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Zero Dollar Copay Pharmacy Benefit Decreases Healthcare Expenditures Among Members With Type 2 Diabetes of Blue Cross Blue Shield of Louisiana

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Abstract

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Objectives: Blue Cross Blue Shield of Louisiana implemented the Zero Dollar Co-payment (ZDC) program on July 1, 2020. This study aims to evaluate whether the ZDC program can reduce total healthcare expenditures.

Methods: Blue Cross Blue Shield of Louisiana's medical and pharmacy claims from January 2019 to December 2021 was used in this study, and the index date was July 1, 2020. We identified 7603 continuously enrolled members with type 2 diabetes, including 3045 ZDC-eligible members as the ZDC group and 4558 Administrative Service Only group members as the control group. The primary outcome measure was monthly total healthcare expenditure, which included monthly medical and pharmacy spending. ZDC program's effectiveness was evaluated by a 2-way fixed-effect difference-in-difference regression weighted by odds of propensity scores. The study population was further classified into 3 subgroups based on their baseline use of ZDC-eligible antidiabetic medications: pre-ZDC users, pre-ZDC nonusers, and complex users.

Results: The ZDC pharmacy benefit was associated with a significant reduction in total healthcare spending of $2121.76 per member per month (PMPM) ($P = .002$) and medical spending of $2131.50 PMPM ($P < .001$). For complex users, the ZDC program was associated with reductions of $283.44 PMPM ($P = .006$) in total healthcare spending and $385.45 PMPM ($P < .001$) in medical spending, whereas pharmacy spending significantly increased by $102.01 PMPM ($P = .022$). No significant results were observed for pre-ZDC users and pre-ZDC nonusers.

Conclusions: The ZDC program was effective in reducing total healthcare expenditures among ZDC-eligible members with type 2 diabetes in Louisiana.

Keywords

copayment; financial incentives; free medication support; healthcare cost; medication adherence; value-based insurance design; Zero-Dollar Co-pay

Introduction

Type 2 diabetes (T2D) is prevalent and costly in the United States. In 2021, more than 38 million people, 11.65% of the population, in the United States had T2D.[1] The national healthcare system and patients with T2D were facing significant economic burden.[2] The estimated direct medical cost and health productivity losses in 2022 were $307 billion and $106 billion, respectively.[3]

Excessive diabetes healthcare costs are often associated with medication nonadherence.[4] Fukuda et al[4] highlighted that among newly diagnosed patients with T2D, medication adherence was associated with significantly higher cumulative healthcare costs, ranging from $937 to $44 673.[5] More so, better medication adherence is typically associated with healthcare cost savings. For instance, Polonsky et al[5] found that annual medical spending per patient with T2D decreased by $4413 for adherent patients—medication possession ratio was 80% or higher. This reduction increased to $5170 for individuals aged 65 years or older. Similarly, Axon and colleagues reported that adherent patients incurred 14.7% lower total healthcare expenditures compared with nonadherent patients.[6] Furthermore, several other diabetes studies have reported that medication adherence at the population level can lead to

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healthcare cost savings amounting to billions of dollars, further highlighting the critical role of medication adherence in reducing healthcare expenditures.[7,8]

Cost-associated medication nonadherence may be overcome by value-based insurance designs (VBIDs). In a study investigating the predictors of medication adherence, the authors found that medication adherence was negatively related to cost sharing, for every $1 decrease in cost-sharing, the proportion of days covered would increase by 1.1 days. In addition, they reported that better medication adherence was associated with fewer healthcare utilizations and lower total healthcare expenditures.[9] Similarly, another study observed that a VBID offering copayment reductions and eliminations for certain cholesterol-lowering medications increased medication adherence by 2.8%.[10] Comparable findings have been reported by many chronic conditions.[11–14] Furthermore, VBIDs designed to reduce cost-sharing can result in significant healthcare cost savings.[15–18]

In 2020, Blue Cross and Blue Shield of Louisiana (BCBSLA) implemented a Zero-Dollar Co-pay (ZDC) program, aimed at alleviating financial burdens, addressing cost-related medication nonadherence, reducing healthcare utilization, and improving clinical outcomes, such as Hemoglobin A1c for eligible beneficiaries. The program operated by eliminating all copayments for antidiabetic medications, which were primarily generic drugs. The ZDC program launched in 2020 expanded the eligible cohort based on the previous iterations in 2014 and 2018 by applying less strict eligibility criteria.[18,19] This study aims to evaluate whether the ZDC program can reduce total healthcare expenditures among BCBSLA fully insured members with T2D. It contributes to the existing literature by examining the effects of a copayment elimination program, whereas prior studies have more commonly assessed copayment reduction strategies. By focusing on the complete removal of copayments, this study provides new evidence on the potential of financial incentives to influence patient behavior. Unlike interventions that incorporate educational or counseling components, the ZDC program was implemented as a standalone financial intervention, enabling a clearer assessment of its independent impact. To enhance the validity of our findings, we applied a 2-way fixed effects difference-in-differences design with balanced baseline characteristics between the intervention and comparison groups, allowing for a more robust causal interpretation.

Methods

Data Source

Medical and pharmacy claims data from BCBSLA, covering the period from January 1, 2019, to December 31, 2021, were obtained for this study. The data set consisted of 2 components: detailed medical and pharmacy claims, and a monthly aggregated table compiled by BCBSLA. Monthly data included total medical spending for all healthcare services, pharmacy spending for all medications, demographic characteristics, and clinical information. The claims records were used to identify diabetes patients, and the monthly aggregated table were used to perform the main analysis.

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Study Period

The study period ranges from January 1, 2019, to December 31, 2021, and the ZDC pharmacy benefit became effective on July 1, 2020 (the index date), providing 18-month baseline and follow-up periods.

Eligibility Criteria

Eligible members were required to be at least 18 years old at baseline, continuously enrolled with BCBSLA for 3 years, and to maintain a copay pharmacy benefit throughout the study period. Members were excluded if they had participated in earlier iterations of the ZDC programs, resided outside Louisiana, had total medical spending greater than $200 000 at baseline, or were enrolled in high-deductible health plans or Medicare supplemental plans. We identified 7565 members who met the eligibility criteria for our analysis.

Patient Enrollment in the ZDC Program

Members covered under firms that selected Administrative Services Only (ASO) arrangements were not eligible for the ZDC program. Under ASO plans, the employer assumes the financial risk for its employees' healthcare costs, whereas a health insurance company manages administrative services, such as claims processing. This differs from fully insured plans, in which the health insurance company assumes both financial risk and administrative responsibilities. Members from firms using BCBSLA as a traditional (fully insured) administrator were automatically enrolled in the ZDC program if they had at least 1 of the following 5 conditions: diabetes, hypertension, heart disease, lung disease, or mental illness and met the other established eligibility criteria. Participation in the program was not voluntary. Apart from receiving the ZDC pharmacy benefit, no other changes were made between the groups, aside from the structural differences between fully insured and ASO plans.

Selection of Patients With Diabetes and Study Cohort

BCBSLA members with T2D were identified using either at least 1 ICD-10 code E11 in medical claims or a generic product identifier major class code starting with 27 in pharmacy claims. Members with type 1 diabetes were excluded from our analysis. The ZDC group included fully insured members with T2D, whereas the control group consisted of ASO plan members who were not eligible for the ZDC benefit. The types of enrollees depend on the health plans selected by their employers.

Outcomes

This study evaluated the impact of the ZDC program on changes in monthly total healthcare expenditures, including both medical and pharmacy expenditures. All the expenditures were calculated using the corresponding allowed amount. The medical expenditure reflects the total cost of healthcare utilization, such as inpatient and outpatient visits, whereas the pharmacy expenditure reflects the total cost of all classes' medication consumption for each patient. Data from the first 3 months were excluded from the outcome analysis because of insufficient pharmacy claims from late 2018 (see Appendix Figs. 10 and 11 in Supplemental

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Materials found at https://doi.org/10.1016/j.jval.2025.07.017). However, the first 3 months of data were retained solely for the purpose of identifying patients with T2D.

Inflation Adjustment

All the expenditures were adjusted to 2024 US dollars using the equation below:

$$Adjusted\ \ Expenditure\ \ = \frac{Expenditure_{month\ \ i}}{Medical\ \ Care\ \ Consumer\ \ Price\ \ Index\ \ (CPI)_{month\ \ i}} * Annual\ \ Medical\ \ Care\ \ CPI\ \ in\ \ 2024$$

All the data regarding monthly and annual consumer price index were extracted from Bureau of Labor Statistics.[20]

Statistical Analysis

This study conducted a 2-way fixed effects difference-in-differences (DID) regression analysis, using the full baseline period as the reference period and incorporating weights based on the odds of the propensity scores for receiving the ZDC pharmacy benefit. Members in the ZDC group were assigned a weight of 1, whereas members in the ASO group were weighted by the odds of their propensity scores. Categorical variables were reported by counts and percentages, whereas continuous variables were reported by means and standard deviations. Event studies were performed to assess the preparallel trend assumption before running the DID regression. The odds-weighted DID regressions were carried out while controlling for individual fixed effects, time-fixed effects, age (continuous and categorical), chronic conditions, diabetes complications severity index, baseline Blue Cross Blue Shield plan or product type, and linear time trends. Standard errors were clustered at the individual level to avert possible serial correlation over time. All analyses were performed using STATA SE/16.1.

Subgroup Analysis

The variation in treatment effects of the ZDC pharmacy benefit was further examined across subgroups defined by baseline ZDC-eligible antidiabetic medication use. Members exclusively using ZDC-eligible medications at baseline were classified as pre-ZDC users, whereas those not using any ZDC-eligible medications were classified as pre-ZDC nonusers. Members using both ZDC-eligible and noneligible medications were classified as complex users.

IRB Approval

This study was approved by Institutional Review Board (IRB# 906810).

Results

We identified 4530 members in the ASO group as the control group and 3035 members in the ZDC group. After the weighting process, the 2 groups have comparable baseline characteristics (Table 1). The average ages were 52.9 years old (standard deviation [SD] = 11.27) and 48.75 years old (SD = 12.44) for the control and the ZDC group members,

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respectively. Among the control group, 55.61% of the members were female, compared with 57.43% in the ZDC group. Additionally, 80.86% of the control group and 77.07% of the ZDC group resided in urban areas. Hypertension was the most prevalent chronic condition in both groups, affecting 73.86% of the control group and 51.30% of the ZDC group. On average, members of the ZDC group were younger and exhibited a better health profile, as indicated by the prevalence of chronic conditions and the average diabetes complications severity index scores.

Figures 1–3 display the event studies and exhibit the trend of the treatment effect of the ZDC program for each month during the follow-up period. The event studies suggest a positive effect of the ZDC program on reducing total and medical spending during the follow-up period. Although estimates are accompanied by wide 95% confidence intervals, several post-intervention event-time estimates are statistically significant, indicating the reductions in healthcare utilization and supporting the potential cost-saving benefits of the program. In addition, given the lack of evident nonparallel trends during the baseline period, we did not conduct formal parallel pretrend test.

Table 2 summarizes the treatment effect and the heterogeneity of the treatment effect across the overall population and subgroups. The ZDC program was able to reduce total healthcare and medical spending among the ZDC population. Specifically, the program was associated with a $121.76 reduction in total healthcare spending per member per month (PMPM) ($P = .002$) and a $131.50 reduction in medical spending PMPM ($P < .001$). However, the ZDC pharmacy benefit had no significant effect on pharmacy spending ($9.74; $P = .54$).

The subgroup analysis of the heterogeneity treatment effect of the ZDC program revealed that the complex users benefited the most from the ZDC program (see Appendix Tables 1-3 for balancing tables and Appendix Figs. 1-9 for corresponding event studies in Supplemental Materials found at https://doi.org/10.1016/j.jval.2025.07.017). Among control group members, 2199 were pre-ZDC users, 711 were pre-ZDC nonusers, and 1620 were complex users. In the ZDC group, 1746 were pre-ZDC users, 579 were pre-ZDC nonusers, and 710 were complex users. For complex users, the ZDC program was associated with a $283.44 ($P = .006$) reduction in total healthcare spending PMPM and a $385.45 ($P < .001$) reduction in the medical spending PMPM. In addition, the ZDC program was also associated with a $102.01 ($P = .022$) increase in pharmacy spending PMPM. No significant findings were observed within the pre-ZDC users and the pre-ZDC nonusers groups.

Discussion

The ZDC program was effective in reducing total healthcare expenditures, with reductions in medical expenditures serving as the primary driving factor. Among all ZDC-eligible T2D beneficiaries, receiving the ZDC pharmacy benefit was associated with a statistically significant reduction in medical expenditures and a nonsignificant increase in pharmacy expenditures, with the greatest improvements observed in the complex users group. The findings of this study suggest that the impact of VBIDs on total healthcare spending can be achieved through financial incentives and improved medication adherence. The results of our study are consistent with the findings from the early iterations of the BCBSLA's

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ZDC program. The 2014 iteration of BCBSLA's ZDC program, which was combined with disease management and health coaches, indicated a $205.90 decrease PMPM in total healthcare spending.[18] Moreover, the 2018 expansion of the ZDC program dropped the requirement of health coaches and still yielded similar findings, albeit at a lower magnitude. Among these 2018 ZDC beneficiaries, the ZDC program reduced medical costs by $71 PMPM and led to a $8 PMPM increase in generic drug use.[19]

Our work also aligns with previous literature. For instance, Maeng et al[21] observed that a ZDC program offered to Geisinger Health System employees was associated with a $144 reduction in total healthcare spending PMPM. Additionally, another value-based patient support program was linked to a significantly lower all-cause medical cost. Patients who received the program benefit experienced a 29.2% reduction in all-cause medical costs compared with those who did not.[22] Another important aspect of the relationship between VBIDs and healthcare costs is that VBIDs that reduce cost sharing typically lead to increased pharmacy spending because patients are encouraged to take more medications. However, this increase in pharmacy costs is often offset by savings in medical spending.[7,19,22–24]

The cost savings associated with ZDC program were also highly consistent with our ZDC medication adherence findings. In our analysis of the ZDC program's impact on medication adherence, we examined the same cohort of BCBSLA fully insured members with T2D who were eligible for the 2020 iteration of the program. We found that the ZDC pharmacy benefit was associated with a 4.4 percentage point increase ($P < .001$) in the proportion of days covered (PDC) for all antidiabetic medications, and a 5.4 percentage point increase ($P < .001$) in PDC specifically for ZDC-eligible antidiabetic medications[25] We observed heterogeneous treatment effects of the ZDC program across different user groups. The greatest improvement in medication adherence was found among the complex users, with increases of 9.1 percentage points for all antidiabetic medications and 10.0 percentage points for ZDC-eligible medications. In contrast, no significant improvement in PDC was observed among the pre-ZDC nonusers.[25] Notably, our cost analysis also suggested that the increase in pharmacy expenditure was offset by the cost savings in medical spending, underscoring the potential cost-effectiveness of the ZDC program. The relationship between cost-related nonadherence and healthcare spending is well documented in other studies.[4] Iuga and McGuire stated that poor medication adherence will lead to poor health outcomes and increased healthcare utilization, which, in turn, drove up healthcare spending and out-of-pocket cost.[22] Additionally, our findings on pharmacy expenditures are consistent with our analysis of monthly drug counts. The ZDC pharmacy benefit was associated with a 0.9 increase in the monthly count of all antidiabetic medications ($P < .001$) and a 0.074 increase in the monthly count of ZDC-eligible antidiabetic medications ($P < .001$). However, it is important to note that the observed—though nonsignificant—increase in overall pharmacy spending was not limited to antidiabetic medications.[4] In summary, although causality cannot be definitively established, the medical cost savings observed in this study may be partially attributed to improved medication adherence and changes in drug use patterns resulting from the ZDC program. We will further examine the socioeconomic impact on the uptake of the ZDC pharmacy benefit. First, BCBSLA eliminated copayments for a wide range of antidiabetic medications and other preventive medications, such as antihypertensive

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medications. A similar study that evaluated the impact of preventive drug list, which removed copayments and deductibles for a wide range of medications, on patients' out-of-pocket cost also observed significant reductions in the out-of-pocket cost and increase in medication utilization.[26] Second, in 2020, the average copayment for first-tier medications was approximately $11 per drug per year,[27] whereas the average annual income per person in Louisiana was $30 117[28]—notably below the national average. This financial landscape suggests that even relatively modest out-of-pocket costs may pose a barrier to medication adherence for lower-income individuals. As such, eliminating these copays through the ZDC program could have provided a strong financial incentive for beneficiaries to initiate or maintain use of essential diabetes medications. This may partly explain the rapid onset of the program's impact, as illustrated in Figure 1, in which improvements in total healthcare savings appear soon after implementation. The socioeconomic context in Louisiana likely heightened the responsiveness to cost-sharing reductions, amplifying the program's early effects.

Our study has several limitations. First, sicker BCBSLA beneficiaries were excluded because of prior participation in the 2014 and 2018 ZDC programs, which may have reduced the statistical power to detect the program's effect of the 2020 iteration. Additionally, the ZDC pharmacy benefit was not randomly assigned, making it difficult to control for unobservable factors that could influence the results. Furthermore, because our study period coincided with the COVID-19 pandemic, we recognize that the healthcare system and patient behaviors were significantly disrupted during this time. Although we adjusted for COVID-19 diagnoses in our regression models, this approach may not fully capture the broader and more complex effects of the pandemic—such as changes in healthcare utilization patterns, access to care, or medication-taking behaviors. As a result, residual confounding related to the pandemic may remain and could potentially bias our estimates. Moreover, the majority of our study population was of working age, whereas other studies may focus on an older population, limiting the generalizability of our findings. Our data also lacked information on race and socioeconomic status, restricting our ability to explore health disparities among different subgroups. In addition, because of data limitations, we were unable to disaggregate medical expenditures, healthcare utilization, or cost savings by specific disease categories, nor could we break down pharmacy expenditures by drug class or individual medications. This restricts our ability to determine whether the observed reductions in spending were driven by changes in diabetes-related care or other healthcare services. Finally, the follow-up period was limited to 18 months, which may not fully capture the long-term effects of the ZDC program.

Conclusions

The ZDC program was associated with a significant reduction in total healthcare expenditures among ZDC-eligible members with T2D, primarily driven by decreased medical spending while maintaining stable pharmacy costs. These findings emphasize the effectiveness VBIDs in addressing cost-related medication nonadherence, ultimately leading to lower healthcare utilization and improved financial sustainability. This study highlights the potential of VBIDs as a strategic approach to optimizing healthcare spending while enhancing patient outcomes.

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Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Highlights

- Cost-related medication nonadherence drives up healthcare expenditures by increasing the risk of complications, hospitalizations, and emergency department visits. Value-based insurance design (VBID) addresses this challenge by lowering financial barriers to essential medications, improving adherence, reducing preventable utilization, and lowering overall system costs.
- Our study shows a consistent link between VBID implementation and improved medication adherence and reduced healthcare spending among individuals with diabetes. By analyzing baseline medication use patterns, we uncover meaningful variation in VBID's impact, supporting a more personalized approach.
- These findings support wider adoption of value-based care models and emphasize the importance of tailoring VBID strategies to individual behavior, guiding more effective benefit design and resource allocation.

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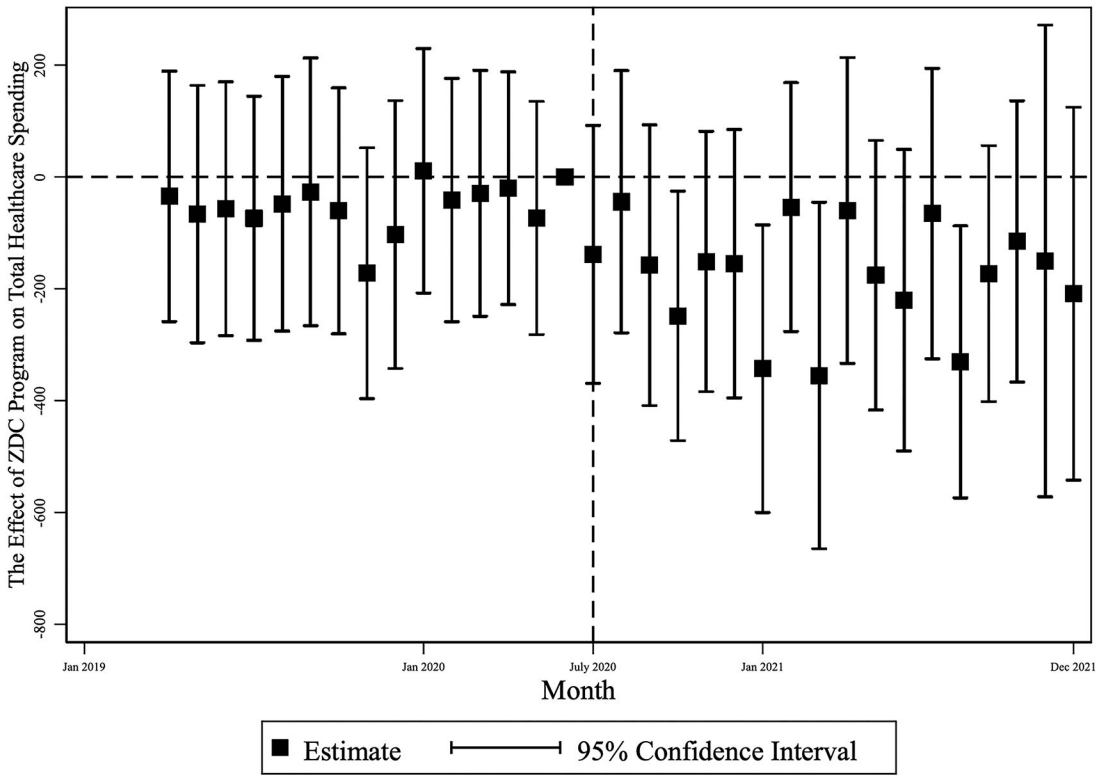


Figure 1. Event study of impact of ZDC program on monthly total healthcare spending, All Members. Figure displays leads and lags coefficients of ZDC program impact from difference-in-difference.

ZDC indicates Zero Dollar Co-payment.

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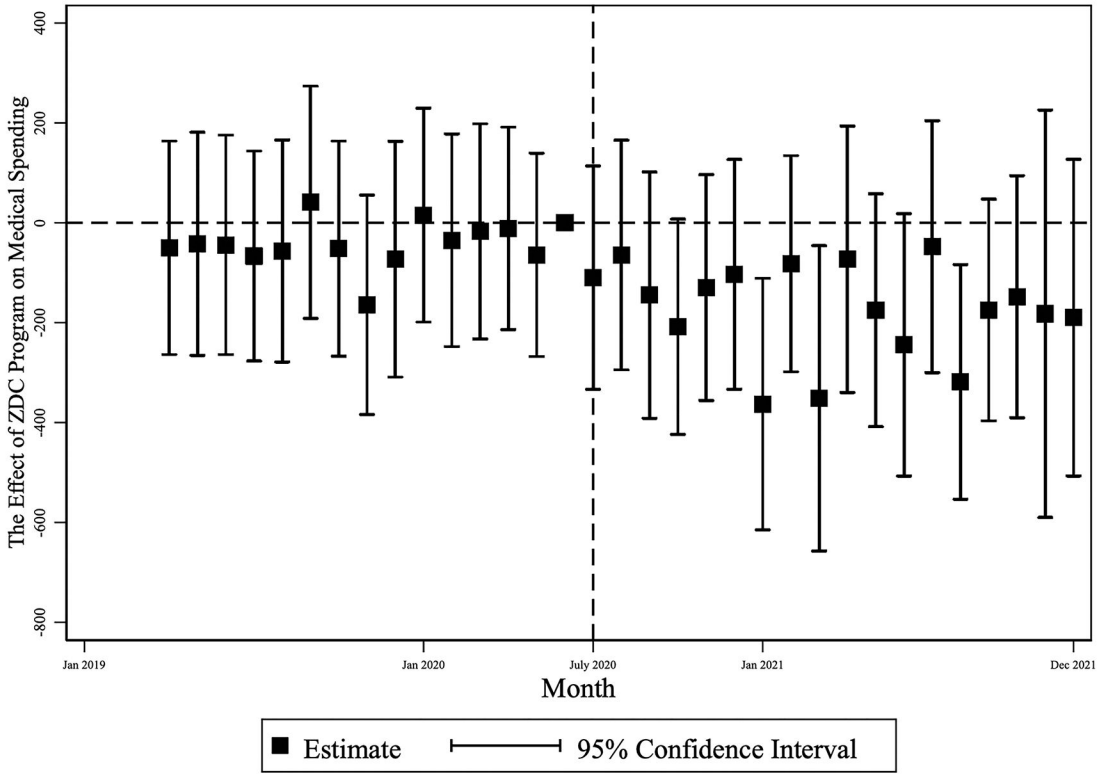


Figure 2. Event study of impact of ZDC program on monthly medical spending, all members.
Figure displays leads and lags coefficients of ZDC program impact from difference-in-difference.
ZDC indicates Zero Dollar Co-payment.

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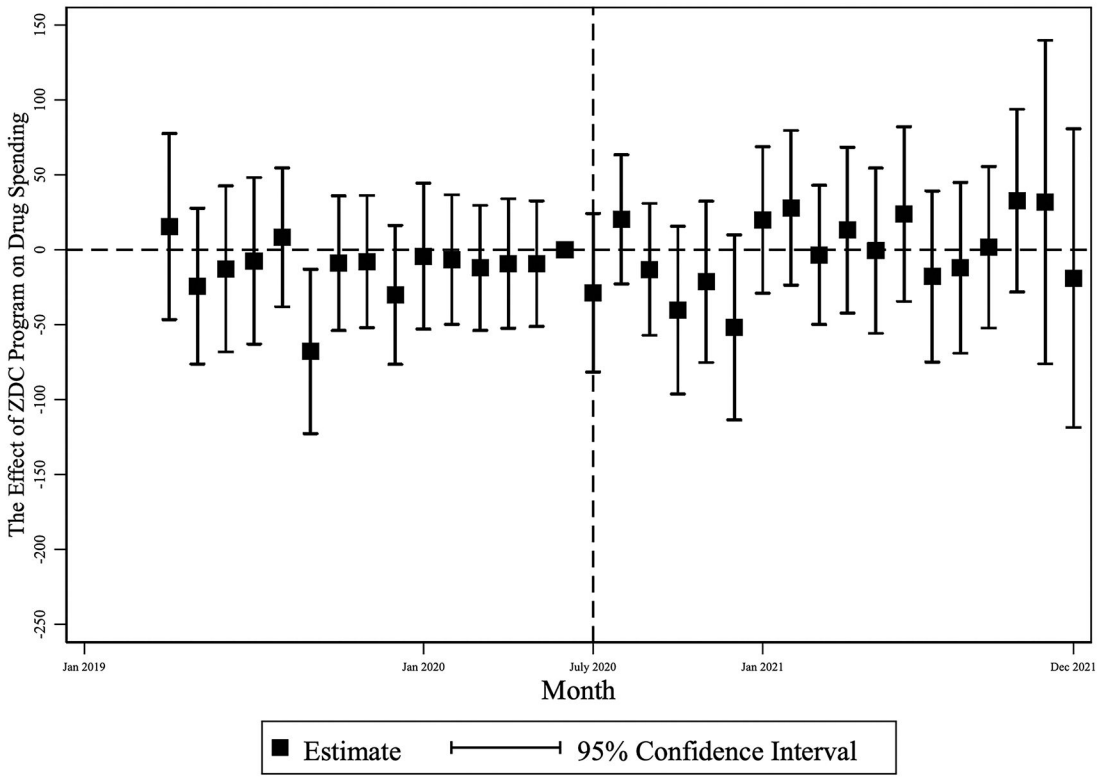


Figure 3. Event study of impact of ZDC program on monthly pharmacy spending, all members. Figure displays leads and lags coefficients of ZDC program impact from difference-in-difference.
ZDC indicates Zero Dollar Co-payment.

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Table 1.

Baseline Characteristics and Covariate Balance for All Members, Total Health Expenditure

	Non-Weighted Group Monthly Average			Weighted Group Mean Monthly Average		
Variables	**Control (N = 4,530)**	**Treatment (N = 3,035)**	**SMD**	**Control (N = 3,027)**	**Treatment (N = 3,035)**	**SMD**
Age	52.9 (11.27)	48.75 (12.44)	−0.35	48.7 (12.5)	48.75 (12.44)	0.00
Age (≤45)	1042 (23%)	1102 (36.31%)	0.29	1110 (36.66%)	1102 (36.31%)	−0.01
Age (46 – 64)	3016 (66.58%)	1744 (57.46%)	−0.19	1729 (57.12%)	1744 (57.46%)	0.01
Age (≥65)	472 (10.42%)	189 (6.23%)	−0.15	188 (6.22%)	189 (6.23%)	0.00
Sex (Women)	2519 (55.61%)	1743 (57.43%)	0.04	1726 (57.01%)	1743 (57.43%)	0.01
Covid	57 (1.26%)	54 (1.78%)	0.04	54 (1.8%)	54 (1.78%)	0.00
Anxiety	923 (20.38%)	572 (18.85%)	−0.04	573 (18.92%)	572 (18.85%)	0.00
Cancer	507 (11.19%)	278 (9.16%)	−0.07	281 (9.27%)	278 (9.16%)	0.00
CHF	169 (3.73%)	55 (1.81%)	−0.12	59 (1.96%)	55 (1.81%)	−0.01
CAD	517 (11.41%)	199 (6.56%)	−0.17	203 (6.7%)	199 (6.56%)	−0.01
CKD	291 (6.42%)	121 (3.99%)	−0.11	125 (4.14%)	121 (3.99%)	−0.01
COPD	149 (3.29%)	56 (1.85%)	−0.09	57 (1.9%)	56 (1.85%)	0.00
ESRD	38 (0.84%)	12 (0.4%)	−0.06	13 (0.44%)	12 (0.4%)	−0.01
Hypertension	3346 (73.86%)	1557 (51.3%)	−0.48	1566 (51.73%)	1557 (51.3%)	−0.01
Osteoarthritis	756 (16.69%)	379 (12.49%)	−0.12	378 (12.49%)	379 (12.49%)	0.00
SAD	180 (3.97%)	120 (3.95%)	0.00	119 (3.93%)	120 (3.95%)	0.00
Urban	3663 (80.86%)	2339 (77.07%)	−0.09	2337 (77.19%)	2339 (77.07%)	0.00
IA	31 (0.68%)	17 (0.57%)	−0.04	18 (0.61%)	17 (0.57%)	−0.01
OP Surgery	233 (5.14%)	129 (4.24%)	−0.08	127 (4.2%)	129 (4.24%)	0.00
PCP Visit	1012 (22.35%)	560 (18.44%)	−0.20	561 (18.52%)	560 (18.44%)	0.00
SO Visit	2627 (57.99%)	1599 (52.69%)	−0.07	1610 (53.17%)	1599 (52.69%)	−0.01
Office Visit	3639 (80.34%)	2159 (71.13%)	−0.11	2170 (71.7%)	2159 (71.13%)	−0.01
UC Visit	168 (3.72%)	94 (3.1%)	−0.09	92 (3.06%)	94 (3.1%)	0.01
ER Visit	111 (2.46%)	55 (1.83%)	−0.12	55 (1.83%)	55 (1.83%)	0.00
Drug Counts	1.23 (0.94)	0.92 (0.81)	−0.35	0.94 (0.77)	0.92 (0.81)	−0.02
DCSI	2.15 (2.75)	1.41 (2.38)	−0.29	1.42 (2.39)	1.41 (2.38)	0.00
PDC	0.67 (0.34)	0.56 (0.36)	−0.32	0.57 (0.36)	0.56 (0.36)	−0.04
Monthly Total Health Care Spending	1151.72 (1528.96)	943.79 (1471.45)	−0.14	900.76 (1323.92)	943.79 (1471.45)	0.03
Monthly Drug Spending	525.36 (850.18)	427.32 (836.44)	−0.12	381.24 (759.72)	427.32 (836.44)	0.06
Monthly Medical Spending	626.36 (1167.57)	516.47 (1126.83)	−0.10	519.52 (985.33)	516.47 (1126.83)	0.00

Abbreviations: Congestive Heart Failure (CHF), Coronary Artery Disease (CAD), Chronic Kidney Disease (CKD), Chronic Obstructive Pulmonary Disease (COPD), End-stage Renal Disease (ESRD), Substance Abuse Disorder (SAD), Inpatient Admission (IA), Outpatient Surgery (OP), Primary Care Physician (PCP), Specialty Office (SO), Urgent Care (UC), Emergency Room (ER), Diabetes Complication Severity Index (DCSI), Standardized Mean Difference (SMD), Proporion of Days Covered (PDC).

Notes: Table displays counts and percentages for categorical variables and means and standard deviations for continuous variables. Monthly expenditures were not included in the probit regression that predicted treatment status, it is displayed to assessment balance across treatment and control groups.

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Table 2.

Impact of the ZDC Program on Monthly Spending Across All Members and Subgroups

	All Members (N = 7,565)		
Outcomes	**Total Healthcare Spending**	**Pharmacy Spending**	**Medical Spending**
ZDC Effect	$-121.76 **	$9.74	$-131.50 ***
Standard Error	39.81	15.93	35.94
Baseline Outcome Average for ZDC Group	$943.79	$427.32	$516.47
Impact (%)	−12.90%	2.28%	−25.46%
Annual Impact	$-1,461.11	$116.91	$-1,578.02
	Pre-ZDC Users (N = 3,945)		
Outcomes	**Total Healthcare Spending**	**Pharmacy Spending**	**Medical Spending**
ZDC Effect	$-81.32	$-23.69	$-57.53
Standard Error	48.62	17.14	45.07
Baseline Outcome Average for ZDC Group	$648.93	$224.12	$424.81
Impact (%)	−12.53%	−10.57%	−13.57%
Annual Impact	$-975.83	$-284.28	$-691.56
	Pre-ZDC Non-Users (N = 1,290)		
Outcomes	**Total Healthcare Spending**	**Pharmacy Spending**	**Medical Spending**
ZDC Effect	$-71.72	$-66.35	$-5.37
Standard Error	84.47	42.84	76.71
Baseline Outcome Average for ZDC Group	$1289.27	$774.14	$515.13
Impact (%)	−5.56%	−8.57%	−1.04%
Annual Impact	$-860.63	$-796.22	$-64.41
	Complex Users (N = 2,330)		
Outcomes	**Total Healthcare Spending**	**Pharmacy Spending**	**Medical Spending**
ZDC Effect	$-283.44 **	$102.01 **	$-385.45 ***
Standard Error	102.48	44.56	87.23
Baseline Outcome Average for ZDC Group	$1387.16	$644.20	$742.97
Impact (%)	−20.43%	15.84%	−51.88%
Annual Impact	$-3401.29	$1224.13	$-4625.42

Abbreviations:

*** : P ≤ 0.001,

** : p ≤ 0.01;

* : p ≤ 0.05, no star: p > 0.05.

Notes: Table displays estimates of ZDC program impact from difference-in-difference regression. The unit is per member per month.