Building the Evidence Base for Evaluating Complex Formulary Designs in Type 2 Diabetes Mellitus

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Background

- **Utilization management tools** (e.g., prior authorization, quantity limits and step therapy) are used to restrict access to medications.
- Fee-for-service **Part D plans are increasingly employing utilization management tools**:
  - Average share of covered drugs subject to utilization management rose from **18% in 2007 to 32% in 2011**
  - Coverage of available chemical entities **decreased from 89% in 2007 to 84% in 2011**
- Previous research shows that **medication utilization is decreased when a prior authorization or step edit is required**, with an unclear impact on medical spending.
- Dipeptidyl peptidase-4 inhibitors (DPP4) are a commonly used class of antihyperglycemic drugs as an addition to metformin therapy, as an alternative to sulfonylureas.
- Current evidence is insufficient to judge the impact of complex formulary designs with multiple restrictions in this drug class.

Objective and Conceptual Framework

Objective: To examine the effect of formulary restrictions on the use of non-insulin antihyperglycemic drugs, with a focus on the DPP4 drug class.

Hypothesis: Formulary restrictions on the DPP4 drug class would result in:

- Decreased initiation of DPP4s as a second-line agent in current metformin users.
- Decreased utilization of DPP4 drugs among these DPP4 initiators.

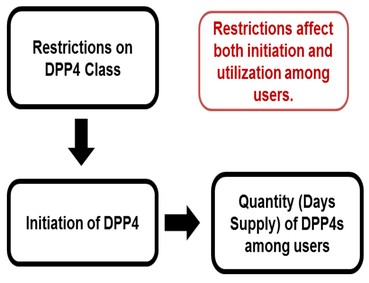

Figure 1. Conceptual Framework.

References

- Salas M, Hughes D, Zuluaga A, Vardeva K, Lebmeir M. Costs of medication nonadherence in patients with diabetes mellitus: a systematic review and critical analysis of the literature. Value Health. 2009;19(6):915-922.
- Academy of Managed Care Pharmacy, Shoemaker SJ, Pozniak A, Subramanian R, Mauch D. Effect of 6 managed care pharmacy tools: a review of the literature. JMCP 2010 Jul;16(6 Suppl):S3-S20.
- Shenolikar R, Bruno, Cantrell C. Sensitivity of medication use to formulary controls in Medicare beneficiaries: a review of the literature. Am Health & Drug Benefits. 2011;4(7):465-74
- Hoadley J, Hargrave E, Merrell K. Medicare Part D Formularies, 2006-2011: Update to the Chartbook. Report to MedPAC, August 2011. No. 11-4

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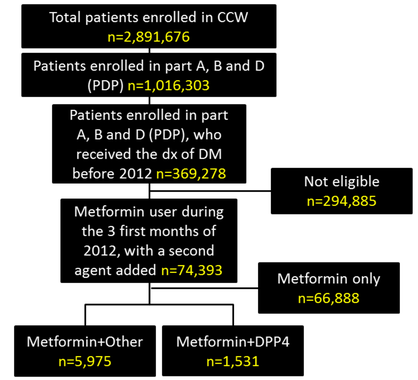
Methods

- **Data: 2012 Chronic Condition Data Warehouse 5% File (CCW) Medicare beneficiaries** with a type 2 diabetes mellitus (T2DM) diagnosis prior to January 1, 2012 and whose only antihyperglycemic agent was metformin from January 1 – March 31, 2012.
- **Part D prescription claims**: to identify antihyperglycemic drug exposure from April 1 – December 31, 2012: **metformin alone, metformin plus DPP4 (MET+DPP4) or metformin plus another non-insulin antihyperglycemic drug (MET+OTHER)**.
- Three possible formulary restrictions for DPP4s among the 337 formularies: **prior authorization, step therapy or formulary exclusion. (0: no drugs restricted, 1: 1 or more drugs restricted)**
- Multinomial logistic regression was used to measure the **association of restrictions in individual classes with initiation of a DPP4**. Multivariable linear regression was used to measure the **association of restrictions with drug utilization as measured by days supplied**.

Figure 2. Cohort identification



Results

- Of 7,506 beneficiaries with treatment intensification, 69% took a sulfonylurea, 20% took a DPP-4, and the rest took other second-line agents (Figure 2).
- Table 3 and 4 show that formulary exclusion of any DPP-4 was associated with a higher likelihood of use but reduced the days supply among users.
- Among those who initiated DPP4s, **exclusion of one or more drugs on formularies was associated with a 12 day reduction in days supplied (p = 0.04).** Step therapy on one or more DPP4s was associated with a 20-day increase in days supplied of sulfonylureas (Table 4).

Table 1. Demographic Characteristics

	Sulfonylureas N = 5174	DPP-4 Inhibitors N = 1531	Other Non-Insulin AD N = 801
Demographics			
Age			
<65	19.71%	22.27%	28.96%
65 – 74	47.58%	47.62%	48.94%
75 – 84	26.01%	24.30%	18.98%
85+	6.69%	5.81%	3.12%
Female	55.26%	60.16%	56.55%
Race/ethnicity			
White	74.06%	72.96%	74.03%
Black	14.28%	13.52%	14.36%
Hispanic	5.22%	6.66%	4.74%
Other	6.44%	6.86%	6.86%
Diabetes Severity/complications			
Uncontrolled diabetes	6.49%	9.14%	11.86%
Long-term complications	3.32%	3.20%	4.49%
Short-term complications	0.17%	0.26%	0.12%
Hypoglycemia	0.02%	0%	0%
Died during the year	1.37%	0.78%	0.87%

Conclusion

Formulary restrictions in the DPP4 class of antihyperglycemic agents increased their uptake and decreased their days supplied among DPP4 users.

Table 2. Characteristics of Part D Formulary Restrictions on Sole-Source Brand Non-Insulin Antihyperglycemic Drugs in 2012

Drug Class , Category of Restriction, and Drug Product	Part D Formularies	Part D Enrollees	Enrollees taking the drug	% of new users using the drug	Mean Days Supply for users (SD)
DPP-4 inhibitors	N = 337	N = 7506	N=1531		
Formulary exclusion					
No restrictions	150	1718	286	17%	136.22(126.02-146.42)
Any drug restricted	187	5788	1245	22%	121.41(116.78-126.04)
Prior authorization					
No restrictions	333	7484	1529	20%	124.09(119.87-128.32)
Any drug restricted	4	22	2	9%	189.5(-731.70-1110.70)
Step therapy					
No restrictions	252	5489	1178	21%	124.99(120.23-129.75)
Any drug restricted	85	2017	353	18%	121.47(112.29-130.65)

Table 3. Multinomial Regression results: Choice of Second-Line Antihyperglycemic Drug

Formulary Restriction Type and Beneficiary Characteristics	Marginal Probability of Use (Reference Category = Sulfonylurea User) DPP-4 Inhibitor N = 1531	Other Non-Insulin AD N = 801
Formulary restrictions		
DPP-4 exclusion	1.424(1.226-1.655)	1.22(1.006-1.48)
DPP-4 prior authorization	0.413(0.095-1.797)	0.399(0.052-3.038)
DPP-4 step therapy	0.621(0.515-0.749)	0.583(0.456-0.745)
GLP-1 exclusion	1.069(0.917-1.245)	1.018(0.832-1.244)
GLP-1 prior authorization	1.283(1.064-1.547)	1.302(1.021-1.661)
GLP-1 step therapy	1.176(0.948-1.459)	1.28(0.971-1.687)

Adjusted for: age, sex, race, diabetes severity, diabetes management, comorbidities, health system contacts, death.

Table 4. Regression Results: Days Supply of Antihyperglycemic Drugs

Variables	Sulfonylureas N=5174		DPP-4 Inhibitor N = 1531		GLP-1 N = 311	
	Estimate	p-value	Estimate	p-value	Estimate	p-value
Intercept	193.96	<.0001	142.22	<.0001	123.6	<.0001
DPP-4 exclusion	-7.26	0.25	-12.26	0.04	5.95	0.66
DPP-4 prior authorization	2.54	0.95	49.28	0.41	-62.47	0.46
DPP-4 step therapy	19.93	0.02	-0.56	0.94	-2.61	0.89
GLP-1 exclusion	3.26	0.64	3.3	0.57	10.93	0.42
GLP-1 prior authorization	-1.7	0.84	-0.76	0.92	-8.51	0.63
GLP-1 step therapy	-7.39	0.44	-8.68	0.28	7.02	0.72

Adjusted for: age, sex, race, diabetes severity, diabetes management, comorbidities, health system contacts, death.