



## COMPLETED GRANT SYNOPSIS

### Evaluation of Cost and Health Utilization Outcomes of Medicare beneficiaries Enrolled in a Medication Synchronization Program

Waghmare PH, Huang CY, Green WM, Jaynes HA, Snyder ME, Zillich AJ  
Purdue University College of Pharmacy | West Lafayette, IN

Objectives	
Medication synchronization (med-sync) aligns patients' chronic medications to a predetermined routine pickup date at a community pharmacy. An appointment-based model (ABM) med-sync service includes a comprehensive medication review or other clinical appointment at the pharmacy. We compared the cost and healthcare utilization outcomes of Medicare beneficiaries enrolled in an ABM med-sync program to beneficiaries not enrolled in such a program.	
Methods	
Design	<ul style="list-style-type: none"> <li>This retrospective cohort study included Medicare beneficiaries obtaining medications from pharmacies providing ABM med-sync.</li> <li>Medicare inpatient, outpatient, emergency, and pharmacy claims data from 2014 to 2016 were used to create med-sync (n=13,193) and non-med-sync (n=156,987) cohorts.</li> <li>All patients were followed longitudinally for 12 months before and after a 2015 index/enrollment date.</li> <li>Anderson's health utilization framework was used to select covariates. The framework posits health service use is determined by primary determinants of health behavior, namely, predisposing, enabling and need characteristics.</li> <li>Baseline characteristics including age, gender, race, geographical region, income-based enrollment status, copayment, and urban residence adopted through this framework were utilized to create a logistic regression model for propensity score matching.</li> <li>A 1:1 greedy nearest neighbor matching algorithm was adapted for sequentially matching both cohorts.</li> </ul>
Study endpoints	<ul style="list-style-type: none"> <li>Difference-in-differences (DID) was used to compare mean changes in costs and utilization outcomes between med-sync and non-med-sync cohorts.</li> </ul>
Results	
After propensity score matching, 13,193 beneficiaries in each cohort were used for analysis (Table 1). Mean outpatient, emergency, pharmacy, and total costs increased before and after enrollment for both cohorts (Table 2). No significant DID in costs were observed between cohorts. Healthcare utilization mean DID were significantly greater in the non-med-sync cohort compared to the med-sync cohort for outpatient visits (DID: 1.17, p<0.0001), emergency department visits (DID: 0.03, p=0.0372) and pharmacy fills (DID: 1.93, p<0.0001). There was no significant DID for inpatient visits between cohorts.	
Conclusion	
Outpatient, emergency, and pharmacy utilizations changes were significantly higher in the non-med-sync cohort compared to the med-sync cohort in the 12-months after enrollment. Lower pharmacy utilization could be due to optimization of therapy during medication reviews of patients in the ABM med-sync cohort.	

**Table 1:** Comparing characteristics of medication synchronization (med-sync) enrolled beneficiaries to non-medication synchronization (non-med-sync) enrolled beneficiaries for predisposing, enabling, and need characteristics after propensity score matching.

<b>Characteristics</b>	<b>Med-sync (n=13,193)</b>	<b>Non-med-sync (n=13,193)</b>
<b>Predisposing characteristics</b>		
<b>Gender, n (%)</b>		
Female	7,529 (57.1%)	7,548 (57.2%)
Male	5,664 (42.9%)	5,645 (42.8%)
<b>Age, continuous</b>		
Mean, Standard deviation	75.0 (11.6%)	75.1 (11.6%)
<b>Age, categorical, n (%)</b>		
18-64	1611 (12.2%)	1610 (12.2%)
65-74	4479 (34.0%)	4473 (33.9%)
75-84	4677 (35.5%)	4680 (35.5%)
85 and above	2426 (18.4%)	2430 (18.4%)
<b>Race/Ethnicity, n (%)</b>		
White	11909 (90.3%)	11959 (90.7%)
Black	714 (5.4%)	722 (5.5%)
Other	198 (1.5%)	185 (1.4%)
Asian	131 (1.0%)	114 (0.9%)
Hispanic	189 (1.4%)	180 (1.4%)
North American Native	37 (0.3%)	24 (0.2%)
Unknown	15 (0.1%)	9 (0.1%)
<b>Enabling characteristics</b>		
<b>Income based enrollment, n (%)</b>		
No Low-Income Subsidy	11211 (85.0%)	11276 (85.5%)
Dual Medicaid Enrollment	1508 (11.4%)	1459 (11.1%)
Qualified Medicare Beneficiaries	287 (2.2%)	282 (2.1%)
Specified Low-Income Beneficiary	187 (1.4%)	176 (1.3%)

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<b>Copayment Indicator, n (%)</b>		
No coverage gap	6937 (52.6%)	6964 (52.8%)
Coverage gap	1078 (8.2%)	1063 (8.1%)
Catastrophic coverage	275 (2.1%)	254 (1.9%)
Unknown <sup>1</sup>	4903 (37.2%)	4912 (37.2%)
<b>Geographic Region, n (%)</b>		
South	6716 (50.9%)	6735 (51.1%)
Midwest	1133 (8.6%)	1130 (8.6%)
Northeast	4071 (30.9%)	4085 (31.0%)
West	1112 (8.4%)	1082 (8.2%)
Other	161 (1.2%)	161 (1.2%)
<b>Type of Residence, n (%) (%)</b>		
Metro	11434 (86.7%)	11442 (86.7%)
Non-Metro	1557 (11.8%)	1542 (11.7%)
Unknown	202 (1.5%)	209 (1.6%)
<b>Need characteristics</b>		
<b>Number of unique oral chronic medications</b>		
Mean, Standard deviation	8.0 (7.5)	8.0 (7.3)
<b>Elixhauser Comorbidity score</b>		
Mean, Standard deviation	6.3 (4.3)	6.3 (4.2)
<b>Outpatient visits</b>		
Mean, Standard deviation	24.5 (18.9)	24.0 (18.5)
<b>Inpatient hospitalizations</b>		
Mean, Standard deviation	0.5 (1.3)	0.5 (1.2)
<b>Emergency Department visits</b>		
Mean, Standard deviation	1.0 (2.2)	0.9 (1.9)

**Table 2.** Difference-in-difference (DID) cost and utilization model comparison of Med-sync and Non-Med-sync groups

Component*	12-month pre-index		12-month post- index		Difference in costs pre and post index		Percent change in costs pre and post index		DID	p-value
	Med Sync	Non-Med sync	Med Sync	Non-Med sync	Med Sync	Non-Med sync	Med Sync	Non-Med sync		
<b>Utilization</b>										
<b>Inpatient hospitalizations, mean (n)</b>	0.54	0.51	0.65	0.63	0.11	0.12	9.2%	10.5%	0.01	0.1966
<b>Outpatient visits, mean (n)</b>	24.56	24.02	24.92	25.55	0.36	1.53	0.7%	3.1%	1.17	<0.0001**
<b>Emergency department visits, mean (n)</b>	0.99	0.92	1.17	1.13	0.18	0.21	8.3%	10.2%	0.03	0.0372**
<b>Pharmacy (drug) utilization, *** mean (n)</b>	47.61	46.68	49.28	50.29	1.67	3.60	1.7%	3.7%	1.93	<0.0001**
<b>Cost</b>										
<b>PM Total, mean (\$USD)</b>	8,310	8,221	9,133	9,157	822	935	10%	11%	113	0.8436
<b>PM Inpatient, mean (\$USD)</b>	1,321	1,357	1,090	1,153	-230	-205	-17%	-15%	-25	0.8708
<b>PM Outpatient, mean (\$USD)</b>	2,809	2,775	2,907	2,957	98	182	3%	7%	84	0.6257
<b>PM Emergency, mean (\$USD)</b>	5,684	5,380	6,490	6,633	805	1,252	14%	23%	447	0.2683
<b>PM Pharmacy, mean (\$USD)</b>	3,694	3,732	3,995	3,961	302	229	8%	6%	-73	0.4095

\*PM=per member, costs components had variable numbers of beneficiaries as not all beneficiaries have cost data for each component. All costs were adjusted to 2016 value

\*\*Significant at alpha=0.05

\*\*\*Number of medications and pharmacy services obtained per member