Use and costs of phosphate binders in U.S. dialysis patients with Medicare Part D in 2007

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Introduction

- Observational studies have found a strong association between high serum phosphorus and increased mortality risk in dialysis patients.
- While phosphate binders are an important tool for managing hyperphosphatemia, the best choice of binder is unclear.
- In one study, the use of phosphate binders was associated with lower mortality risk in hemodialysis patients. The mortality benefit was observed independently of the specific binder used.
- An open-label randomized clinical trial (DCOR) found no mortality benefit with sevelamer versus calcium-containing binder use in hemodialysis patients.
- The choice of binder is likely to have important economic impli-cations for patients and insurers.
- In this study, we investigated the prevalence of phosphate binder use in Medicare dialysis patients with Part D coverage in 2007.
- 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 further required both survival and continuous dialysis therapy during all of 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 for calcium acetate (CA), lanthanum carbonate (LC), and sevelamer hydrochloride (SH), as identified by National Drug Codes in the First DataBank database.
- We used logistic regression to estimate odds ratios of CA, LC, and SH use, adjusted for demographics, ESRD network, CV comorbidity, and low-income subsidy (LIS) status.
- 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 continuous Part D coverage in 2007 (n=168,055) was 42% African American and 48% female, with mean age 59.6 yr and mean ESRD duration 4.3 yr.
- Overall, 76% of patients used phosphate binders.
- 48, 37 and 12% used sevelamer, calcium acetate, and lanthanum carbonate respectively (Figure 1).
- Calcium acetate use was higher in men, patients with diabetes as the primary cause of ESRD, those with shorter dialysis duration (< 2 yr) (Table 1) and those with LIS.
- Lanthanum use was higher in younger patients (< 45 yr), those with longer dialysis duration, patients dialyzing in for-profit facilities & those with LIS (Table 1).
- Sevelamer use was higher in younger patients, Asian/Pacific Islanders, females, those with longer dialysis duration and those with LIS (Table 1).
- After adjustment for multiple factors, the odds of calcium acetate use in Network (NW) 4 was 2.3 times that in NW 18, and for lanthanum use, the odds in NW 7 were 1.6 times that in NW 18. Adjusted odds of sevelamer use were highest in NWs 17 and 18 (Figures 2, 3, and 4).
- After adjustment, LIS patients were 1.7 times more likely to receive any binder than non-LIS patients.
- LIS patients were 1.5 times more likely to use sevelamer than non-LIS patients (Figure 5).
- About 16% (8%) of treated patients used a combination of phosphate binders for ≥ 30 days (≥ 90 days) (Figure 6).

Table 1. Prevalence of use (≥ 1 prescription) of ACEIs, ARBs, and RIs within demographic, provider, and low income subsidy (LIS) strata

	N	% CA	% LC	% SH	% any binder
Age					
18-44 yr	29,664	36.0	16.5	50.9	77.8
45-64 yr	68,020	38.4	13.8	50.8	78.7
65-74 yr	39,879	38.2	9.8	47.3	76.0
75+ yr	30,492	35.6	7.6	41.3	69.9
Race					
White	85,069	38.8	12.5	46.7	75.5
Black	71,135	35.6	12.2	49.1	77.0
American Indian/ Alaska Native	2664	36.2	8.2	44.5	70.0
Asian/Pacific Isl.	7827	38.8	10.2	58.2	81.2
Other or unkn.	1360	40.1	14.5	51.1	79.5
Sex					
Men	87,249	38.1	12.9	45.7	74.6
Women	80,806	36.8	11.4	51.1	78.2
Primary ESRD cause					
Diabetes	72,821	40.3	11.5	47.8	77.8
Hypertension	48,708	35.3	12.2	48.6	75.5
Glomeruloneph.	18,878	35.8	14.2	50.2	76.6
Cystic kidney	4103	34.4	14.7	52.3	77.4
Other or unk.	23,545	34.8	12.4	47.0	73.1
ESRD duration					
< 0.5 yr	15,005	40.4	9.8	41.8	72.5
0.5-0.9 yr	18,637	40.2	11.5	43.3	74.3
1.0-1.9 yr	29,900	39.2	12.0	44.7	75.0
≥ 2.0 yr	104,513	36.0	12.8	51.1	77.6
Dialysis unit affiliation					
LDO	97,519	37.4	12.9	48.7	77.1
SDO	9913	36.9	12.1	48.4	77.3
Hospital-based	26,994	37.3	10.4	48.0	74.6
Independent	25,692	38.8	11.2	46.3	75.0
Dialysis unit profit status					
For-profit	120,106	37.6	12.7	48.4	76.9
Not-for-profit	35,867	38.4	10.5	47.7	75.4
Dialysis unit size					
Quartile 1	15,058	38.0	11.8	48.1	76.0
Quartile 2	25,043	38.9	12.6	45.3	75.2
Quartile 3	42,195	37.8	12.3	46.0	75.4
Quartile 4	77,822	37.0	12.0	50.3	77.3
Low income subsidy (LIS)					
No LIS	45,698	35.3	9.3	38.9	67.7
LIS	122,357	38.2	13.3	51.8	79.5

Figure 1. Prevalence of use (≥ 1 prescription) of individual phosphate binder or any phosphate binder

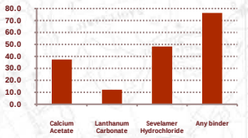


Figure 2. Adjusted odds ratios of calcium acetate use across ESRD Networks (referent: Network 18, So. CA)

Adjusted for demographics , CV comorbidity, and LIS status

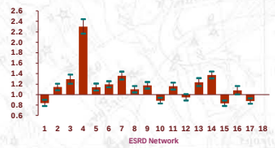


Figure 3. Adjusted odds ratios of lanthanum carbonate use across ESRD Networks (referent: Network 18, So. CA)

Adjusted for demographics, CV comorbidity, and LIS status

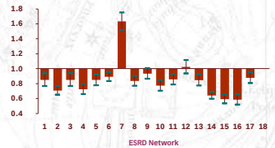


Figure 4. Adjusted odds ratios of sevelamer hydrochloride use across ESRD Networks (referent: Network 18, So. CA)

Adjusted for demographics, CV comorbidity, and LIS status

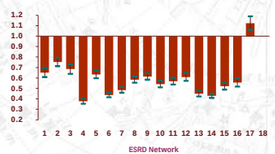


Figure 5. Adjusted odds ratios of phosphate binder use for LIS status (LIS vs. no LIS)

Adjusted for demographics, ESRD Network, and CV comorbidity

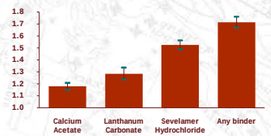


Figure 6. Prevalence of use of combination phosphate binder regimens, by duration of exposure

In treated patients

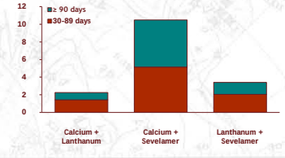
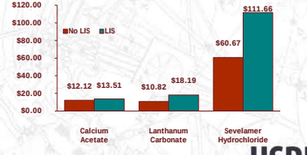


Figure 7. Out of pocket costs per user per month, stratified by LIS status

Figure 8. Gross costs per member per month, stratified by LIS status



Results (cont'd)

- OOP costs per user per month were highest for sevelamer, particularly in those patients not receiving LIS.
- Gross costs PMPM for sevelamer were much higher than for either calcium acetate or lanthanum in LIS patients; gross costs were also higher in patients not receiving LIS.

Conclusions

- Despite highest per-member gross costs and per-user out-of-pocket costs, sevelamer was the predominant phosphate binder in use in 2007.
- Patients who receive the LIS assistance pay only $1.21 per month out-of-pocket for sevelamer, while non-LIS patients pay $37.03. Similarly for lanthanum, LIS patients pay only $0.89 per month, while non-LIS patients pay $28.61.
- The landscape for phosphate binders will change in 2014, when phosphate binders will be included under the ESRD Prospective Payment System.
- Further research will examine other factors that may impact use and variation in use of these agents in dialysis patients.

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