lowest SES quartile (20 percent

Table 1: Population Characteristics by Socioeconomic Quartile

	<i>All</i>	<i>Lowest Quartile</i>	<i>Highest Quartile</i>
Number	221,248	55,338	55,296
Age (mean)	73.0	71.2	74.8***
Female (%)	51	51	51
Race (%)			
White	89	80	93***
Black	8	17	4
Other	2	3	3
Qualified for Medicare due to disability (%)	21	30	14***
Prescription drug coverage or financial assistance (%)			
Part D plan	35	32	37***
Alternative prescription drug coverage	40	34	43
No prescription drug coverage	15	15	15
Part D Low Income Subsidy (Partial)	2	2	1
Part D Low Income Subsidy (Full)	3	6	2
Limited Medicaid (Part B premium)	3	5	1
Limited Medicaid (Cost-sharing)	3	7	1
Days between hospitalizations (mean)	59.3	59.3	59.3**
Length of index hospital stay (mean)	6.1	6.2	6.0***
Second inpatient stay in new benefit period (%)	48	49	48

Notes. Based on author's analysis of Medicare enrollment and claims data. Difference between beneficiaries in the lower and higher socioeconomic quartile different at: * $p < .05$ level; ** $p < .01$ level; *** $p < .001$ level.
SES, socioeconomic.

vs. 5 percent in the highest SES quartile, $p < .001$). There was no significant difference between the quartiles in whether beneficiaries' second hospitalization occurred after the 60-day threshold, which is a reassuring sign that beneficiaries in the lowest SES quartile probably did not time their hospital readmissions to avoid a second deductible.

To confirm the basic premise of our analysis, we plotted the average deductible amount charged to beneficiaries for their second hospitalization by the number of days between a beneficiary's first discharge date and readmission date. At the 60-day benefit period threshold, the average deductible charge increases by about \$1,000 (Figure 1). Only 1.8 percent of beneficiaries readmitted before the 60-day benefit period threshold were charged a deductible for their second hospital stay compared to 97.7 percent of beneficiaries readmitted after 60 days.

By 3 months after the second admission date, there was a small, marginally significant difference in Medicaid entry among beneficiaries in the lowest SES quartile depending on whether their readmission was subject to a deductible because it happened more than 60 days after their initial hospitalization

Figure 1: Part A Mean Deductible Charges by Day of Readmission

Notes. Based on author's analysis of Medicare enrollment and claims data. Part A deductible ranged between \$992 and \$1,100 during the study period. [Color figure can be viewed at wileyonlinelibrary.com]

(Figure 2). The proportion of beneficiaries joining Medicaid was 3.5 percent among those individuals whose second hospital stay was more than 60 days after their first hospitalization and 3.2 percent among beneficiaries readmitted in less than 60 days following discharge (unadjusted between-group difference of 0.30 percentage points [95 percent CI: 0.00, 0.60 percentage points]; $p = .05$). By 6 months after the second admission date, Medicaid entry was still marginally more common among beneficiaries whose second hospital stay was subject to a deductible (unadjusted between-group difference of 0.32 percentage points [95 percent CI: -0.03 , 0.68 percentage points]; $p = .08$).

Only 1.3 percent of beneficiaries in the highest SES quartile enrolled in Medicaid within 3 months of their second hospital admission. There was no significant difference in Medicaid entry at 3 months or 6 months when comparing beneficiaries whose second hospital stay initiated a new benefit period or not.

In our adjusted results, beneficiaries in the lowest SES quartile had a 21 percent increase in relative risk of Medicaid entry within 3 months if they were readmitted after the 60-day threshold in a new benefit period (Table 2,

Figure 2: Cumulative Medicaid Enrollment (Unadjusted) for Beneficiaries with Second Admission in Same or New Benefit Period, by Month and Socioeconomic Quartile

Notes. Based on author's analysis of Medicare enrollment and claims data. SES, socioeconomic. [Color figure can be viewed at wileyonlinelibrary.com]

adjusted relative risk 95 percent CI: 1.03, 1.40; $p = .01$). The absolute adjusted difference in Medicaid entry between these two groups was 0.66 percentage points (Figure 3, 95 percent CI: 0.15, 1.17). At 6 months after beneficiaries' second hospitalizations, there was still a significant difference in Medicaid enrollment rates depending on the timing of the readmission. The results are insignificant for beneficiaries in the highest SES quartile.

Several other factors predicted greater likelihood of Medicaid enrollment regardless of whether the second hospitalization occurred before or after the 60-day threshold (Table 2). These factors include originally qualifying for Medicare due to disability and a longer length of stay for the beneficiary's first hospitalization. Previous participation in the Part D LIS program or partial Medicaid was associated with a greater probability of transitioning to full Medicaid.

Findings were consistent across several sensitivity analyses for subpopulations of beneficiaries within the lowest socioeconomic quartile. When we examined results separately depending upon beneficiaries' reason for

Table 2: Adjusted Relative Risk of Medicaid Entry within Three Months by Socioeconomic Quartile

	<i>All</i> <i>N</i> = 221,248	<i>Lowest SES Quartile</i> <i>N</i> = 55,338	<i>Highest SES Quartile</i> <i>N</i> = 55,296
Readmitted in new benefit period (Readmitted 60–66 days after discharge)	1.05 (0.95,1.15)	1.21* (1.03,1.40)	0.97 (0.70,1.23)
Days since first discharge	1.25 (0.92,1.58)	1.45 (0.79,2.11)	1.27 (0.64,1.89)
Demographic characteristics			
Aged into Medicare (ref.)	—	—	—
Medicare due to disability	1.36*** (1.25,1.48)	1.29*** (1.15,1.43)	1.65*** (1.30,2.01)
Age (Aged into Medicare)	1.03*** (1.02,1.04)	1.03*** (1.02,1.04)	1.04*** (1.03,1.05)
Age (Qualified for Medicare due to disability)	0.99*** (0.98,0.99)	0.99** (0.98,1.00)	0.99** (0.98,1.00)
Male (ref.)	—	—	—
Female	1.16*** (1.08,1.24)	1.06 (0.97,1.16)	1.23** (1.04,1.43)
Race: White (ref.)	—	—	—
Black	1.49*** (1.34,1.63)	1.46*** (1.31,1.61)	1.79*** (1.31,2.27)
Other race	1.48*** (1.24,1.72)	1.48*** (1.17,1.79)	1.97*** (1.52,2.43)
SES index (0–100)	0.97*** (0.97,0.98)	0.99 (0.95,1.03)	0.96*** (0.96,0.97)
Prescription drug coverage or financial assistance			
Part D plan (ref.)	—	—	—
Alternate drug coverage	0.52*** (0.46,0.58)	0.50*** (0.41,0.59)	0.55*** (0.41,0.70)
No drug coverage	1.57*** (1.40,1.74)	1.74*** (1.52,1.96)	1.49*** (1.21,1.76)
Part D LIS (Full subsidy)	4.55*** (4.10,5.00)	3.54*** (3.03,4.05)	6.41*** (4.99,7.83)
Part D LIS (Partial subsidy)	3.18*** (2.57,3.78)	2.07*** (1.44,2.70)	5.53*** (3.27,7.79)
Limited Medicaid (Part B premium)	4.00*** (3.28,4.71)	2.89*** (2.33,3.45)	5.99*** (4.27,7.71)
Limited Medicaid (Cost-sharing)	3.15*** (2.42,3.88)	2.37*** (1.85,2.89)	3.50*** (1.94,5.05)
Characteristics of initial hospital stay			
Length of first stay	1.05*** (1.04,1.06)	1.04*** (1.02,1.05)	1.06*** (1.03,1.09)
Day of month, first discharge (1–31)	1.00 (0.98,1.01)	1.01 (0.99,1.03)	0.98 (0.95,1.01)
Year, first discharge			
2007 (ref.)	—	—	—
2008	1.02 (0.92,1.11)	1.07 (0.95,1.19)	1.07 (0.84,1.30)
2009	1.09* (1.00,1.18)	1.10 (0.97,1.22)	1.36*** (1.15,1.57)
2010	1.08 (0.97,1.20)	1.06 (0.91,1.20)	1.44*** (1.13,1.75)

Notes. Based on author's analysis of Medicare enrollment and claims data. Results are presented at adjusted relative risk from logistic regression model. Different from zero at: * $p < .05$ level; ** $p < .01$ level; and *** $p < .001$ level.

Part D LIS, part D low-income subsidy; SES, socioeconomic.

Medicare benefits, we still observed a similar effect size estimate for beneficiaries who aged into Medicare, although the confidence intervals have widened (Table S1, adjusted relative risk 1.27 [95 percent CI: 0.99, 1.55], $p = .04$).

Figure 3: Adjusted Difference in Medicaid Entry within Three and Six Months for Beneficiaries Readmitted in New Benefit Periods

Notes. Based on author's analysis of Medicare enrollment and claims data. Differences adjusted for beneficiaries' demographic characteristics, participation in financial assistance programs, prescription drug coverage, socioeconomic index, days between hospitalizations, and attributes of first hospital stay. [Color figure can be viewed at wileyonlinelibrary.com]

Results were positive, but no longer significant for the relatively small number of beneficiaries in the lowest socioeconomic quartile who qualified for Medicare due to disability (adjusted relative risk ratio of 1.15 [95 percent CI: 0.87, 1.43], $p > .05$). The adjusted difference does not change when the lowest SES quartile cohort excludes beneficiaries who enrolled in Medicaid or died in the same month as their second hospitalization. The adjusted differences also change only slightly when beneficiaries with previous forms of financial assistance are excluded from the study cohort (Figure S1).

We performed numerous sensitivity analyses to rule out other explanations for why beneficiaries' Medicaid entry might differ (Appendix SA2). There was no surge of readmissions prior to the 60-day threshold, and the characteristics of beneficiaries did not change abruptly at the 60-day threshold. These findings suggest that beneficiaries were not timing their second hospitalization to avoid a deductible and that there are no other observable differences, besides the extra deductible, that could explain the difference in Medicaid enrollment rates. When we included state fixed effects in the model, we found similar results. Our results were also robust to changing the

covariates in the model and testing shorter windows around the 60-day threshold. For beneficiaries in the lowest SES quartile, we found no effect when we performed falsification tests that pretended the benefit period threshold was at 30 days or 90 days.

DISCUSSION

Among Medicare beneficiaries with two hospitalizations, we compared entry into Medicaid among two nearly identical groups of beneficiaries who were exposed to different amounts of cost-sharing due to a technical feature of Medicare's benefit policy. When charged approximately \$1,000 more in inpatient cost-sharing, we found that low-income beneficiaries had Medicaid enrollment rates within 3 months of hospital readmission that were 23 percent higher than low-income beneficiaries without additional inpatient charges. Although it is difficult to establish a causal effect with observational data, almost all robustness checks for the analysis indicate that the difference in deductible charges was the main factor influencing Medicaid enrollment rates. In contrast, greater cost-sharing requirements had no impact on Medicaid enrollment for beneficiaries living in high-socioeconomic areas.

To our knowledge, this is the first study to examine whether increased Medicare cost-sharing impacts Medicaid enrollment. Studies in younger populations have suggested that increased Medicaid premiums or greater Medicaid cost-sharing requirements can deter Medicaid enrollment (Sommers et al. 2012; Abdus et al. 2014; Dague 2014), which suggests potential Medicaid enrollees are influenced by expected out-of-pockets. These studies often rely on variation across states or time to make comparisons, which could be linked to other unmeasured factors that influence Medicaid enrollment. One of the strengths of this national study is that we can compare individuals who are subject to the same Medicaid eligibility rules within the same state and time period.

Our study's main limitation is that there could still be unobserved differences between people whose hospital readmissions fall within a week on either side of the 60-day benefit period threshold. However, in multiple sensitivity analyses, we found no evidence that there were other factors or other beneficiary characteristics that might be explaining our results. Because we relied on administrative data sources, we could not directly observe beneficiaries' income, assets, or supplemental insurance coverage and instead had to rely on area-level information about socioeconomic resources. If we had

individual-level data, we could more precisely identify whether low-income beneficiaries are more likely to be impacted by greater cost-sharing and could directly observe whether beneficiaries' eligibility for Medicaid, not just their participation, actually changed with greater out-of-pocket costs. Finally, we only examine Medicaid entry and not whether beneficiaries remained in the Medicaid program long-term.

An additional study limitation is that we examined the impact of cost-sharing on Medicaid enrollment in a very narrowly defined population. All study members had recently been charged a deductible for their first hospitalization, which might have made them more responsive to additional cost-sharing requirements for a second hospitalization. An extra \$1,000 in Medicare cost-sharing could have a different impact on Medicaid enrollment in other settings, such as outpatient care, where there may be less access to hospital-based resources that steer beneficiaries to financial assistance programs. Furthermore, providers in different settings face varying financial incentives for their low-income patients to gain Medicaid benefits, which may influence how frequently they refer beneficiaries to Medicaid or assist with applications. Being reimbursed by Medicaid may be an improvement over bearing beneficiaries' unpaid cost-sharing debts, but many state Medicaid programs do not reimburse providers for the full Medicare cost-sharing amount (Medicaid and CHIP Payment and Access Commission 2015).

Previous research has demonstrated that changing Medicare cost-sharing may not necessarily result in lower overall costs. In reviewing the evidence on cost-sharing for older populations, one common concern is that the landmark RAND study excluded adults older than 62, so it is not clear whether its finding that higher cost-sharing leads to reduced medical expenditures is generalizable to Medicare beneficiaries (Manning et al. 1987; Rice and Matsuoka 2004; Swartz 2010). When retirees faced higher outpatient and pharmaceutical cost-sharing requirements, they reduced the use of these services but increased the use of expensive inpatient care, which offset outpatient savings (Chandra, Gruber, and McKnight 2010). A similar pattern was observed when increased outpatient copayments in Medicare Advantage plans resulted in fewer outpatient visits and greater inpatient use (Trivedi, Moloo, and Mor 2010).

Further evidence on whether Medicare cost-sharing influences Medicaid enrollment is needed to inform debates about restructuring Medicare benefits, especially given previous examples of how Medicare and Medicaid often shift costs to each other without reducing overall medical spending for low-income beneficiaries (Grabowski 2007; Frank 2013). Several Medicare reform

proposals suggest combining the Part A and B deductibles and no longer tying the inpatient deductible to the 60-day threshold (Jacobson 2014). In effect, this reform would decrease out-of-pocket costs for beneficiaries with an inpatient stay but would slightly increase out-of-pocket costs for the majority of Medicare beneficiaries who only use outpatient services in a given year (Cubanski et al. 2011). Our findings suggest that reducing out-of-pocket costs for inpatients may prevent Medicaid enrollments caused by paying multiple deductibles. However, an increase in outpatient cost-sharing would impact a greater number of Medicare beneficiaries. We are not aware of any studies that examine whether outpatient cost-sharing spurs Medicaid enrollment, which is an important question for being able to predict the impact of cost-sharing reforms.

A fundamental question that still needs to be addressed is how Medicare cost-sharing impacts Medicare and Medicaid spending, and access to services, for low-income beneficiaries. Once enrolled in Medicaid, many beneficiaries will no longer face any cost-sharing for Medicare services, which suggests that they will face few financial access barriers to care and their medical costs could increase. Having Medicaid coverage, though, could limit access to care in other ways. For example, in states where providers are not reimbursed in full for Medicare cost-sharing amounts, lower payment rates for dual-eligible beneficiaries may make providers less willing to accept dual-eligible beneficiaries (Medicaid and CHIP Payment and Access Commission 2015).

This study found evidence that low-income Medicare beneficiaries are more likely to enroll in Medicaid when faced with higher cost-sharing for an inpatient stay. Potential savings from increased cost-sharing in the Medicare program may be offset by increased enrollment by low-income beneficiaries in Medicaid.

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SUPPORTING INFORMATION

Additional supporting information may be found online in the supporting information tab for this article:

Appendix SA1: Author Matrix.

Appendix SA2: Robustness Checks.

Table S1: Adjusted Relative Risk of Medicaid Entry within Three Months for Beneficiaries in the Lowest Socioeconomic Quartile, by Reason for Medicare Eligibility.

Table S2: Lowest Socioeconomic Quartile—Estimated Effect with Different Model Specifications.

Table S3: Lowest Socioeconomic Quartile: Estimated Effect with Varying Inclusion Criteria for Window at Benefit Period Threshold.

Table S4: Estimated Effect with False Benefit Period Thresholds, by Socioeconomic Quartile.

Figure S1: Lowest Socioeconomic Quartile: Adjusted Difference in Medicaid Entry within Three Months for Beneficiaries with Second Hospital Admission in Different Benefit Periods.

Figure S2: Lowest Socioeconomic Quartile: Adjusted Difference in Medicaid Entry within Six Months for Beneficiaries with Second Hospital Admission in Different Benefit Periods.

Figure S3: Highest Socioeconomic Quartile: Adjusted Difference in Medicaid Entry within Three Months for Beneficiaries with Second Hospital Admission in Different Benefit Periods.

Figure S4: Highest Socioeconomic Quartile: Adjusted Difference in Medicaid Entry within Six Months for Beneficiaries with Second Hospital Admission in Different Benefit Periods.

Figure S5: Lowest Socioeconomic Quartile, Number of Readmissions per Day.

Figure S6: Lowest Socioeconomic Quartile—Characteristics by Day of Readmission.