Medication Adherence and Healthcare Disparities: Impact of Statin Co-Payment Reduction

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ABSTRACT

Objectives: Minority patients have lower rates of cardiovascular medication adherence, which may be amenable to co-payment reductions. Our objective was to evaluate the effect of race on adherence changes following a statin co-payment reduction intervention.

Study Design: Retrospective analysis.

Methods: The intervention was implemented by a large self-insured employer. Eligible individuals in the intervention cohort (n = 1961) were compared with a control group of employees of other companies without such a policy (n = 37,320). As a proxy for race, we categorized patients into tertiles based on the proportion of black residents living in their zip code of residence. Analyses were performed using difference-in-differences design with generalized estimating equations.

Results: Prior to the new co-payment policy, adherence rates were higher for individuals living in areas with fewer black residents. In multivariable models adjusting for demographic factors, clinical covariates and baseline trends, the co-payment reduction increased adherence by 2.0% ($P = .14$), 2.1% ($P = .15$) and 6% ($P < .0001$) for intervention patients living in areas with the bottom, middle and top tertiles of the proportion of black residents. These results persisted after adjusting for income.

Conclusions: Co-payment reduction for statins preferentially improved adherence among patients living in communities with a higher proportion of black residents. Further research is needed on the impact of value-based insurance design programs on reducing racial disparities in cardiovascular care.

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Differences in the use of evidence-based cardiovascular (CV) therapies, such as percutaneous coronary intervention and bypass surgery, are believed to contribute to the persistent racial and ethnic disparities in patients with coronary artery disease.[1-6] Lower rates of long-term adherence to evidence-based medications, including statins, that are likely to be clinically significant, have been documented among racial/ethnic minorities.[7-9] This has been found even when controlling for income, and may be amenable to intervention.[10-12]

While many factors contribute to nonadherence, patient out-of-pocket costs (ie, co-payments, coinsurance, and deductibles) appear to be a central issue, even for patients with prescription drug coverage.[7,13,14] Cost-related medication nonadherence may affect some patients more than others. Among patients with at least partial prescription drug coverage, nonadherence, secondary to cost, is highest among those with lower income, more medical conditions, and worse self-reported health status.[15] In some studies, black patients are more likely to report cost-related barriers to adherence compared with whites, even when socioeconomic factors are taken into account.[15-17]

Some employers and insurers have attempted to address cost-related medication nonadherence with reduced patient cost sharing for evidence-based medications through value-based insurance design programs. This has led to improvements in adherence, resource utilization, and clinical outcomes for patients with CV disease.[18-20] These programs may also be particularly effective for racial and ethnic minorities, as has recently been reported among high-risk patients discharged after acute myocardial infarction.[21] It is unclear whether these findings are generalizable to a more heterogeneous and lower-risk population with CV disease. Accordingly, we sought to evaluate whether statin co-payment reductions for patients with diabetes or vascular disease[19,22] differentially affected medication adherence for patients living in neighborhoods with different racial compositions.

METHODS

Take-Away Points

Patients living in predominately minority neighborhoods are less likely to be adherent to important medications that prevent heart disease compared with patients living in largely white neighborhoods. Eliminating co-payments for evidence-based medications improves adherence preferentially for patients living in minority neighborhoods.

- Disparities in cardiovascular outcomes are prevalent in the United States and may be improved by programs that focus on improving medication adherence.
- Quality improvement interventions may have differential impact based on the racial/ethnic composition of communities.
- Interventions provided by the employer or health insurer can have a meaningful clinical impact.

Setting and Design

A large national employer eliminated co-payments for statins for patients with diabetes or vascular disease on January 1, 2007. We evaluated whether the impact of this co-payment reduction differed by race, as measured by the racial composition of a patient's neighborhood. We compared the impact of this benefit change on medication adherence, stratified by zip code–level race data, with a control population of comparable patients drawn from Horizon Blue Cross Blue Shield of New Jersey (BCBSNJ), the largest insurer in New Jersey. The national employer and BCBSNJ use the same pharmacy benefit manager.

Data Sources

We combined complete paid pharmacy and medical services claims data from both the intervention and control employers to create a relational database consisting of all filled prescriptions, procedures, inpatient and outpatient physician encounters, hospitalizations, long-term care admissions, and deaths for all patients studied. All traceable person-specific identifying factors were transformed into anonymous, coded study numbers to protect subjects' privacy. The Institutional Review Board of Brigham and Women's Hospital approved this study.

Cohort Eligibility

A detailed description of the study cohort has been published previously.[19] In brief, eligible patients were those with diabetes or vascular disease—based on claims for diabetes medications or supplies, antiplatelet medications, or beta-blockers—who filled a prescription for a statin between January 1, 2006, and December 31, 2007. Patients entered the cohort on the date of their first medication fill after January 1, 2006, and were followed until they died, lost insurance eligibility, or the study period ended.

Medication Adherence

We measured medication adherence by estimating the number of days of medication available or the "proportion of days covered" (PDC) in each month between January 2006 and December 2007, based on prescriptions actually filled. To do this, we created a "supply diary" for each patient-day by aggregating consecutive fills of each medication class being studied based on dispensing dates, quantity dispensed, and reported days' supply. All statins were considered to be interchangeable. When a dispensing occurred before the previous dispensing should have run out, utilization of the new medication was assumed to begin the day after the end of the old dispensing. If a patient accumulated more than 180 days' supply on a given day, the accumulated supply was truncated at 180 days. The PDC was calculated by dividing the number of days of medication available to each patient within a given month by the number of calendar days in that month. We subtracted from the denominator any days a patient spent in the hospital or a nursing home.

Race

The predictor of interest was the percentage of black residents living in each patient's zip code, determined by linking the patient's zip code to 2000 US Census data. In the primary analysis, we divided patients into tertiles based on the percentage of black residents in each patient's zip code. The bottom, middle, and top tertiles corresponded to a mean percentage of 1%, 5%, and 30% black residents, respectively. This method has been used in previous research to assess the impact of racial[23,24] and socioeconomic[25] composition of neighborhoods on health outcomes.

Covariates

Patient demographics were assessed as of the date of cohort entry. Individual level characteristics included age and gender; zip code–level characteristics were median income, percentage of residents who were low-income, and percentage of residents who had completed high school. Comorbidities were assessed based on medical service and pharmacy claims from the 12-month period before cohort entry and included coronary artery disease (*International Classification of Diseases, Ninth Revision* [*ICD-9*] codes 410.x-414.x, 429.2, V45.81), congestive heart failure (*ICD-9* code 428.x), diabetes (*ICD-9* code 250.x), hypertension (*ICD-9* code 401.x-404.x), Charlson comorbidity score, number of hospitalizations, and number of prescription medications.[26]

Statistical Analysis

We first plotted monthly adherence proportions for the intervention and control cohorts before and after co-payments were reduced, stratified by neighborhood racial composition. We then compared the impact of the co-payment reduction on patients living in communities with different proportions of black residents, using a difference-in-differences design. Our regression models included a constant term, a binary indicator for exposure (ie, intervention vs control), a binary indicator for the post intervention time period, and an interaction term between exposure and post intervention period indicator. We fit separate models, comparing intervention and control, for each tertile of percentage of black residents. We controlled for correlated error terms using generalized estimating equations assuming normally distributed errors. We repeated this analysis adjusting for the covariates listed above, and we repeated our analysis by evaluating the proportion of patients who were fully adherent—defined as a proportion of days covered greater than or equal to 80%.[27]

Collinearity between zip code–level race and income was addressed by conducting the primary analysis with and without income and then looking for changes in standard error. The Pearson correlation coefficient between these 2 continuous variables was also measured. Effect modification was examined by introducing an interaction term between the main effect in the primary analysis with income in each black race tertile. Because we were most interested in testing the interaction between low income and neighborhood racial composition, we initially divided zip code–median income into tertiles for low, middle, and high income. We then re-ran the analysis combining middle and high income into 1 group (compared with low income). These results were consistent with the analysis conducted with income included as a 3-group categorical variable, and are thus presented here. We also analyzed the impact of co-payment reduction on 6 groups stratified by zip code–level race (3 groups) and zip code–level median income (2 groups).

Sensitivity Analyses

We performed several additional analyses to test the robustness of our results. First, we repeated our analysis, dividing the cohort into deciles based on percentage of black residents in each zip code, and compared patients in the decile with the greatest proportion of black residents to the remaining 90% of patients. We then divided the cohort into 4 groups corresponding to the 10th, 75th, and 90th percentiles of black residents in each zip code: less than 1%, 1% to 14%, 14% to 32%, and more than 32%. Second, we re-ran our models including both an indicator variable for the post intervention level and slope and interaction terms between group membership (intervention or control) and the post intervention level and slope parameters.[19] This allowed us to evaluate whether the policy intervention influenced medication adherence immediately or over the longer term, by changing the level or slope of the trend in adherence, respectively. Third, we re-ran our models using 3-way interaction terms; the results were similar to the above models. Finally, we conducted the analysis among prevalent users at the time of co-payment reduction so as to exclude patients who initiated therapy in response to the policy change.

RESULTS

Patient Characteristics

Our primary cohort consisted of 1961 individuals with vascular disease or diabetes who were eligible for co-payment reductions along with 37,320 comparable control subjects who also met the inclusion criteria. Their baseline characteristics are presented in Table 1. Compared with controls, members of the intervention cohort were older, more likely to have completed high school, and less likely to have hypertension. They were similarly matched with regard to other comorbidities, medication use, and hospitalizations prior to cohort entry (Table 1).

Baseline characteristics differed significantly by race. Individuals living in zip codes with the highest proportion of black residents had lower incomes, were less likely to have graduated from high school, were younger, and more likely to be female. Zip code–level black race and median household income were negatively correlated (correlation coefficient, –0.41; 95% CI, –0.42 to –0.40; P <.0001). Rates of comorbid conditions were also different. Patients living in areas with the highest proportion of black residents had lower rates of coronary artery disease, higher rates of diabetes and hypertension, and were prescribed more medications than the other cohorts.

Co-Payment Changes

Prior to the new co-payment policy, statin co-payments were higher in the intervention cohort than among controls in all tertiles based on neighborhood racial composition (Table 1). The new policy brought about a substantial reduction in monthly statin co-payment in the intervention cohort ($23.18 vs $0.47); there was virtually no decrease in co-payment in the control cohort during this time period ($10.89 vs $10.63). While the new co-payment policy should have eliminated co-payments for statins, small co-payments were still charged on 3% of eligible statin claims because of incorrect claims processing.[19]

Table 1. Baseline Characteristics According to Racial Composition of Zip Code

Characteristic	Tertile of the Proportion of Black Residents in Zip Code					
	Bottom		Middle		Top	
	Intervention (n = 668)	Control (n = 12,438)	Intervention (n = 664)	Control (n = 12,731)	Intervention (n = 629)	Control (n = 12,151)
Demographics						
Mean age, years	59.1	54.2[a]	59.2	53.8[a]	57.9	53.3[a]
Female, %	33.8	36	32.8	38.8	43.9	44.5
Income, mean	$67,084	$67,404	$57,705	$60,632[a]	$45,498	$47,711[a]
Low income, %	31	37.9[a]	43.9	46.6	81.7	75.2[a]
Completed high school, %	88.9	87.8[a]	84.6	84.6	78.3	76.6[a]
Comorbid conditions						
Coronary artery disease, %	28.6	27.3	27	25.6	22.6	23
Congestive heart failure, %	1.7	1.6	1.5	1.6	2.1	2.2
Hypertension, %	47.3	58.3[a]	50.5	58.9[a]	52.5	61.1[a]
Diabetes, %	33.7	31.5	34.3	33.3	41.5	38.8
Charlson comorbidity score	0.94	0.93	0.95	0.96	1.1	1.1
Medication use in prior year						
Number used, mean	8.4	8.8	8.6	9.1[a]	9.8	9.5
Hospital use in prior year						
Number of hospitalizations, mean	0.16	0.16	0.17	0.15	0.26	0.17[a]
Monthly drug co-pay, mean						
Year prior to co-pay reduction	$22.50	$12.09[a]	$22.33	$11.49[a]	$23.18	$10.89[a]
Year after co-pay reduction	$0.49	$11.97[a]	$0.87	$11.37[a]	$0.47	$10.63[a]

[a] $P < .05$, comparing reduced-co-payment cohort with control cohort.

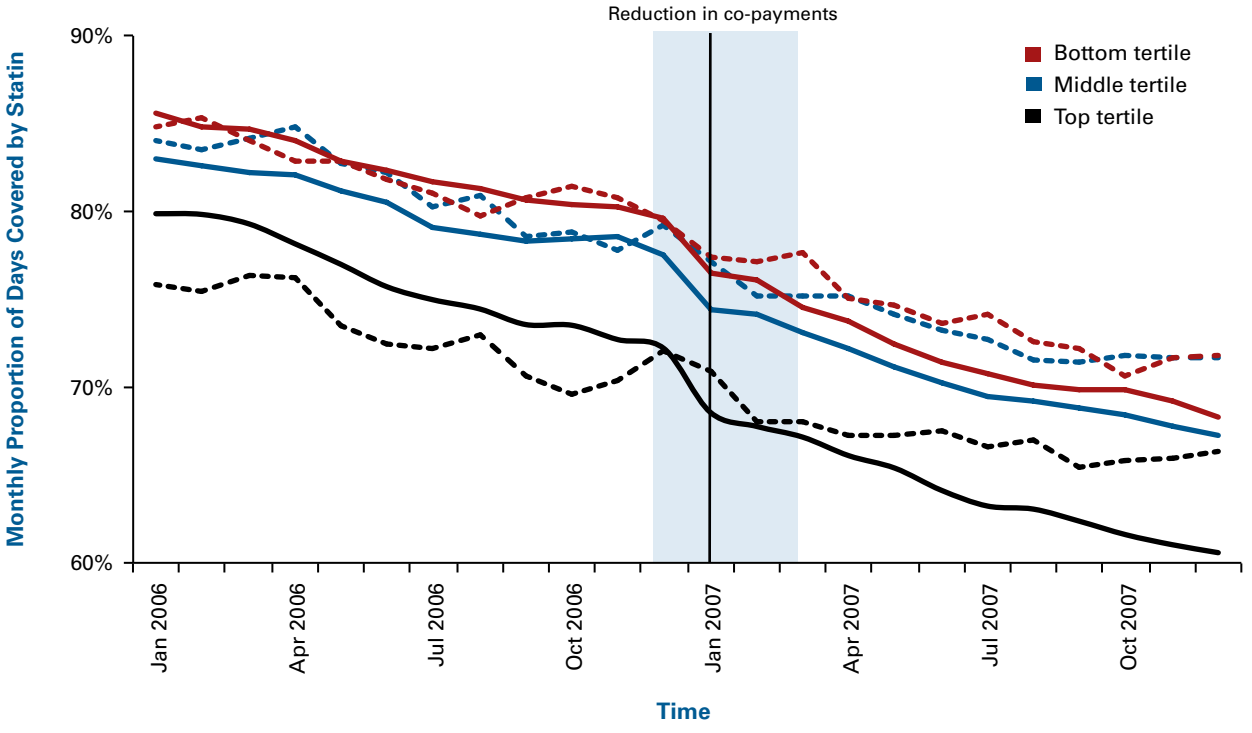
Statin Adherence

The unadjusted monthly rates of adherence to statins before and after co-payment reductions are shown in Figure 1. Prior to the intervention, adherence declined by similar rates in the control and intervention cohorts and across all tertiles. The co-payment reduction was associated with stabilization of adherence in the intervention cohort living in neighborhoods with the greatest proportion (top tertile) of black residents, but adherence continued to decline in the other intervention and control cohorts. By the end of the follow-up period, the adherence rate in the intervention cohort with the highest proportion of black residents was similar to that in the control subgroup with the lowest proportion of black residents.

In the multivariate model, controlling for demographic and clinical characteristics, the policy intervention resulted in a nonsignificant 2 percentage-point increase in mean adherence in the tertiles with the lowest and medium number of black residents. In contrast, the intervention cohort had a significant 6 percentage-point increase in mean adherence in the high-black tertile (95% CI, 3%-8.9%; $P < .0001$). The odds of patients being fully adherent improved 24.9% (95% CI, 11.3%-38.5%; $P = .003$) compared with 14.4% (95% CI, 1.8%-26.9%; $P = .03$) among individuals living in neighborhoods with the largest and smallest proportion of black residents, respectively.

Including income as a variable in the model did not change the effect size or standard error for any of the tertiles (Figure 2). Further, interaction terms between the main effect of the intervention and income within the middle and highest tertiles of proportion of black residents were not statistically significant (see eAppendix, available at **www.ajmc.com**). In the tertile with the fewest black residents, the interaction term comparing the response to co-payment reduction among individuals living in neighborhoods with lower median household income compared with higher income was statistically significant ($P = .007$). This suggests that individuals living in predominately white neighborhoods, middle- to higher-income individuals, had a more robust improvement in adherence in response to the co-payment reduction (3.8 percentage-point improvement; 95% CI, 1.1-6.5; $P = .007$) than lower-income individuals. Stratifying by tertile of neighborhood racial composition and income produced similar results.

Figure 1. Monthly Statin Adherence in the Intervention Cohort Compared With Control, by Racial Composition of Zip Code



Lines represent crude monthly adherence rates for intervention (dotted line) and control (solid line) patients living in zip codes with the lowest proportion of black residents (red lines), medium proportion (blue lines), and highest proportion (black lines).

Sensitivity Analyses

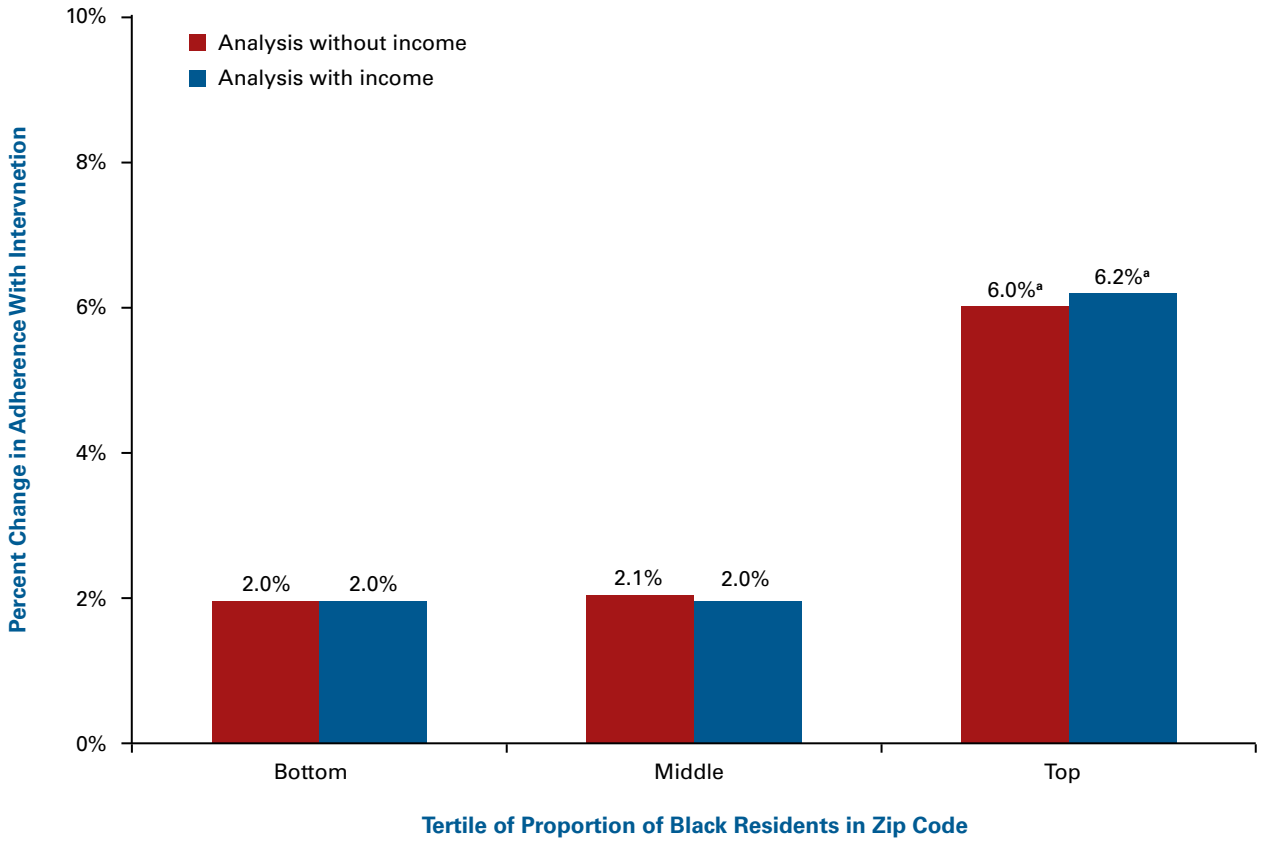
Using alternate cut points for race yielded very similar results to our primary analysis. For example, when comparing individuals in the highest and lowest deciles of proportion of black residents, adherence levels increased by 12.2 percentage points (95% CI, 6.2%-18.2%; P <.0001) in the zip codes with the highest decile of black residents compared with a 2.4 percentage-point increase (95% CI, 0.8%-4.1%; P = .004) in the rest of the cohort. Including a level variable into our models did not meaningfully change our results. The co-payment reduction was associated with an immediate 4.5 percentage-point increase in monthly adherence in areas with the highest tertile of black residents (95% CI, 1.2%-7.8%; P = .008), compared with a nonsignificant increase in adherence among tertiles with fewer black residents (Table 2). The rate of change in adherence levels (slope) after the intervention did not significantly change in any of the cohorts. Restricting the cohort to individuals who filled an eligible prescription prior to the policy intervention did not change the results (results not shown).

DISCUSSION

We evaluated the impact of co-payment elimination for statins among patients with diabetes or vascular disease, stratified by race and found that this strategy resulted in a 3-fold greater improvement in adherence levels for individuals living in neighborhoods with the highest—compared with the lowest—proportion of black residents. As a result, 1 year after the new co-payment policy was introduced, disparities in adherence appear to have been largely eliminated. Controlling for income status did not alter these results.

Disparities in CV outcomes continue to persist despite overall reductions in CV morbidity and mortality.[5,28] Nonwhite patients already experience increased barriers to accessing high-quality care, however, quality improvement efforts run the risk of worsening disparities.[29] For example, practices serving a higher proportion of vulnerable patients appear to be at risk of receiving significantly less payment per practice as result of a proposed pay-for-performance program for primary care providers in Massachusetts.[30] Similarly, Medicare's recently implemented value-based purchasing

Figure 2. Changes in Monthly Statin Adherence With and Without Income Adjustment



The red boxes represent the multivariate analysis without including income as a covariate and the blue boxes represent the multivariate analysis including income.
[a]*P* <.05.

program has the potential to decrease payments to hospitals that serve a disproportionate share of vulnerable patients.[31,32] Minority patients may have more difficulty navigating complex health systems, such as enrollment in Medicare Part D, which may inadvertently lead to greater disparities.[33,34]

In addition, insured individuals are increasingly bearing a greater proportion of healthcare costs through higher deductibles and cost sharing. The percentage of adults considered as underinsured based on the percent of medical expenses relative to income has increased by almost 80% since 2003.[35] Not surprisingly, low-income individuals are more likely to bear the burden of higher healthcare costs.[35,36] Among vulnerable populations, increased patient cost sharing reduces both nonessential and essential healthcare utilization, resulting in increased hospitalizations and decreased use of essential medications.[13] Low-income and chronically ill patients are most at risk for having increased rates of adverse outcomes, and racial and ethnic minorities may also be disproportionately affected.[13,25,37]

In lieu of increased patient cost sharing for all services, a strategy known as value-based insurance design (V-BID) reduces or eliminates the cost of services that have high clinical value relative to their costs.[38] Several studies have demonstrated that when V-BID was integrated into health plans offered by large employers, patients had fewer emergency department visits and improved medication adherence.[18-20,39] Such results were achieved while reducing overall costs for the employer or remaining cost neutral.[18,20,39] The impact of V-BID interventions on health disparities has thus far been subject to much less attention. In the Full Coverage for Preventive Medications after Myocardial Infarction (MI FREEE) trial, providing free CV medications after an acute myocardial infarction preferentially improved medication adherence, decreased vascular events, and lowered cost among nonwhite patients compared with white patients.[21] The current study extends these results to a broader range of CV disease.

Our results add to the growing literature on how co-payment reductions may impact groups of patients dif-

Table 2. Impact of Co-Payment Reduction on Statin Adherence According to Zip Code–Level Racial Composition

Model of Racial Composition[a]	Change in Level[b] (%)	95% CI	*P*	Change in Slope[c] (%)	95% CI	*P*
Tertiles						
Bottom	2.8	–0.1 to 5.6	.06	–0.1	–0.5 to 0.2	.47
Middle	1.4	–1.6 to 4.4	.35	0.1	–0.2 to 0.5	.5
Top	4.5	1.2-7.8	.008	0.3	–0.1 to 0.7	.09
Deciles						
Lowest	2.2	0.4-4.0	.02	0.1	–0.2 to 0.3	.64
Highest	9.9	2.8-16.9	.006	0.6	–0.1 to 1.3	.11
Percentiles						
<10th percentile	3.5	–0.3 to 7.3	.07	–0.2	–0.7 to 0.2	.37
10th-75th percentile	1.8	–0.5 to 4.1	.13	0.1	–0.2 to 0.4	.62
75th-90th percentile	2.4	–2.1 to 6.9	.29	0.3	–0.3 to 0.8	.3
>90th percentile	10.4	3.3-17.5	.004	0.6	–0.1 to 1.3	.11

[a]Model of racial composition represents the proportion of black residents living in each patient's zip code. All models are multivariable adjusted.
[b]"Level" refers to the immediate impact of the co-payment policy on medication adherence.
[c]"Slope" refers to the subsequent rate of change in adherence resulting from the co-payment policy.

ferently, especially among those living in predominately black neighborhoods. Minority patients are more likely to report cost-related medication nonadherence compared with white patients, so co-payment reductions may directly remove a barrier to accessing medications in neighborhoods with more minorities.[16,17] Alternatively, co-payment reductions may be "less visible" to individuals living in neighborhoods with a lower proportion of black residents, either because nonadherent individuals do not take their medications or because the cost of medication co-payments are insignificant relative to other costs.[40] Although adherence was low in all subgroups and decreased over time, individuals living in predominately black neighborhoods had the lowest adherence rates. Thus, any incentive to improve adherence may have greater impact. Finally, although we controlled for zip code–level income in our analysis, it is possible that residual socioeconomic confounders, such as differences in social class, occupation, and wealth, may have impacted responses to cost changes.

Even after eliminating co-payments, adherence rates remained extremely low. Successful efforts that improve adherence are often multifaceted and complex.[41] Co-payment reductions for high-value medications could be combined with other adherence interventions, such as counseling at the pharmacy,[42,43] scale-up of electronic medical records,[44] and simplified dosing regimens and better coordination of care,[45] which have all been demonstrated to be effective at improving adherence. While all racial groups are in need of improved adherence, our finding that co-payment reductions had a differential effect by race suggests the need to more precisely tailor interventions. For example, an adherence intervention targeting hypertensive black patients using positive affect induction and self-affirmation material shows promise for improved adherence to blood pressure medications.[46]

Because we evaluated race at the zip code level, our results may also suggest that implementing interventions targeted at high-risk neighborhoods could help reduce disparities.[6] For example, community health workers[47] and peer mentors[48] may be effectively deployed in community-based settings. Additionally, patient education and outreach provided at the level of faith-based organizations or other community groups holds promise for improving outcomes.[49] Patients living in predominately minority communities are more likely to receive care from facilities that provide lower-quality care at higher cost, so addressing this inequality in access may lead to better uptake of and adherence to medical care.[31]

Socioeconomic status factors are a key determinant of health outcomes, and different levels of household income may mediate the relationship between neighborhood racial composition and response to co-payment reductions. That said, the impact of such factors may differ across racial/ethnic groups.[50] Although our analysis was not powered to test for effect modification, we found that in predominantly white neighborhoods, middle to high-income individuals had a more robust response to co-payment reduction compared with lower-income individuals. One possible explanation is that higher-income individuals are more aware of the policy change secondary to increased health literacy or education, and therefore, a co-payment reduction may be

more effective in motivating behavior change. For neighborhoods with a high proportion of black residents, income does not appear to have this modifying effect.

Limitations

Our study has several limitations. First, we used zip code–based data for race because individual-level identification by race was not available. Residential segregation has led many black individuals to live in neighborhoods with unique social conditions that contribute to health status, beyond socioeconomic status and race.[50] Therefore analyzing the data by geographic area may aid in better understanding contributors to nonadherence and the effect of interventions when implemented within geographic constraints. Compared with more narrow census tracts and census block, zip code–level data encompasses a larger population with greater heterogeneity and spatiotemporal instability.[51] Several studies that have analyzed socioeconomic status based on zip code data have found similar results compared with census tract or block level.[25,51] Our analysis did not control for other factors that influence health disparities, such as degree of racial segregation.[50] Furthermore, we did not have access to other measures of healthcare access such as number of pharmacies or accessibility of physicians.

Second, we performed a retrospective cohort study using difference-in-differences design, adjusting for utilization trends in a comparable population for whom co-payments were not reduced. Our analysis cannot control for simultaneously occurring events that could have influenced medication utilization. Similarly, although baseline differences between the control and intervention cohorts should not bias our results, as they are time invariant, we cannot exclude the possibility of effect modification, such as that resulting from participation in a disease management program. Our finding that income may modify the response to co-payment reduction in predominately white neighborhoods needs to be addressed further in larger studies. Finally, the administrative data used do not contain detailed clinical information or outcomes. Therefore, if a patient discontinued a statin for clinically appropriate reasons, such as normalized cholesterol levels, the patient would appear as nonadherent. Our results would have only been affected if this occurred differentially by racial tertile.

CONCLUSIONS

Minority patients have lower rates of cardiovascular medication adherence which may contribute to disparities in clinical outcomes. Few studies have focused on how adherence-improving interventions differentially impact patients from different racial or ethnic groups. Our study provides high-quality empirical data on the effect of co-payment reductions for evidence-based medications on health disparities. These results suggest that V-BID programs may be particularly effective for improving adherence among individuals living in predominately black neighborhoods and may be an easily implemented strategy for reducing disparities in CV care. As V-BID programs become more widely implemented, further research is needed to understand how interventions influence medication adherence and clinical outcomes among patients from diverse backgrounds.

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eAppendix

Table. Effect of Income Level on the Association Between Zip Code–Level Racial Composition and Change in Medication Adherence

		Low Income			Middle/High Income		
	Interaction Term *P*[a]	**Pre/Post Change[b]**	**95% CI**	***P***	**Pre/Post Change[b]**	**95% CI**	***P***
Race Tertile							
Bottom	.007	–5.6%	–12 to 0.7	.08	3.8%	1.1 to 6.5	.007
Middle	.704	1.1%	–4.7 to 6.9	.71	2.3%	–0.7 to 5.4	.132
Top	.992	6.2%	2.3 to 10.1	.002	6.1%	2.0 to 10.2	.003

[a] *P* value represents main effect interacted with income within each race tertile.
[b] "Pre/Post Change" represents the percentage point change in adherence based on difference in differences model.