Impact of zero-dollar copayment on medication adherence, resource utilization, and disease control in diabetic patients in an employee health group

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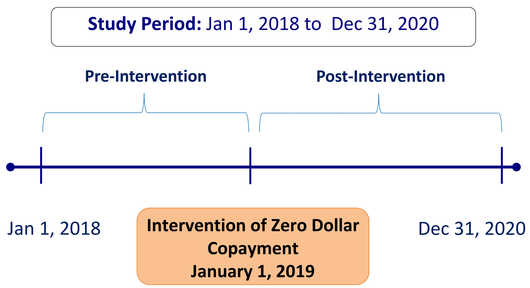
BACKGROUND

- Poor medication adherence in diabetes has shown to increase the likelihood of negative outcomes, such as all-cause hospitalization.[1,2]
- Value-based insurance design (VBID) attempts to promote adherence by lowering or eliminating out-of-pocket costs for drugs known to improve medical outcomes.
- Since April 2016, Baylor Scott & White Health has implemented a copay reduction program for select brand chronic and preventive medications with the goal of improving adherence to costly medications.
- In 2019, a $0 out-of-pocket benefit for all diabetes medications (generic & brand) was provided for health system employees earning <$25/hour, which lowered costs even further.

Purpose: To evaluate the impact of a zero-dollar copayment benefit on adherence rates in patients with diabetes

Study Period:



Study Inclusion:

- Employees and dependents >18 years old
- ICD-10 diagnosis: E11.XX –Type 2 Diabetes Mellitus (T2DM)
- At least one paid claim for diabetes medication

METHODS

- Retrospective study using an interrupted time series design
- Pharmacy claims data from the system's virtual data warehouse was obtained to determine medication adherence.
- Medication adherence will be calculated via monthly proportion of days covered (PDC)
- **Statistical Analysis**: The general segmented regression model was fitted manually with guidance from an automated stepwise selection fitting process using predicted residual sum of squares (PRESS) criteria on all measured variables.

MODEL

Sample Size:

Drug Class	# of Patients
Biguanides	427
GLP-1 agonists	147
SGLT2-inhibitors	80

Due to insufficient patient count, alpha-glucosidase inhibitors, DPP-4 inhibitors, meglitinides, sulfonylureas, and TZDs were not considered further.

Missing Data

- Fill data was incomplete for month 34, and not provided for the months leading into month 0.
- Three indicator variables were assigned to the months with missing fill data (*missingmonth0)* and the 1st and 2nd months immediately following (*missingmonth1* and *missingmonth2)*

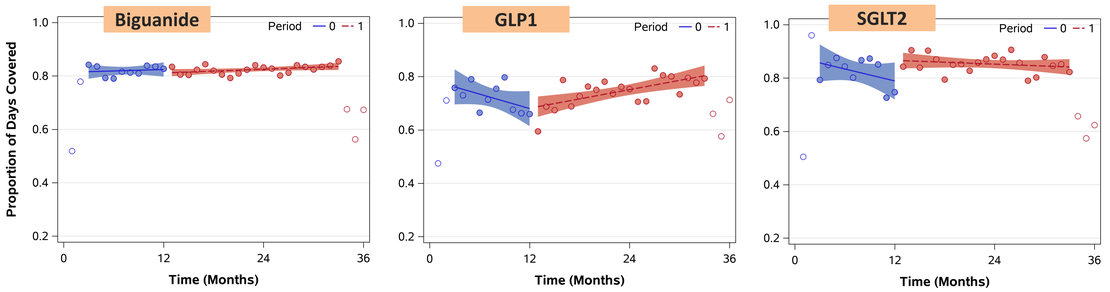
Final Model

$$PDC = \beta 0 + (\beta_1 * time) + (\beta_2 * intervention) + (\beta_3 * time\ after\ intervention) + (\beta_4 * missingmonth0) + (\beta_5 * missingmonth1) + (\beta_6 * missingmonth2) + \varepsilon$$

Model Variable	Interpretation
PDC	Predicted adherence
time	Elapsed time (in months)
intervention	Binary Indicator – Zero-dollar copay
time after intervention	Elapsed time after Zero-dollar copay is in effect (in months)
missingmonth0	Binary indicator for months with missing fill data
missingmonth1	Binary indicator for 1st month after month with missing fill data
missingmonth2	Binary indicator for 2nd month after month with missing fill data

RESULTS AND DISCUSSION

Variable	Parameter	Biguanide			GLP1			SGLT2i		
		Estimate	Std. Error	*P*-value	Estimate	Std. Error	*P*-value	Estimate	Std. Error	*P*-value
intercept	β_0	0.28489	0.03748	**<0.0001**	0.28264	0.07382	**0.0006**	0.35839	0.09296	**0.0006**
time	β_1	-0.00097	0.00216	0.6566	-0.00838	0.00426	0.0589	-0.01070	0.00537	0.0556
intervention	β_2	-0.00304	0.01565	0.8474	-0.00124	0.03083	0.9681	0.09511	0.03882	**0.0205**
time after intervention	β_3	0.00158	0.00244	0.5266	0.01421	0.00480	**0.0061**	0.00838	0.00605	0.1764
missingmonth0	β_4	0.15353	0.02454	**<0.0001**	0.14895	0.04834	**0.0045**	0.16762	0.06087	**0.0101**
missingmonth1	β_5	0.28879	0.01888	**<0.0001**	0.26969	0.03719	**<0.0001**	0.32095	0.04683	**<0.0001**
missingmonth2	β_6	0.10324	0.01859	**<0.0001**	0.08193	0.03662	**0.0331**	0.06228	0.04611	0.1873



Significant Parameter Estimates

- At baseline, adherence for SGLT2 was the highest at 0.84696, followed by biguanides at 0.83045, and GLP1s at 0.78321.
- At the introduction of the zero-dollar copay, there was a significant increase in SGLT2 adherence of 0.09511, while adherence for GLP1 began to significantly increase by 0.01421 monthly after the intervention.

Discussion

- Introduction of the zero-dollar copay for diabetes drugs was most beneficial for GLP1-agonist patients, as there was a durable increase in PDC increase each month.
- Overall trends in adherence for SGLT2 inhibitors before and after the policy change were not statistically significant; however, there was a significant increase in adherence to SGLT2s immediately after the policy change.
- Larger sample sizes are needed to validate these findings.

References

1. Han E, Suh DC, Lee SM, Jang S. The impact of medication adherence on health outcomes for chronic metabolic diseases: a retrospective cohort study. *Res Social Adm Pharm*. 2014;10(6):e87-e98.
2. Lee JL, Maciejewski M, Raju S, Shrank WH, Choudhry NK. Value-based insurance design: quality improvement but no cost savings. *Health Aff (Millwood)*. 2013;32(7):1251-1257.