

typically offered by disease management organizations today. And once CMS begins making monthly payments for CCIP programs, recouping payments from contractors that do not meet performance standards could prove difficult. The Congressional Budget Office estimated that the CCIP would not maintain budget neutrality—it estimated that the program would cost \$500 million over the 2004–2013 period.

Chronic kidney disease and chronic care improvement programs: A case study

This case study focuses on the potential benefits of improved care coordination for renal patients because of MedPAC’s long-standing interest in the quality of renal care. Most recently, we recommended linking payments to physicians and facilities caring for ESRD patients to the quality of care furnished to patients (MedPAC 2004). In the future, MedPAC may examine the potential of care coordination programs to improve quality for other populations with chronic conditions.

CKD includes conditions that affect the kidney, with the potential to cause either progressive loss of kidney function or complications resulting from decreased kidney function. Persons with CKD range from those with decreased kidney function to those with permanent kidney failure—ESRD—who require either maintenance dialysis or a kidney transplant to survive. In most instances, ESRD develops as the consequence of progressive damage to the kidney over a decade or more. The National Institutes of Health (NIH) and the Centers for Disease Control have recognized CKD as a major public health problem because of the increased numbers of those with the disease, their high costs, and the substantial morbidity and mortality experienced by affected patients.

Although CKD is not a threshold condition under the MMA, CKD patients will most likely be among the participants of the program because they suffer from conditions targeted by the law—diabetes, CHF, and COPD. Diabetes is the leading cause of renal failure; about 45 percent of dialysis patients have diabetes, 30 percent have CHF, and 8 percent have COPD. Patients with ESRD will not be among the participants because CMS has excluded them from the CCIP.

Based on our review of the scientific literature, our discussions with providers of care coordination services, and our analysis of Medicare claims data, we find that:

- The ESRD population is growing and is costly.
- Slowing or preventing permanent renal failure may be possible.
- Earlier referral to a renal team may improve patients’ outcomes.
- Coordinated care programs may improve some aspects of care for renal patients, although the impact of such programs on Medicare spending is unclear.

The end-stage renal disease population is growing and is costly

The impetus behind coordinating the care of CKD patients is to delay or prevent new cases of ESRD. The number of new cases of ESRD continues to grow, particularly among diabetics, African Americans, and the elderly. Patients with ESRD, particularly patients on dialysis, are one of the costliest populations for Medicare and have significant morbidity and mortality. Permanent renal failure lowers most patients’ quality of life. Healthy People 2010, a set of health objectives for the first decade of the new century developed by the Department of Health and Human Services, calls for the rate of new cases of ESRD to be reduced by one-third (Office of Disease Prevention and Health Promotion 2004).

The ESRD population comprises about 293,000 patients requiring dialysis and 114,000 patients who have undergone a kidney transplant and have a functioning kidney graft. Dialysis is the process by which wastes and excess fluids are removed from a patient’s body.^{9, 10} Kidney transplantation is preferred over dialysis because it improves both survival and quality of life while reducing long-term costs of care. Dialysis patients, however, outnumber transplant patients, not because of a lack of demand for transplants, but because of the well-documented shortage of kidneys available for transplantation. In 2001, only 15,331 kidney transplants were performed. By contrast, 57,336 patients were awaiting a transplant (United Network for Organ Sharing 2004).¹¹

Left unchecked, the number of ESRD patients is estimated to be more than 650,000 patients by 2010. Incidence rates have increased during the past decade from 223 per

1,000,000 people in 1991 to 334 per 1,000,000 people in 2001. Diabetes accounts for most new cases of ESRD, and diabetics and the elderly are the fastest growing segments of the ESRD population. About half of the nearly 100,000 new cases in 2001 were patients 65 years or older. Other conditions that contribute significantly include high blood pressure and other cardiovascular conditions, and obesity.

ESRD patients are costly to Medicare. Although representing less than 1 percent of beneficiaries, they account for about 6 percent of all Medicare spending. According to the U.S. Renal Data System, average spending per ESRD patient was \$45,000 in 2001. Dialysis patients, with average annual spending of \$52,000 in 2001, were 2.8 times more costly than kidney transplant patients. The high spending of dialysis patients is partly driven by the costs for outpatient dialysis, which account for about 42 percent of total spending.¹² However, because many dialysis patients suffer from and are frequently hospitalized for other chronic comorbidities, spending for inpatient hospital services accounts for about 36 percent of total spending.

Rates of hospitalization and mortality for dialysis patients have remained high and relatively unchanged during the past 10 years. Between 1993 and 2001, hospitalization rates per 1,000 patient years ranged from 2,019 to 2,062. Adjusted annual mortality rates have remained relatively constant during this time, ranging from 236 to 253 per 1,000 patient years at risk (USRDS 2003).

Finally, ESRD patients experience a decline in their quality of life, although transplant patients have higher quality-of-life scores than those treated with dialysis. Women and older ESRD patients have lower scores than do men and younger patients.

Slowing or preventing new cases of end-stage renal disease may be possible

Earlier intervention and better management of CKD patients may, for certain cases, delay or even prevent permanent kidney failure. The NIH, Healthy People 2010, and the renal clinical guidelines developed by the National Kidney Foundation (NKF)—the Kidney Disease Outcome Quality Initiative (K/DOQI)—all conclude that early referral to a renal team is important to reduce the substantial morbidity and mortality associated with ESRD (NIH 2004, NKF 2004).

The first step in slowing or preventing the progression to ESRD is identifying patients with CKD. The K/DOQI recently published a clinical guideline in which CKD is defined according to the presence and absence of kidney damage and the level of kidney function—glomerular filtration rate (GFR)—with higher stages representing more severe kidney damage (Table 2-7). This guideline defines CKD as either having structural or functional abnormalities of the kidney or having a GFR of less than 60 mL/min—stages 3 and 4—for three months or more. K/DOQI recommends that stage 3 patients be evaluated and treated for complications of CKD and that stage 4 patients be prepared for renal replacement therapy.

Populations at risk for CKD include patients with one of the conditions targeted by the CCIP—diabetes. Other at-risk groups include: older persons, persons with hypertension, and minorities. How large is the at-risk population? Using data from the National Health and Nutrition Examination Survey III, Coresh and colleagues (2003) estimated that 14.2 percent (about 2.6 million) of all diabetics have stage 3 and 0.92 percent (about 167,000) have stage 4 CKD. Among persons age 70 and older, 24.6 percent (about 6.3 million persons) have stage 3 and 1.3 percent (about 332,000 persons) have stage 4 CKD.¹³

Screening at-risk populations may be necessary because kidney disease in its early stages is often asymptomatic; thus, many people who would benefit from early intervention are not identified. In addition, some evidence

TABLE 2-7 Stages of chronic kidney disease

CKD stage	Description
1	Kidney damage with normal or elevated GFR (≥ 90)
2	Kidney damage with mildly decreased GFR (60–89)
3	Moderately lower GFR (30–59)
4	Severely lower GFR (15–29)
5	Kidney failure GFR (<15)

Note: CKD (chronic kidney disease), GFR (glomerular filtration rate). GFR is a measure of kidney function and measures the rate at which the kidneys filter the blood of toxins. Normal GFR values in adults are between 100 and 150 milliliters per minute.

Source: Adapted from the National Kidney Foundation’s clinical guideline for chronic kidney disease, 2004.

suggests that CKD is underdiagnosed even when clinical measures are available to identify the disease (Coresh et al. 2003, Kausz et al. 2001, McClellan et al. 1997).

Once CKD is identified, it may be possible to slow or halt the progression of kidney disease to ESRD by improving the care of cardiovascular disease and diabetes. The American Diabetes Association recommends diabetic patients receive hemoglobin A1c testing at least two to four times per year and lipid testing at least annually. Care for some CKD patients did not meet these targets:

- About half of CKD patients with diabetes did not receive two to four hemoglobin A1c tests in 2001.
- 37 percent of CKD patients with diabetes did not receive at least one lipid test in 2001 (USRDS 2003).

Reducing the complications of CKD—such as anemia, bone disease, and malnutrition—may also slow the progression to ESRD and improve quality of care. Opportunities exist to improve the care of CKD complications:

- About 75 percent of patients initiating dialysis did not receive erythropoietin in the pre-ESRD period (USRDS 1999). K/DOQI calls for erythropoietin therapy for CKD patients with anemia.
- A substantial number of CKD patients do not receive appropriate dietary instruction (Pennell 2001). Fifty percent of hemodialysis and 43 percent of peritoneal dialysis patients reported that they had not seen a dietician before starting dialysis.

Prescription of angiotensin-converting enzyme (ACE) or angiotensin-receptor blocker (ARB) therapy in persons with microalbuminuria—the presence of protein in the urine, indicating that the kidneys are not working properly—has been demonstrated to decrease both the progression of kidney disease toward ESRD as well as the incidence of cardiovascular events and death. CMS's request for proposals includes two quality indicators for monitoring the frequency with which contractors test persons with diabetes for microalbuminuria and prescribe either ACE or ARB therapy.

Finally, better management of patients with CKD may lower their risk of mortality due to cardiovascular disease. Cardiovascular mortality is three times greater in patients with CKD than in the general population. CKD patients are 5 to 10 times more likely to die due to cardiovascular disease than to develop ESRD (USRDS 2003). Healthy People 2010 calls for reducing the mortality rate due to cardiovascular disease.

Improving the quality of care for patients progressing to end-stage renal disease

Earlier intervention and better management of CKD patients may reduce the substantial morbidity, mortality, and costs associated with ESRD. More integrated care among primary care physicians and providers with expertise in nephrology—physicians, nurses, dieticians, and social workers—may improve the care furnished to CKD patients. Healthy People 2010 calls for increasing the proportion of CKD patients under the care of informed health care providers 12 months before the start of renal replacement therapy.

Referring patients with chronic kidney disease to a renal team

Many CKD patients are not seen by providers with expertise in nephrology until they are very close to beginning dialysis. Kinchen and colleagues (2002) reported that 30 percent of patients were seen by a nephrologist less than 4 months before dialysis initiation, 22 percent were seen 4 to 12 months before, and 48 percent were seen more than one year before. Potential reasons for late referral include asymptomatic CKD, noncompliance with referrals, and the attitudes of primary care physicians about referring CKD patients to specialists. These researchers also found that referral patterns varied based on patients' demographic characteristics.

Earlier referral to a renal team may lead to better ESRD outcomes. The risk of death was significantly greater among ESRD patients referred to a renal team late (less than 4 months before the start of dialysis) compared to patients referred early (more than 12 months before the start of dialysis) (Kinchen et al. 2002).¹⁴ Other researchers have also found that late referral to a renal team is associated with: (1) a higher risk for unplanned first dialysis, (2) more complications, (3) higher hospital costs

and longer duration of hospitalization in the first three months of dialysis, and (4) greater use of temporary vascular access.

Some care coordination programs promote earlier referral to a nephrology team for patients with CKD as one way to improve quality. MedPAC contracted with Direct Research, LLC, to examine the potential impact of early referrals to nephrology care on the use of services, outcomes, and Medicare spending for CKD patients before and after they started dialysis. This analysis uses Part A and B claims data from 1996 to 2002 for a 5 percent representative sample of FFS beneficiaries.

First, we identified a cohort of incident dialysis patients. The study population is comprised of patients who received at least six dialysis sessions during their initial month of dialysis and whose initial dialysis date from the outpatient dialysis claim matched the start of dialysis date from the Renal Beneficiary Utilization System/Program Management and Medical Information System (REBUS/PMMIS) to within two weeks. So that we could examine the use of services for up to two years before dialysis, we excluded patients starting dialysis in 1996 and 1997. We also excluded patients whose Medicare entitlement was due to ESRD so that we would have at least two years of data before the start of dialysis.¹⁵

Because of this latter exclusion, the study population is older, on average, than all new dialysis patients. In the study population, 16 percent of patients are under age 65, 40 percent are between 65 and 74 years, and 45 percent are 75 years and older.¹⁶ By contrast, among all new dialysis patients in 2001, 50 percent of patients were under age 65, 25 percent were between 65 and 74 years, and 25 percent were 75 years and older. Thus, the results derived from this analysis are not representative of all new dialysis patients.

Next, we classified patients based on when they first saw a provider with expertise in nephrology and when they started dialysis:

- late (on or after the start of dialysis),
- intermediate (within 4 months before starting dialysis or between 4–12 months before starting dialysis), or
- early (more than 12 months before starting dialysis).

Providers with expertise in nephrology are defined as physicians who reported the specialty code of nephrology on at least one Part B claim. Ideally, we would have preferred measuring access to any physician with expertise in nephrology but this information is not available in Medicare claims data. Thus, our results will be affected to the extent that physicians are either under reporting or over reporting nephrology as their specialty.

We examined the use of services during the pre-ESRD period that are recommended in renal clinical guidelines: (1) prescription of Medicare-covered injectable medications, such as erythropoietin, for complications of CKD and (2) outpatient placement of an arteriovenous (AV) fistula.¹⁷ We measured the use of peritoneal dialysis—the most common home dialysis method—as the initial dialysis method because of interest by the Congress and others in promoting home dialysis. We examined outcomes that better care coordination during the pre-ESRD period might improve: (1) hematocrit at dialysis onset, (2) hospitalization in the month prior to starting outpatient dialysis, and (3) mortality in the first and second years following dialysis.

We were not able to examine the rate of kidney transplantation among the study population because this analysis would have led to small, unstable estimates. As noted earlier, the study population is older, on average, than all new dialysis patients and the rate of kidney transplantation among persons 65 years and older is low. About 8 percent of all transplants were received by patients 65 years and older in 2001. MedPAC may, in the future, examine the factors associated with receiving a kidney transplant among all CKD patients. As compared to dialysis, renal transplantation improves survival and quality of life while reducing long-term costs of care.

We also were not able to examine the use of medical nutrition therapy services because Medicare coverage did not begin until January 1, 2002. Included in the Medicare, Medicaid, and SCHIP Benefits Improvement & Protection Act of 2000, this benefit provides nutritional counseling to patients with diabetes or CKD. MedPAC may, in the future, examine use of this service among all CKD patients.

The results presented below are not adjusted for potential differences in the demographic and clinical characteristics of patients in each group. For example, we were not able to adjust for differences in the level of renal function at which dialysis was initiated.¹⁸ Other researchers have shown some differences in their results after they adjusted for potential confounders (Kinchen et al. 2002).

The majority of the study population first saw a nephrologist less than one year before dialysis. About 28 percent of patients did not see a nephrologist until they started dialysis, 17 percent saw one less than 4 months before starting dialysis, 15 percent saw a nephrologist 4 to 12 months before, and 40 percent saw a nephrologist more than one year before. Ten percent of the study population had no record of a claim submitted by a nephrologist either before or after dialysis. Because this analysis uses claims data, we do not know whether these patients were never treated by a nephrologist or whether they were treated by a nephrologist who reported a physician specialty code other than nephrology.

Patients may not be seeing a nephrologist before starting dialysis because CKD has yet to be diagnosed. We determined, however, that 51 percent of the study population had a Part A or B claim indicating chronic renal failure more than one year before starting dialysis, 46 percent in the year before starting dialysis, and only 3 percent on or after starting dialysis.

Our results about the association between earlier referral and use of services and outcomes are generally consistent with those reported by other researchers (Table 2-8). A greater proportion of patients with early referrals were prescribed at least one medication for complications of CKD and had an AV fistula placed compared with late referral patients. The average initial hematocrit of early referral patients was greater than that of late referral patients (31 percent versus 27 percent, respectively); K/DOQI recommends a target hematocrit ranging from 33 percent to 36 percent.

Early referral may have a small, positive effect on peritoneal dialysis use: 2.3 percent of late referral patients chose this modality compared with 5.8 percent of early referral patients. Overall, the use of peritoneal dialysis among all new dialysis patients in the U.S. is 7.8 percent. Our results are lower because the study population is older than all new dialysis patients and use of peritoneal dialysis is inversely related to age (USRDS 2003).

**TABLE
2-8**

Some differences in the use of services based on the timing of nephrology care

Time between first visit to nephrologist and start of dialysis

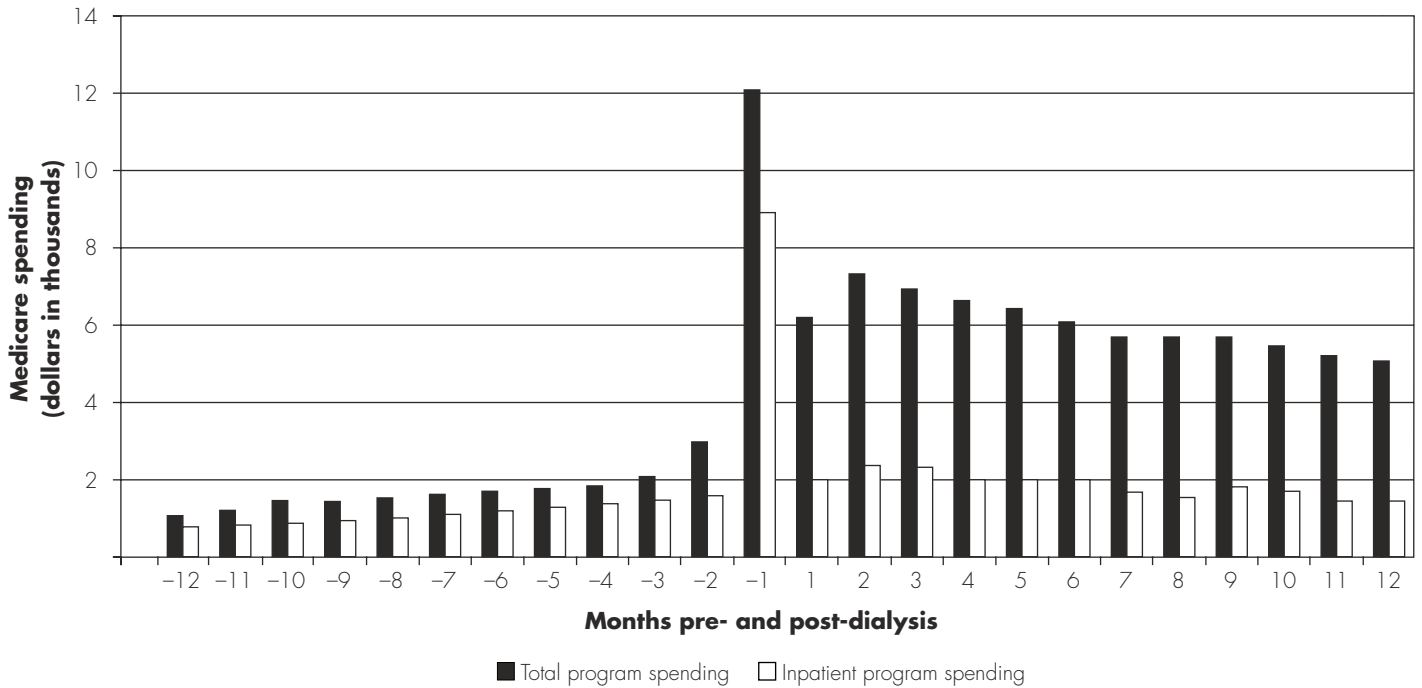
	Same time or after	Less than 4 months	4-12 months	More than 12 months
Received at least one medication for complications of CKD	4.7%	9.8%	15.2%	17.9%
Average initial hematocrit	27.3%	28.1%	28.1%	31.0%
Use of arteriovenous fistulas:				
5-12 months before dialysis	2.2	0.4	8.1	10.8
1 month before dialysis	9.5	16.1	30.8	29.8
Hospitalized in the month before starting dialysis	83.2	71.2	66.5	64.8
Peritoneal dialysis is initial dialysis modality	2.3	6.2	5.3	5.8
Mortality in the first year after dialysis	29.9	31.3	27.4	24.8
Mortality in the first two years after dialysis	51.6	49.4	49.4	47.9

Note: CKD (chronic kidney disease). To permit for sufficient data, patients starting dialysis in 2002 are excluded from the first year mortality rates; patients starting dialysis in 2001 and 2002 are excluded from the mortality rates for the first two years after dialysis.

Source: Direct Research, LLC, based on a 5 percent sample of Medicare beneficiaries, their claims, and information from REBUS/PMMIS.

Although hospitalization rates are high in the month before dialysis begins, the rate is lower for patients who saw a nephrologist more than 12 months before starting dialysis. Mortality rates among the study population are also high. Two years after dialysis, 48 percent of patients who were referred early had died compared with 52 percent of patients who were referred late.

CKD patients are costly: average Medicare spending was \$29,804 in the 12 months preceding dialysis and \$61,434 in the 12 months after dialysis begins. Not surprisingly, total Medicare spending increases once patients start dialysis (Figure 2-5, p. 62). However, spending is also high in the month before starting dialysis because a substantial proportion of patients are hospitalized.

**FIGURE
2-5****Inpatient spending spikes in the month before dialysis begins**

Note: Month 1 is the start of dialysis.

Source: Direct Research, LLC, based on a 5 percent sample of Medicare beneficiaries, their claims, and information from REBUS/PMMIS.

Providers of renal care coordination services told us that they aim to decrease rates of hospitalization by better preparing patients for dialysis.

Inpatient hospital spending modestly differs by when patients first saw a nephrologist (Figure 2-6). Inpatient spending in the year before dialysis averaged \$20,137 for late referral patients compared to \$14,878 for early referral patients; in the year after dialysis began, the difference in average inpatient spending narrowed to \$20,941 for late referral patients compared to \$18,229 for early referral patients. The difference in inpatient spending between early and late referral patients after starting dialysis may be associated with care at the end of life. Nearly all ESRD patients (92 percent) are hospitalized in the last year of life, and 60 percent of ESRD patients die in the hospital (MedPAC 2000).

One of the important reasons to look at patterns of care among CKD patients is to consider chronic care management. While there appear to be opportunities to

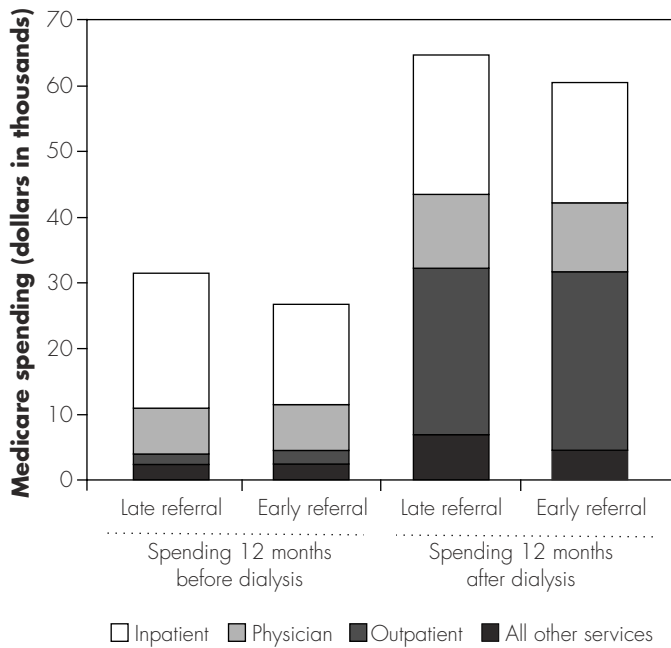
improve quality and reduce spending, it is not clear how care coordination programs would affect Medicare spending once the fees associated with such programs are considered in a spending analysis. Total program spending for early referral patients was 16 percent lower in the year before dialysis and 6 percent lower in the year after dialysis compared to late referral patients. What is unknown is the level and intensity of care coordination services that CKD patients would require and the fees associated with these programs. Some patients would most likely require case management services, which are more expensive to provide than the services typically offered by disease management organizations.

Preparing chronic kidney disease patients for renal replacement therapy

As noted in the prior section, earlier intervention may lead to improved care of complications from CKD and comorbidities, particularly diabetes, lipid abnormalities,

FIGURE 2-6

Inpatient spending is somewhat lower for early referral patients



Note: Late referral patients are those whose first visit to a nephrologist was on or after the start of dialysis. Early referral patients are those whose first visit was more than 12 months before dialysis. The increase in outpatient spending in the one year after dialysis is primarily associated with outpatient dialysis services.

Source: Direct Research, LLC, based on a 5 percent sample of Medicare beneficiaries, their claims, and information from REBUS/PMMIS.

and high blood pressure, and may reduce morbidity and mortality once patients progress to ESRD. Two interventions that may benefit patients are:

- educating CKD patients about the different renal treatment options, and
- surgically placing a permanent vascular access device instead of a temporary access device.

Educating CKD patients about renal treatment options Better education in the pre-ESRD period gives patients an opportunity to learn about the different ESRD treatment options. Only 25 percent of CKD patients who were ultimately treated with hemodialysis reported that one type of peritoneal dialysis—continuous ambulatory peritoneal dialysis—was discussed with them as a treatment option (USRDS 1997). By contrast, 82 percent of patients who received information about continuous

ambulatory peritoneal dialysis during the pre-ESRD period chose home dialysis. The lack of appropriate education during the pre-ESRD period may have contributed to the decline in the use of peritoneal dialysis from 13 percent of all new dialysis patients in 1991 to 8 percent in 2001 (USRDS 2003).¹⁹

Many CKD patients are not educated about kidney transplantation. For example, among patients under age 60 years, only 60 percent of peritoneal dialysis and 45 percent of hemodialysis patients recalled being informed about kidney transplantation. The lack of knowledge about transplantation is just one of the many factors that affect access to this treatment option. As noted earlier, a limited supply of donor organs is available. Access differs based on race and ethnicity: African Americans are less likely than Whites to be identified as potential candidates, be referred for transplant evaluation, and receive a transplant (Alexander and Sehgal 1998).

Using arteriovenous fistulas Vascular access services are needed by the 90 percent of all dialysis patients who undergo hemodialysis. AV fistulas are considered the best long-term vascular access because they provide adequate blood flow for dialysis, last a long time, and have a complication rate lower than the other access types—AV grafts and venous catheters. However, AV fistulas need more time to mature than grafts and catheters. K/DOQI recommends that a fistula should be allowed to mature for at least one month, and preferably for three to four months. Data from 2001 show that only 29 percent of new dialysis patients had an AV fistula (CMS 2002). Healthy People 2010 targets increasing the proportion of new hemodialysis patients who use AV fistulas.

Care coordination programs may improve the outcomes of renal patients

Care coordination programs offer the potential of improving the quality of care for CKD patients. Some health care organizations and providers have begun to implement programs focusing on the care of CKD patients (Schorr 2003, Yeoh et al. 2003). These programs emphasize:

- Early identification of at-risk patients. Laboratories calculate patients' GFR when physicians order a lab test that measures serum creatinine;²⁰

- Managing CKD and comorbidities to delay or avoid renal replacement therapy;
- Educating patients and families about the role of nutrition, weight management, compliance with prescribed drug regimens, types of renal replacement therapy, and types of vascular access;
- Referring patients to nephrologists and multidisciplinary teams. (One program, for example, refers stage 3 patients with structural damage or with risk factors for developing ESRD and those in stage 4 to renal multidisciplinary teams); and
- Measuring outcomes.

Evidence is lacking on the effectiveness of these programs. MedPAC was unable to locate studies examining the effectiveness of programs targeting patients with CKD in the scientific literature.

Care coordination programs also offer the potential for broadening providers' focus of care from ESRD to all comorbidities and, in doing so, better coordinating care. ESRD patients, particularly dialysis patients, fit the profile of a population that could benefit from coordinated care programs because they suffer from multiple comorbidities, are hospitalized frequently, are prescribed many medications, and incur high costs.

Several private payers, including Aetna, PacifiCare, Empire Blue Cross and Blue Shield, Blue Cross and Blue Shield of Minnesota, and Elderplan have arranged for disease management organizations to provide services for their ESRD members. These programs often offer a range of services including outreach to the primary care physician and nephrologist, initial assessment and ongoing monitoring of patients, and patient education. Providers of ESRD disease management services told us that they too vary the level and intensity of the services by the severity of the illness. Some state Medicaid programs are also contracting with outside vendors to provide ESRD disease management services. Two of the four national for-profit dialysis chains have affiliate organizations offering renal disease management services.

Like programs for other populations, the effectiveness of care coordination programs for ESRD patients has yet to be conclusively demonstrated. One study evaluating a

disease management program showed that hemodialysis patients enrolled in a health plan with a disease management program had 19 to 35 percent significantly better survival rates and 45 to 54 percent fewer hospitalization rates compared with all hemodialysis patients enrolled in FFS Medicare (Nissenson et al. 2001).

Conclusion

Renal patients experience substantial morbidity and mortality and are among the costliest populations for Medicare. Evidence from the literature suggests that earlier intervention and better management of patients with CKD may, in some cases, delay or prevent permanent kidney failure. In addition, MedPAC's analysis of claims data suggests that earlier referral of CKD patients to a nephrologist may reduce some of the morbidity associated with ESRD.

The CCIP will provide opportunities to promote earlier intervention and improve management of CKD. Patients with CKD will undoubtedly be among the program's participants because of the high prevalence of diabetes and CHF in this population. In the initial phase of the CCIP, policymakers should consider including in the evaluation how well each contractor met the special needs of patients with CKD.

As more information becomes available, MedPAC may examine the potential of different approaches to coordinate the care for patients with CKD. Such an effort would include interviewing providers of programs focusing on improving the quality of CKD care and reviewing studies examining the effectiveness of different approaches. It is not yet clear that population-based disease management is the optimal approach because CKD is asymptomatic for many persons. Programs that coordinate the care of CKD patients may need laboratory data for targeting patients.

CMS has excluded patients with ESRD from participating in the CCIP, but not patients with other costly conditions, such as rheumatoid arthritis and multiple sclerosis. Care coordination programs as configured under the MMA might have provided opportunities to improve renal care. Although CMS will be initiating a disease management demonstration for ESRD patients in the near future, not all ESRD patients will be able to participate in this program. ■

Endnotes

- 1 CMS published a request for proposals on April 23, 2004, and applications are due to CMS by August 6, 2004.
- 2 Hierarchical condition category scores are used by CMS as part of its formula for risk adjusting payments to Medicare Advantage plans.
- 3 Since many drugs are prescribed for multiple conditions, prescription data will not always be useful to determine diagnoses.
- 4 In addition, CMS only recognizes outpatient diagnoses from professional (physician) office and emergency room visits and consultations, not from other providers or from other physician services. For example, physician services for procedures, test, and imaging are not counted when flagging the target populations for the intervention.
- 5 The National Kidney Foundation is in the process of developing diabetes- and cardiovascular-related guidelines for patients with chronic kidney disease.
- 6 Interviewees informed us that they periodically reevaluate the risk level of each patient participating in their disease management and care coordination programs. Some patients who are at a higher risk level may shift to a lower risk level. On the other hand, the condition of some patients may worsen during the course of the year. Having claims data may enable contractors to monitor changes in a patient's condition.
- 7 Here we use the term "dual eligible" to refer to people for whom a state has paid their Medicare Part B (or A) premium. This includes those eligible for a state's full package of Medicaid benefits, as well as Qualified Medicare Beneficiaries and Specified Low-Income Beneficiaries.
- 8 Note that the 18 percent share is lower than other figures from studies on care provided at the end of life. Those analyses tend to examine the amount of program spending on beneficiaries during the last 12 months of their lives, rather than for a calendar year (Hogan et al. 2000).
- 9 About 90 percent of all dialysis patients undergo hemodialysis, in which blood from the patient's body is circulated through an external machine and returned to the patient's blood stream. About 10 percent of all patients undergo peritoneal dialysis, a procedure that introduces dialysate into the abdominal cavity to absorb and remove waste products through the peritoneum.
- 10 The estimate of kidney transplant patients includes patients undergoing transplantation in 2001 and patients with a functioning kidney transplant.
- 11 To help address this problem, the Department of Health and Human Services awarded grants totaling \$4.3 million in 2003 to support social, behavioral, and clinical intervention programs to increase organ and tissue donation.
- 12 Outpatient dialysis services include composite rate services, injectable drugs administered during dialysis, physician monthly capitation services, vascular access services, and peritoneal access services.
- 13 Estimates obtained from the American Diabetes Association and the U.S. Bureau of the Census were used to estimate the number of diabetics and persons 70 years or older who have CKD, respectively.
- 14 The median follow-up period for the population was 2.2 years.
- 15 The 1972 amendments to the Social Security Act extended Medicare benefits to people with ESRD who were fully or currently insured or eligible for Social Security, their spouses, and their dependent children. About one-third of ESRD patients are entitled to Medicare on the basis of ESRD alone.
- 16 Sum does not total to 100 because of rounding.
- 17 Vascular access refers to the site on the patient's body where blood is removed and returned during hemodialysis. The AV fistula is the type of vascular access recommended by renal clinical guidelines because it is associated with fewer complications and lasts longer than the other types of vascular access.
- 18 Clinicians are still debating the level of renal function at which dialysis should be initiated. Some clinicians suggest that early dialysis leads to reduced mortality among dialysis patients. Others recommend a strategy of careful management until dialysis becomes inevitable (Kausz et al. 2000).
- 19 Other factors related to the decline in peritoneal dialysis include the medical conditions, preferences, and social circumstances of patients and the preferences of medical personnel. In addition, MedPAC has noted that the rapid growth in the number of dialysis facilities throughout the 1990s has created an incentive to direct patients to in-center treatment so that facilities operate at capacity. Finally, the profitability of separately billable drugs may also provide an incentive for in-center care.
- 20 Creatinine is a waste product from muscles and protein in the diet removed from the body by the kidneys. As kidney disease progresses, the level of creatinine in the blood increases.

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