Use & costs of antidiabetic medications in U.S. adult dialysis patients with Medicare Part D in 2007

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Introduction

- More than 55% of prevalent dialysis patients in 2007 had diabetes mellitus (DM) as a cause of ESRD or a comorbid condition.
- There have been no published reports describing the use and costs of medications to treat DM in dialysis patients after the implementation of the Medicare Part D prescription drug benefit.
- Very little information exists about adverse effects or the comparative effectiveness of these agents in dialysis patients.
- Understanding use patterns, including single medication and combination medication use, is the first step toward designing comparative effectiveness studies.
- We investigated the prevalence of antidiabetic medication use in Medicare dialysis patients, along with the relative odds of use by age, ESRD network, and low-income subsidy (LIS) status.
- We also assessed related patient and Medicare costs.

Methods

- From USRDS data, we identified point-prevalent adult (≥18 years) dialysis patients, alive on January 1, 2007.
- We also required both survival and dialysis therapy during all of 2007.
- We included only patients with DM, as indicated either as the primary cause of ESRD or as a comorbid condition on CMS form-2728 (at any time) or on Medicare claims from 2007.
- Data were linked with 2007 Part D enrollment and drug data from the CMS Chronic Condition Warehouse.
- We retained those patients with enrollment in either a standalone or Medicare Advantage Part D plan during all of 2007.
- We analyzed drug event data pertaining to alpha-glucosidase inhibitors (AGIs), amylin analogues (AAs), biguanides (BIs), DPP-4 inhibitors (DPP-4Is), incretin mimetics (IMs), glinides, sulfonylureas (Sulf.), thiazolidinediones (TZDs), and insulin, as indicated by National Drug Codes in the First DataBank drug database.
- We used logistic regression to estimate odds ratios of oral diabetes agents and insulin use, adjusted for demographics, ESRD network, LIS status, CV comorbidity and diabetes (type 1, 2).
- We calculated out-of-pocket (OOP) costs per user and gross drug costs per member per month (PMPM).

Results

- The cohort of adult dialysis patients with diabetes and continuous Part D coverage in 2007 (n=93,046) was 39% black and 49% female; mean age 62.3 yr, mean ESRD duration 3.3 yr.
- Almost 30% of patients used oral antidiabetic agents; sulfonylureas were most commonly used (17%), followed by TZDs (13%) and glinides (3.3%; Figure 1).
- 50% used insulin (Figure 1).
- Exenatide (incretin mimetic) and metformin (biguanide) were used in a minority of patients.
- Sulfonylurea and TZD use was higher in Asian/Pacific Islander patients, while insulin use was higher in whites (Table 1).
- TZD and insulin use was higher in patients receiving LIS (Table 1).
- Younger patients (age < 45 yr) were less likely to use oral antidiabetic agents, while older patients were less likely to use insulin (Figure 2).
- The odds of receiving an oral antidiabetic agent or insulin varied considerably across the ESRD Networks, even after adjustment for multiple factors (Figures 3, 4).
- After adjustment, LIS patients were more likely to use glinides, TZDs, and insulin than non-LIS patients (Figure 5).
- Glipizide was the most commonly used sulfonylurea (Figure 6).
- Only 12% of patients received long-term (≥ 90 days) combination medication therapy; use of a sulfonylurea with a glinide was most common (Figure 7).
- OOP costs for LIS patients were < $2 per month, regardless of agent; OOP costs were 6-8 times higher for TZDs, glinides, and insulin than sulfonylureas in non-LIS patients (Figure 8).
- Gross costs PMPM were highest for insulin and TZDs (Figure 9).

Figure 1. Prevalence of use (≥ 1 prescription) of oral diabetes medications and insulin

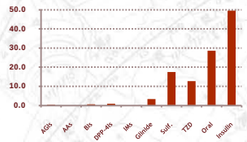


Table 1. Prevalence of use (≥ 1 prescription) of glinides, sulfonylureas, TZDs, and insulin within demographic and LIS strata

	N	% glinide	% sulf.	% TZD	% insulin
All patients	93,046	3.3	17.5	12.7	49.6
Age					
18-44 yr	8957	1.43	8.6	7.7	55.1
45-64 yr	40,015	2.94	17.3	13.4	52.8
65-74 yr	27,455	3.98	19.9	13.9	49.3
75+ yr	16,619	4.26	18.8	11.7	39.3
Race					
White	49,327	3.52	19.0	13.3	52.8
Black	36,487	2.78	14.7	10.7	46.0
American Indian/ Alaska Native	2027	0.74	14.9	18.1	44.4
Asian/Pacific Isl.	4411	6.62	23.8	18.0	45.5
Other or unk.	794	5.79	18.5	19.5	52.1
Sex					
Men	45,166	3.23	18.5	12.5	45.9
Women	47,880	3.44	16.5	12.8	53.1
Primary ESRD cause					
Diabetes	72,821	3.57	18.7	13.9	56.2
Hypertension	12,166	2.92	14.6	9.1	28.1
Glomeruloneph.	2807	1.67	9.1	5.6	16.6
Cystic kidney	531	1.51	10.9	8.9	18.6
Other or unk.	4721	1.97	11.7	8.0	26.2
ESRD duration					
< 0.5 yr	9718	3.68	20.9	12.9	55.5
0.5-0.9 yr	11,914	3.46	19.9	12.5	53.4
1.0-1.9 yr	18,567	3.60	18.9	13.1	52.4
≥ 2.0 yr	52,847	3.15	15.8	12.6	46.7
Low income subsidy (LIS)					
No LIS	25,152	3.18	18.8	10.3	43.5
LIS	67,894	3.39	17.0	13.6	51.8

Figure 2. Adjusted odds ratios of antidiabetic medication use across age categories (referent: 45-64 years)

Adjusted for demographics, ESRD Network, LIS status, CV comorbidity, and diabetes type

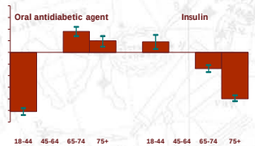


Figure 3. Adjusted odds ratios of oral antidiabetic agent use across ESRD Networks (referent: Network 18, So. CA)

Adjusted for demographics, ESRD Network, LIS status, CV comorbidity, and diabetes type

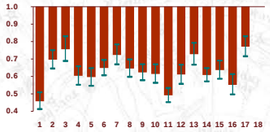


Figure 4. Adjusted odds ratios of insulin use across ESRD Networks (referent: Network 18, So. CA)

Adjusted for demographics, ESRD Network, LIS status, CV comorbidity, and diabetes type

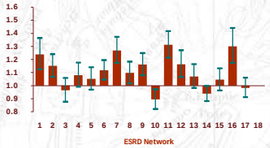


Figure 5. Adjusted odds ratios of antidiabetic medication use for LIS status (LIS vs. no LIS)

Adjusted for demographics, ESRD Network, LIS status, CV comorbidity and diabetes type

Figure 6. Distribution of use of individual sulfonylurea agents

Each prescription was weighted by the days of medication supplied.

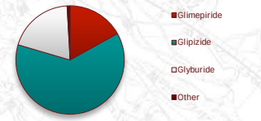


Figure 7. Prevalence of use of combination antidiabetic agent regimens, by duration of combination exposure

In treated patients

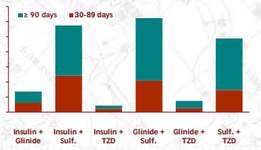


Figure 8. Out of pocket costs per user per month, stratified by LIS status

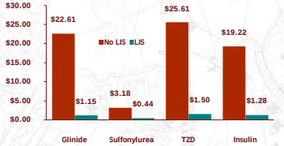
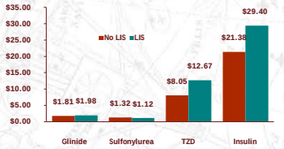


Figure 9. Gross costs per member per month, stratified by LIS status



Conclusions

- In 2007, variation existed in use of antidiabetic agents in adult dialysis patients with Part D coverage.
- Newer agents and metformin were not extensively used in dialysis patients in 2007.
- Further research will examine other factors that may impact use and variation in diabetic agent use in adult dialysis patients.

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