Health Plan Retention and Pharmacy Costs of Newly Diagnosed Patients with Chronic Kidney Disease in a Managed Care Population

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Background: Chronic kidney disease is prevalent in the United States, and diabetes and hypertension cause up to two thirds of all new cases. Many health plans believe that these patients do not retain their health plans for a long duration, therefore plans do not focus on prevention for this disease.

Objective: To determine health plan retention rates and direct healthcare costs of adults with newly diagnosed chronic kidney disease with diabetes or hypertension.

Methods: A total of 31,917 patients with chronic kidney disease were included in this study between January 1995 and December 2006, using a managed care database. Patients were divided into 3 subgroups for cost comparison—patients with chronic kidney disease only (n = 8836), those with chronic kidney disease with diabetes (n = 11,252), and patients with chronic kidney disease with hypertension (n = 20,836). Follow-up of patients from index period of initial kidney disease diagnosis was 5 years. Average enrollment duration was 38 months; 60% of all patients remained enrolled at 3 years postdiagnosis.

Results: On average, patients with chronic kidney disease and diabetes and those with chronic kidney disease and hypertension remained enrolled slightly longer than chronic kidney disease–only patients (39 months, 40 months, and 36 months, respectively). The largest number of claims was for inpatient medical, followed by pharmacy and laboratory. Mean annual direct healthcare costs were higher for patients with chronic kidney disease and diabetes ($20,165) and those with chronic kidney disease and hypertension ($17,612) compared with patients with chronic kidney disease only ($9390).

Conclusion: The study findings indicate that most patients who are newly diagnosed with chronic kidney disease retain their health plan affiliation for a considerable period, including those with diabetes or hypertension. Increased direct healthcare costs were associated with the presence of comorbidities in patients with chronic kidney disease. [AHDB. 2009;2(7):283-290.]

Chronic kidney disease (CKD) affects approximately 26 million people in the United States.1 Diabetes and hypertension cause up to two thirds of all new CKD cases.1,2 According to Medicare policy, health plans are financially responsible for the care of CKD patients for up to 33 months after they have reached the final stage of end-stage renal disease (ESRD).3 Data from the Institute for Health and Productivity Management 2001 database show that treatment costs nearly double from one stage of CKD to the next.4 The stages of CKD are defined based on the glomerular filtration rate (GFR) as determined by the National Kidney Foundation Kidney Disease Outcomes Quality Initiative guidelines.5

Insurance claims for patients with CKD average $5000 to $12,000 per patient per year (PPPY) as a patient proceeds from stage 1 (GFR ≥90 mL/min/1.73 m²) to stage 2 (GFR 60-89 mL/min/1.73 m²), $15,000 to $28,000 PPPY from stage 3 (GFR 30-59 mL/min/1.73 m²) to stage 4 (GFR 15-29 mL/min/1.73 m²), and exceed $70,000 PPPY once the patient reaches stage 5 (GFR <15 mL/min/1.73 m²).4 Progressive CKD presents a burden to employers as suggested by researchers who examined ESRD-related nonmedical costs for employers.6 It was estimated that employers may incur life insurance costs of $55,055 per ESRD-related death, disability insurance costs of $31,617 per ESRD disability, and worker replacement costs of $27,869 per ESRD-related lost work.6

From a managed care perspective, it has been suggested that controlling and stabilizing the main comorbidities of CKD—diabetes and hypertension—may slow the progression of CKD, which would result in a reduction of healthcare costs.2 Factors that may be associated with optimal quality of care for patients with
CKD during the 12-month predialysis phase have been identified, including predialysis erythropoietin therapy, nephrology referrals, and phosphate binder/vitamin D administration. As many as 48.7% of patients did not have any interventions associated with optimal care, suggesting a need for proactive management of CKD in the managed care setting to reduce utilization, while improving patient outcomes. Similarly, a retrospective claims analysis of 27 health plans in 19 states evaluated resource utilization in 3 defined time periods:• Predialysis: months 2 to 6 before initial dialysis• Peridialysis: 30 days before and 30 days after dialysis• Postdialysis: months 2 and 3 after initial dialysis.

Information regarding retention of CKD patients will enable managed care plans to understand the potential impact of treating predialysis CKD as a chronic illness on the plan and the impact on its members. Such data may encourage plans to implement early-intervention strategies and potentially minimize costly expenditures in later stages.

Although data are available that establish the cost impact of CKD, as well as identify gaps in the treatment of CKD patients at all stages, data to characterize retention among newly diagnosed CKD patients in managed care plans are limited.

Methods

Data Source

De-identified medical and pharmacy claims from the PharMetrics patient-centric database between January 1995 and December 2006 were used to conduct this analysis. The PharMetrics database was selected because it is largely representative of the commercially insured population in the United States. This longitudinal database captures de-identified medical and pharmacy claims from 85 health plans that are submitting complete patient-level data for more than 45 million managed care lives. The average member enrollment across the entire database is 2 years. Data elements used in this analysis include health plan product type, health plan payer type, enrollment records, patient demographics, diagnoses, Episode Treatment Groups (ETG) codes, and prescription records.

Study Design

We utilized a retrospective cohort consisting of 3 subgroups of newly diagnosed patients with CKD: (1) CKD only, (2) CKD and diabetes, and (3) CKD and hypertension. All patients were at least 18 years old as of the date of their initial CKD diagnosis, had initiated health plan enrollment between January 1, 1995, and September 2001, and had at least 1 CKD claim, using International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) diagnosis codes:

KEY POINTS

► Approximately 26 million Americans have chronic kidney disease.
► About two thirds of all new cases are caused by diabetes and hypertension, suggesting that early intervention can reduce or delay the progression to this devastating and costly disease.
► This study’s findings indicate that most patients who are newly diagnosed with chronic kidney disease retain their health plan for a considerable period.
► In this study of 31,917 patients with chronic kidney disease, the mean annual total medical costs were $22,444 for patients with kidney disease plus diabetes, $19,667 for those with kidney disease plus hypertension, and $10,170 for patients with kidney disease only.

CKD and diabetes, or CKD and hypertension remain within a health plan after the initial CKD diagnosis, and compare the direct costs of CKD alone and the costs of CKD plus these closely related comorbidities.
585.XX, 592.XX, 593.9, including a 180-day preindex period with no evidence of CKD (Figure 1).

Patients were excluded if they had missing member data or enrollment data of less than 6 months. Patients identified after 2001 were not included, because the objective was to have a 5-year follow-up period for the identified diagnosis. Each patient was followed for 5 years from index diagnosis, and the length of enrollment was captured at the patient level.

Subgroups were identified by segmenting the patients with CKD according to evidence of the selected comorbidities—diabetes and hypertension. Diabetes and hypertension were identified by the presence of corresponding ETG codes. The ETG coding method is an illness classification system that identifies and classifies an entire episode of care for a patient, taking into account all medical care delivered in the inpatient and outpatient setting collectively for that episode. The ETG system considers patient age, comorbidities, procedures, clinical complications, and pharmaceutical claims in a synergistic manner to group patients by total clinical activity.

ETG coding was selected for this study over ICD-9-CM codes, because ETG codes more accurately and completely represent the patient episodic healthcare profile. ETG codes allow researchers to capture underdiagnosed cases that would otherwise be missed by ICD-9-CM codes. ETG codes are already formatted and readily retrievable from the PharMetrics patient-centric database. Patients with no evidence of diabetes or hypertension were categorized as the CKD-only group. CKD patients with ETG codes 278 to 281 and 908.4 were categorized as the CKD and diabetes group. CKD patients with ETG codes 27 to 30 were categorized as the CKD and hypertension group.

Outcomes Measures

The overall duration of health plan enrollment was reported in days and months, as a continuous variable, for each subgroup based on patient level enrollment records. Enrollment status for each patient was analyzed and aggregated at annual intervals, and reported as a yearly categorical variable for each subgroup.

This study looked at direct healthcare costs and pharmacy costs, which together comprise total medical costs. Annualized direct healthcare costs were calculat-
ed based on health plan payments for inpatient, emergency department visits, home health visits, office visits, laboratory testing, and other outpatient claims. Costs were divided into total inpatient, total outpatient, and total medical costs for each subgroup. The annualized cost of total pharmaceutical treatment was calculated based on health plan payments for all prescription medications. Costs were summarized for each subgroup and presented in US dollars.

Statistical Analysis

Descriptive statistics were provided for both continuous and categorical variables by subgroup and overall. All statistical analyses were performed using SAS release 9.1.3 (SAS Institute, Cary, NC).

Results

Study Population

A total of 31,917 eligible patients were identified and comprised the newly diagnosed CKD cohort. The study population consisted of 8836 CKD-only patients, 11,252 patients with CKD and diabetes, and 20,836 patients with CKD and hypertension. The CKD and diabetes and CKD and hypertension subgroups were not mutually exclusive, and had overlapping patients. Among 23,081 patients identified with comorbidities, 9007 (39%) patients had both diabetes and hypertension.

Table 1 (page 285) lists the study population baseline characteristics for the subgroups. The average age for all eligible patients with CKD was 55 years; of these patients, 51.2% were men. Patients with CKD and diabetes (average, 58.3 years) and those with CKD and hypertension (average, 59.2 years) were older than the CKD-only (average, 45.6 years) patients. The proportion of men was higher in the CKD and diabetes (53.8%) and CKD and hypertension (52.6%) subgroups compared with the CKD-only subset (47.2%).

Slight differences were seen in the initial diagnosis of CKD by physician specialty. There was a trend toward a greater proportion of patients with CKD and diabetes and patients with CKD and hypertension diagnosed with CKD by a nephrologist compared with the CKD-only subgroup. A large number of patients in each subgroup were initially diagnosed with CKD by a physician who is not specialized in cardiology, nephrology, endocrinology, or internal medicine/general family practice. The top identifiable specialties included in the “other” category were urology and emergency department physicians; however, the majority of physician coding was not specified.

Geographic distribution reflected representation from all 4 regions of the United States, with most patients residing in the Midwest. The majority of the patients in each subgroup belonged to a health maintenance organization.

Figure 2 outlines the distribution of patients by payer type. A greater proportion of CKD-only patients (63%) was enrolled in a commercial plan compared with those with CKD and diabetes (46%) or with CKD and hypertension (44%). Conversely, a greater proportion of patients with CKD and diabetes (40%) and CKD and hypertension (40%) had coverage through a Medicare Risk plan compared with CKD-only patients (13%).

Duration of Enrollment

The average duration of enrollment was slightly
longer for the CKD and diabetes (1163 days; 39 months) and the CKD and hypertension (1190 days; 40 months) subgroups compared with the CKD-only (1079 days; 36 months) subgroup. Overall, newly-diagnosed CKD patients remained enrolled in their health plan at 3 years postdiagnosis. Table 2 summarizes the enrollment status at yearly intervals for the subgroups and the overall group.

When grouping the patients into subgroups of CKD only, CKD and hypertension, or CKD and diabetes, we looked at their entire diagnostic phase and follow-up period. For example, for patients to be classified as CKD only, they could not have hypertension or diabetes mellitus anytime on or after their first diagnosis of CKD up to 5 years of follow-up period.

### Costs

Annual direct healthcare costs are outlined in Table 3 and Figure 3. The mean annual direct healthcare costs were substantially greater for patients with CKD and diabetes ($20,165) and those with CKD and hypertension ($17,612) compared with patients with CKD only ($9390).

**Pharmacy.** The mean annual pharmacy costs (Table 3, Figure 4) were substantially higher for the patients with CKD and diabetes ($2409) and CKD and hypertension ($2185) compared with the CKD-only ($904) patients.

**Medical.** The mean annual total medical costs (Table 3) were substantially greater for patients with CKD and diabetes ($22,444) or CKD and hypertension ($19,667) compared with patients with CKD only ($10,170).
Discussion

The study used ETG codes to classify the patients into 3 groups; those with CKD and hypertension and those with CKD and diabetes mellitus were given this designation at the beginning of the study and were then compared with the CKD-only group regarding enrollment duration and cost. This project was undertaken to identify the proportion of patients with newly diagnosed CKD that remain in the same health plan over time. An assumption was made that the longer a patient remains within a health plan, the better the opportunity to implement and assess the impact of early intervention strategies for disease management and overall quality of health.

CKD patients were much higher in those with disease-related comorbidities compared with those with CKD alone. Delay of disease progression to the next stage could, therefore, also have financial benefits to health plans. Implementation of an aggressive disease-specific approach by a health plan could impact patient outcomes by a possible delay of disease progression as well.

In this study, we evaluated 3 groups of newly diagnosed CKD patients stratified based on the documented coexistence of hypertension or diabetes. Patients with CKD and comorbidities tended to stay with their same health plan for approximately 3 months longer than patients with CKD only. To ensure that CKD patients were accurately identified, a frequency distribution was run, evaluating the number of patients in each subgroup (ie, CKD only, CKD and diabetes, and CKD and hypertension) with 1 claim for CKD versus those with more than 1 claim. The subgroups were similar in that approximately 70% of patients in each subgroup had at least 2 claims for CKD, providing additional validity to the diagnosis of CKD.

Approximately 66% of CKD-only patients were enrolled in commercial plans, whereas a larger proportion of the patients with CKD and diabetes and CKD and hypertension were enrolled in Medicare Risk plans. The average retention time may be influenced or directed by the Medicare timeline law that dictates when Medicare coverage begins for a CKD dialysis patient. As the law extends this timeframe from the

Figure 3  Direct Healthcare and Total Medical Costs

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<thead>
<tr>
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<th>Total medical costs</th>
<th>Direct healthcare costs</th>
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<tbody>
<tr>
<td>CKD only</td>
<td>$2409</td>
<td></td>
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<tr>
<td>CKD + diabetes</td>
<td>$2185</td>
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<tr>
<td>CKD + hypertension</td>
<td>$904*</td>
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*P < .001. CKD indicates chronic kidney disease.

Figure 4  Mean Yearly Pharmacy Costs

<table>
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<th>Mean pharmacy costs, $</th>
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<tr>
<td>CKD only</td>
<td>$2409</td>
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CKD indicates chronic kidney disease.

Early intervention in these populations is paramount to preventing or delaying disease progression and, in parallel, to potential cost reduction for the health plan, employers, and patients/members.

Smith and colleagues documented that per-patient costs increased as the stages of CKD progressed. Our results of increased pharmacy costs for CKD patients with disease-related comorbidities agree with Smith and colleagues’ findings, which demonstrated that costs for
current 33 months to the proposed 42 months, retention time in health plans will most likely expand, further necessitating the need to intervene as early as possible in these at-risk employee populations. Early intervention in these populations is paramount to preventing or delaying disease progression and, in parallel, to potential cost reduction for the health plan, employers, and patients/members. Our findings, which have not been documented extensively in previous studies, support the notion that newly diagnosed patients with CKD and those with disease-related comorbidities retain their healthcare plans for considerable periods.

Limitations

This study design has several limitations. Our goal was to highlight the amount of time patients who are actually diagnosed with CKD remain in plans, which provide a strong incentive to treat it appropriately rather than assume that patients would not be in the plan long enough to reap the benefits of treatment. We acknowledge that the number of patients diagnosed with CKD in the real world is well below what would be found if proper screening was conducted. We also acknowledge that CKD was likely more prevalent than it appears in these data we evaluated, although patients with CKD who are not diagnosed may move between plans at similar rates as those without CKD.

In addition, there were potential overlaps between the CKD and diabetes and CKD and hypertension subgroups. Factors for patient disenrollment were not available due to the retrospective nature of the study. Only newly diagnosed CKD patients were included in the study; therefore, retention periods for existing CKD patients and a healthy non-CKD cohort were not evaluated. A diagnosis of CKD was captured during the identification period only (July 1, 1995-September 30, 2001), so patients with a new CKD diagnosis during the 5-year follow-up period were not evaluated.

The study design also did not account for patients whose diagnosis of CKD might have been ruled out by further investigation. The retention rates reported may not be representative of all CKD patients, because they may be different for patients who had a previously established CKD diagnosis (not newly diagnosed).

Also, retention rates and costs were not evaluated within and between subgroups for differing stages of CKD and hypertension or severity of diabetes (eg, requiring oral or injectable medications). Direct comparison between groups in similar plan types was also not evaluated.

This study does not account for access to healthcare differences and its impact on costs among different plans. Finally, the use of ETG codes in this analysis limited the ability to compare it with other studies using traditional diagnosis and procedure costs.

 Managed care plans may benefit from earlier management strategies for CKD, because these patients could contribute to increased healthcare utilization and cost over the long-term.

Conclusion

The majority of newly diagnosed CKD patients retain their health plan affiliation for a considerable period, including those with diabetes or hypertension. Presence of these comorbidities resulted in increased total direct healthcare costs. Results of this study further support the need for early intervention in CKD. Managed care plans may benefit from earlier management strategies for CKD, because these patients could contribute to increased healthcare utilization and cost over the long-term.

Acknowledgment

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Disclosure Statement

All the authors are employed by Centocor Ortho Biotech Services, LLC.

References

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**STAKEHOLDER PERSPECTIVE**

**Alignment of Incentives along the Healthcare Payer Continuum for Patients with Kidney Disease**

**PAYERS:** Payers have members and beneficiaries with certain high-cost and high-utilization diagnoses on their radar screen for a variety of reasons, and chronic kidney disease (CKD) is one such diagnosis. As the authors of this article have nicely quantified, CKD diagnosis—alone or with comorbidities—is associated with increased costs (ie, medical and pharmacy) and greater utilization of services (ie, outpatient physician and specialty visits, dialysis, and inpatient hospitalization).

The natural progression of disease management and financial obligations often flows initially from a commercial or a Medicaid responsibility to eventually becoming a permanent Medicare responsibility. The alignment of incentives within this payer continuum encourages the initial responsible payer to have early identification means for this diagnosis, through the use of a coding system such as the ICD-9-CM (*International Classification of Diseases, Ninth Revision, Clinical Modification*) or through other diagnostic identifiers on the medical benefit or the drug surrogates on the pharmacy benefit.

Once members are identified, health plans are further incentivized to track and facilitate the progression of the timeline along the plan care continuum, until the next handoff or transition point to a subsequent payer. Simultaneously, during this timeframe, it is in the specific plan’s or payer’s best interest to actively case-manage these members to slow their disease progression and to minimize utilization of avoidable services, such as preventable hospitalizations.

Proposed regulatory changes that would expand the tenure of a member’s time on a pre-Medicare coverage further encourages a payer’s active case-management of these members during the plan’s time of financial responsibility.

**PATIENTS:** Receiving a diagnosis of CKD elicits a variety of responses in a person, such as fear, anxiety, or planning for the future. It also becomes a decision point on how to best manage, live with, and address the forthcoming progression.

If the rate of progression can be influenced and managed medically, this becomes a time of opportunity for member engagement. Members with currently stable employment and insurance will often consider the risks associated with a job and a coverage change in light of their now having a preexisting diagnosis and its implications for a potential carrier.

Often, the thought of the potential risks in such a change make people opt to remain in their current employment and under their current medical coverage, and they begin to reach out to their existing carrier to understand the resources available to them.

Such a member-directed decision is probably one of the main contributors to health plan retention during the progression down the healthcare payer continuum for newly diagnosed patients with CKD.

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