

Chapter 6: Medicare Expenditures for CKD

Introduction

Determining the economic impact of chronic kidney disease (CKD) on the health care system is challenging on several levels. There is, for instance, considerable under-recognition of CKD (as noted in Vol. 1, Chapters 1, 2, and 3), that reduces estimated CKD total expenditures. A biochemical measure of renal function would create the most definitive criterion, but health plan datasets, including Medicare, rarely contain this information on a reliable or large scale. Definition of a CKD cohort based on ICD-9-CM (International Classification of Diseases, 9th revision, clinical modification) diagnosis codes, however, may selectively represent only the more advanced, and thus most expensive cases. This bias tends to result in an over-estimate of per capita CKD costs.¹ In addition, the costs of CKD are influenced by its interactive nature and resulting association with cardiovascular disease, diabetes mellitus (DM), stroke, and infectious complications. Thus, it is not possible to attribute health care expenditures to mutually exclusive diagnostic categories.

To calculate costs related to CKD, we employ the method first discussed in the 2011 USRDS Annual Data Report (ADR), and continued in the 2012 and 2013 ADRs. This method utilizes diagnosis codes to create a point prevalent CKD cohort from patients classified as having CKD on January 1 of each given year. As described in the 2013 ADR, this cost-calculation method does not include “new” CKD patients, who in the 2009 and 2010 ADR accounted for a disproportionate percentage of overall costs, resulting from a possible association with high rates of acute kidney injury (AKI). How to best integrate costs of AKI patients into CKD cost calculations is a continuing area of research due to the potential for transition from AKI to CKD.

¹ “Costs” in this chapter refer to Medicare expenditures rather than true economic costs.

For this year, we present only Medicare Parts A and B cost data² (using the 5 percent Medicare sample). We first examine CKD costs in relation to patients’ CKD stage, race, and concurrent disease, focusing on DM and congestive heart failure (CHF). DM and CHF, in addition to CKD, represent the highest chronic disease population-level expenditures in the Medicare population, and thus are analyzed as coexisting diseases. CHF, for example, affects nine percent of patients in the fee-for-service Medicare population, but accounts for nearly 22 percent of expenditures. More than 34 percent of overall expenditures go toward the 24 percent of patients with DM. And patients with recognized CKD, who represent 10 percent of the point prevalent population, account for 20 percent of total expenditures. People with diagnoses of DM, CKD, and/or CHF thus account for one-third of the Medicare population and one-half of programmatic costs (see Table 6.1).

We next present data on overall Medicare costs and those related to CKD with and without DM and CHF, allowing for comparison of trends. CKD with comorbidities contributes significant cost stress to the Medicare system, accounting for large proportions of Medicare spending on DM and CHF. CKD patients with DM account for 31.3 percent of Medicare spending on DM, while CKD with CHF accounts for greater than 41.3 percent of Medicare CHF spending.

Lastly, we present costs in different Medicare populations, including CKD patients with concurrent DM and CHF, comparing 2008 and 2012 expenditures. Although costs in all categories have grown, the rate of growth differs across groups. These data further illustrate the importance of prevention of comorbidities in cost-reduction efforts.

Analytical Methods

See the CKD Analytical Methods chapter for an explanation of analytical methods used to generate the figures and tables in this chapter.

² Limitation based on unavailability of data.

vol 1 Table 6.1 Point prevalent distribution of Medicare fee-for-service patients aged 65+ and total annual costs of Medicare Parts A and B services, by DM, CHF, and/or CKD, 2012

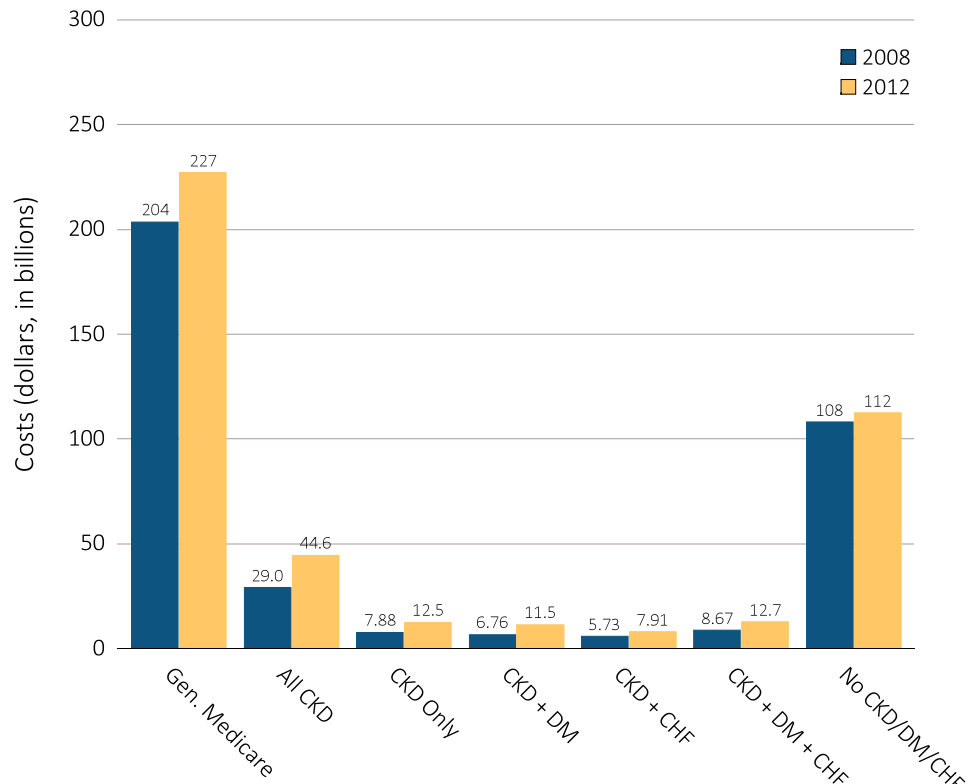
	U.S. Medicare population	Costs (millions, U.S. \$)	PPPY (U.S. \$)	Population (%)	Costs (%)
All	24,818,540	\$227,107	\$9,806	100.0	100.0
With CHF or CKD or DM	8,295,460	\$114,649	\$15,048	33.4	50.5
CKD only (- DM & CHF)	931,880	\$12,463	\$14,469	3.8	5.5
DM only (- CHF & CKD)	4,265,980	\$40,811	\$10,182	17.2	18.0
CHF only (- DM & CKD)	977,660	\$16,924	\$19,215	3.9	7.5
CKD & DM only (- CHF)	762,740	\$11,535	\$16,492	3.1	5.1
CKD & CHF only (- DM)	340,140	\$7,910	\$27,810	1.4	3.5
DM & CHF only (- CKD)	580,740	\$12,332	\$23,768	2.3	5.4
CKD & CHF & DM	436,320	\$12,674	\$34,631	1.8	5.6
No CKD or DM or CHF	16,523,080	\$112,459	\$7,236	66.6	49.5
All CKD (+/- DM & CHF)	2,471,080	\$44,581	\$20,162	10.0	19.6
All DM (+/- CKD & CHF)	6,045,780	\$77,352	\$13,832	24.4	34.1
All CHF (+/- DM & CKD)	2,334,860	\$49,840	\$24,312	9.4	21.9
CKD & DM (+/- CHF)	1,199,060	\$24,209	\$22,723	4.8	10.7
CKD & CHF (+/- DM)	776,460	\$20,584	\$31,648	3.1	9.1
DM & CHF (+/- CKD)	1,017,060	\$25,006	\$28,261	4.1	11.0

Data Source: Medicare 5 percent sample. Abbreviations: CKD, chronic kidney disease; CHF, congestive heart failure; DM, diabetes mellitus; PPPY, per patient per year costs.

Costs of CKD

Among the general Medicare population aged 65 and older, total costs for Parts A and B rose 11.5 percent to \$227.1 billion between 2008 and 2012, while such costs rose 53.6 percent to \$44.6 billion among the CKD patients (Figure 6.1). Costs for these patients with CKD now represent 19.6 percent of all Medicare Parts A and B spending. Although there was a universal rise in expenditure for all covered groups, certain patient populations with comorbid conditions in addition to CKD experienced higher rates of growth. Costs for patients with CKD and DM rose 70.2 percent between 2008 and 2012, while similar costs for patients without CKD, DM, or CHF increased by only 4.1 percent.

vol 1 Figure 6.1 Overall Medicare Parts A and B costs for fee-for-service patients aged 65 and older, by CKD, DM, CHF, and year, 2008 and 2012



Data source: Medicare 5 percent sample. Abbreviations: CKD, chronic kidney disease; CHF, congestive heart failure, DM, diabetes mellitus.

vol 1 Table 6.2 Overall per person per year costs for Medicare Parts A and B services for CKD patients, by CKD stage, age, sex, race, and year, 2009 and 2012

	2009					2012				
	Any CKD	Stages 1-2	Stage 3	Stages 4-5	Unk/ unspc	Any CKD	Stages 1-2	Stage 3	Stages 4-5	Unk/ unspc
All	\$20,555	\$18,290	\$19,262	\$25,456	\$20,657	\$20,162	\$17,969	\$19,392	\$25,623	\$20,100
Population	1,653,828	140,329	531,543	188,477	793,479	2,211,129	209,487	936,011	225,867	839,765
Age:										
66-69	\$18,623	\$16,002	\$17,101	\$26,268	\$18,700	\$18,364	\$16,876	\$16,955	\$26,641	\$18,482
70-74	\$18,545	\$15,441	\$17,643	\$24,903	\$18,489	\$18,023	\$15,682	\$17,155	\$24,502	\$18,186
75-80	\$19,730	\$17,341	\$18,448	\$24,220	\$20,063	\$19,509	\$16,643	\$18,907	\$24,496	\$19,698
70-84	\$21,791	\$21,277	\$20,589	\$24,719	\$21,939	\$20,851	\$18,594	\$20,258	\$25,564	\$20,668
85+	\$23,100	\$21,901	\$21,864	\$27,023	\$22,925	\$22,836	\$22,222	\$22,238	\$26,614	\$22,387
Male	\$20,317	\$17,741	\$19,222	\$26,272	\$20,198	\$20,346	\$18,072	\$19,837	\$26,020	\$20,055
Female	\$20,774	\$18,839	\$19,302	\$24,770	\$21,068	\$20,000	\$17,873	\$18,993	\$25,304	\$20,138
White	\$20,172	\$18,052	\$19,005	\$24,737	\$20,281	\$19,935	\$18,016	\$19,260	\$24,914	\$19,855
Black/Af Am	\$22,664	\$20,360	\$20,590	\$29,155	\$22,600	\$22,322	\$18,631	\$20,803	\$29,014	\$23,015
Other race	\$22,455	\$17,385	\$20,921	\$27,122	\$23,123	\$19,320	\$16,195	\$18,551	\$27,813	\$18,477

Data source: Medicare 5 percent sample. Abbreviations: Af Am, African American; CKD, chronic kidney disease; Unk/unspc, CKD stage unknown.

Table A. ICD-9-CM Codes

585.1	Chronic kidney disease, Stage 1
585.2	Chronic kidney disease, Stage 2 (mild)
585.3	Chronic kidney disease, Stage 3 (moderate)
585.4	Chronic kidney disease, Stage 4 (severe)
585.5	Chronic kidney disease, Stage 5 (excludes 585.6: Stage 5, requiring chronic dialysis ^a)

CKD unspecified identified by multiple codes including 585.9, 250.4x, 403.9xm & others. CKD stage estimates are from a single measurement.

For clinical case definition, abnormalities should be present ≥ 3 months.

^a In USRDS analyses, patients with ICD-9-CM code 585.6 and no end-stage renal disease (ESRD) Medical Evidence form (CMS 2728) or other indication of ESRD are considered to have code 585.5; see CKD Analytical Methods chapter for details.

Table 6.2 shows overall per person per year (PPPY) costs of Parts A and B services for patients with CKD (but not end-stage renal disease [ESRD]) by stage of CKD (see Table A for definitions). In 2012, PPPY costs reached \$20,162 for Medicare CKD patients aged 65 and older, a 2.0 percent decrease compared to 2011 (\$20,564). Costs for patients with Stages 4-5 CKD (\$25,623) were 42.6 percent greater than costs for patients with Stages 1-2 CKD (\$17,969).

In Table 6.3, PPPY costs are shown for patients with both CKD and DM. Among 2012 Medicare patients with these two conditions, PPPY costs for Blacks/African Americans were \$24,696, 8.9 percent greater than the \$22,494 incurred by Whites. This represents an increase in the percentage difference in PPPY costs between Blacks/African Americans and Whites of 1.2 percentage points as compared to 2011, when PPPY for Blacks/African Americans was 7.7 percent greater than Whites. Greater comparative PPPY costs were seen for all stages of CKD with concurrent DM. For Blacks/African Americans in Stage 4-5 of CKD with concurrent DM, PPPY costs rose 8.3 percent between 2011 and 2012, while PPPY costs for comparable White patients decreased by 2.0 percent.

vol 1 Table 6.3 Per person per year costs for Parts A and B services for Medicare CKD patients with DM, by CKD stage, age, sex, race, and year, 2009 and 2012

	2009					2012				
	Any CKD	Stages 1-2	Stage 3	Stages 4-5	Unk/ unspc	Any CKD	Stages 1-2	Stage 3	Stages 4-5	Unk/ unspc
All	\$23,240	\$20,692	\$22,130	\$28,694	\$23,037	\$22,723	\$20,247	\$22,007	\$29,378	\$22,190
Population	778,557	68,088	257,455	97,343	355,671	778,557	68,088	257,455	97,343	355,671
Age:										
66-69	\$21,615	\$18,199	\$20,202	\$29,882	\$21,505	\$21,330	\$19,670	\$19,918	\$30,064	\$21,075
70-74	\$21,689	\$17,995	\$21,122	\$28,108	\$21,292	\$20,629	\$17,337	\$19,719	\$28,304	\$20,599
75-80	\$22,841	\$20,565	\$21,834	\$27,836	\$22,677	\$22,095	\$18,874	\$21,680	\$28,408	\$21,538
70-84	\$24,551	\$24,737	\$23,191	\$27,883	\$24,532	\$23,451	\$21,540	\$22,707	\$29,456	\$22,775
85+	\$25,960	\$24,981	\$24,977	\$30,265	\$25,365	\$26,408	\$26,439	\$26,249	\$30,779	\$25,094
Male	\$22,680	\$19,541	\$21,626	\$29,512	\$22,381	\$22,587	\$20,117	\$22,101	\$29,830	\$21,799
Female	\$23,788	\$21,948	\$22,658	\$28,011	\$23,666	\$22,853	\$20,383	\$21,913	\$29,007	\$22,558
White	\$22,719	\$20,794	\$21,668	\$27,958	\$22,472	\$22,494	\$20,279	\$21,976	\$28,472	\$21,913
Black/Af Am	\$25,518	\$22,019	\$24,211	\$31,968	\$25,058	\$24,696	\$21,198	\$22,838	\$32,817	\$25,132
Other race	\$25,028	\$17,418	\$24,063	\$29,545	\$25,989	\$21,541	\$18,305	\$20,724	\$31,379	\$20,042

Data source: Medicare 5 percent sample. Abbreviations: Af Am, African American; CKD, chronic kidney disease; Unk/unspc, CKD stage unknown.

Table 6.4 shows PPPY costs for patients with both CKD and concurrent CHF. In 2012, PPPY costs for Black/African American patients with both conditions reached \$35,989, 14.0 percent higher than the \$30,943 PPPY cost for their White counterparts.

This cost difference, however, is decreasing; in 2011, costs for Blacks/African American patients were 15.5 percent higher than for Whites.

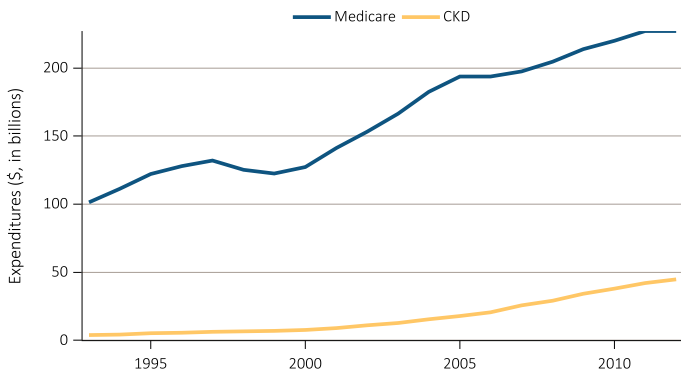
vol 1 Table 6.4 Per person per year costs for Parts A and B services for Medicare CKD patients with CHF, by CKD stage, age, sex, race, and year, 2009 and 2012

	2009					2012				
	Any CKD	Stages 1-2	Stage 3	Stages 4-5	Unk/ unspc	Any CKD	Stages 1-2	Stage 3	Stages 4-5	Unk/ unspc
All	\$31,537	\$31,444	\$31,242	\$36,013	\$30,403	\$31,648	\$30,850	\$31,301	\$37,295	\$30,159
Population	650,385	53,480	273,146	86,839	236,920	650,385	53,480	273,146	86,839	236,920
Age:										
66-69	\$32,896	\$34,075	\$32,129	\$37,935	\$31,711	\$34,610	\$36,698	\$32,620	\$45,419	\$32,814
70-74	\$32,640	\$29,107	\$33,077	\$38,163	\$31,353	\$31,720	\$28,523	\$30,698	\$38,903	\$31,258
75-80	\$31,678	\$30,702	\$31,486	\$36,504	\$30,471	\$31,498	\$30,081	\$31,783	\$36,879	\$29,529
70-84	\$31,808	\$33,222	\$31,143	\$34,649	\$31,138	\$32,036	\$30,058	\$31,753	\$37,563	\$30,660
85+	\$30,172	\$30,698	\$29,548	\$35,097	\$28,986	\$30,460	\$30,818	\$30,518	\$34,409	\$28,855
Male	\$31,068	\$31,196	\$30,762	\$36,597	\$29,621	\$31,656	\$31,668	\$31,587	\$37,552	\$29,571
Female	\$31,970	\$31,683	\$31,748	\$35,511	\$31,080	\$31,641	\$30,086	\$31,026	\$37,080	\$30,646
White	\$30,703	\$30,258	\$30,424	\$34,479	\$29,861	\$30,943	\$30,250	\$30,802	\$35,605	\$29,598
Black/Af Am	\$35,688	\$37,547	\$35,865	\$44,088	\$32,290	\$35,990	\$34,245	\$34,398	\$44,559	\$34,873
Other race	\$36,464	\$34,734	\$35,946	\$40,037	\$35,713	\$33,551	\$31,441	\$32,551	\$45,961	\$29,712

Data source: Medicare 5 percent sample. Abbreviations: Af Am, African American; CKD, chronic kidney disease; Unk/unspc, CKD stage unknown.

Over time, the costs for Medicare patients aged 65 and older with recognized CKD have accounted for an increasing share of Medicare expenditures, expanding from 4.2 percent in 1995, to 7.1 percent in 2002, and 19.6 percent in 2012. Much of this growth is due to the increased ascertainment of CKD as shown in Chapter 2 of this volume. Figure 6.2 shows total expenditures on Part A and Part B services for the Medicare fee-for-service patients as a whole, and for patients with CKD.

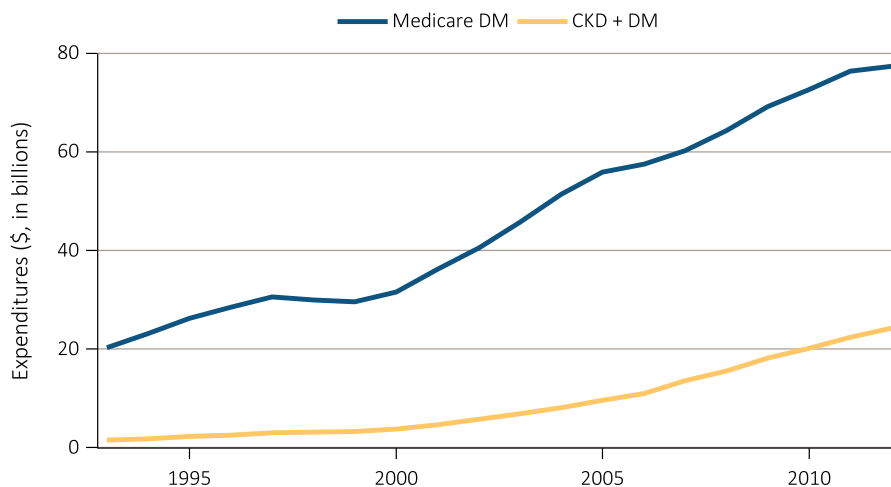
vol 1 Figure 6.2 Overall expenditures on Parts A and B services for the Medicare population age 65+ and for those with CKD, by year, 1993-2012



Data source: Medicare 5 percent sample. Abbreviations: CKD, chronic kidney disease.

In Figures 6.3 and 6.4 we show total Part A and Part B service expenditures for Medicare fee-for-service patients with DM and CHF, respectively. Spending for patients with comorbid DM and CKD, and CHF and CKD are also shown. Costs for patients with CKD and concurrent DM amounted to \$24.2 billion in 2012, or 31.3 percent of total Medicare spending on DM.

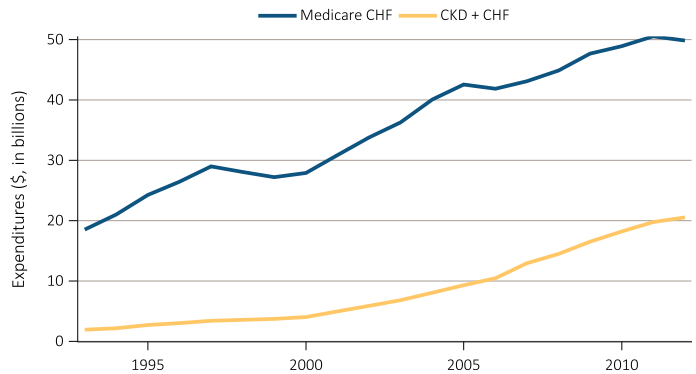
vol 1 Figure 6.3 Overall expenditures on Parts A and B services for the Medicare DM population age 65+ and for those with CKD and DM, by year, 1993-2012



Data Source: Medicare 5 percent sample. Abbreviations: CKD, chronic kidney disease; DM, diabetes mellitus.

Spending on CHF in the Medicare population was \$49.8 billion in 2012. Of this, \$20.6 billion (41 percent) was spent on the CKD patient population with CHF. Costs decreased by \$0.8 billion in 2012 for the entire Medicare CHF population, representing the first decrease in costs for this cohort since 2005-2006.

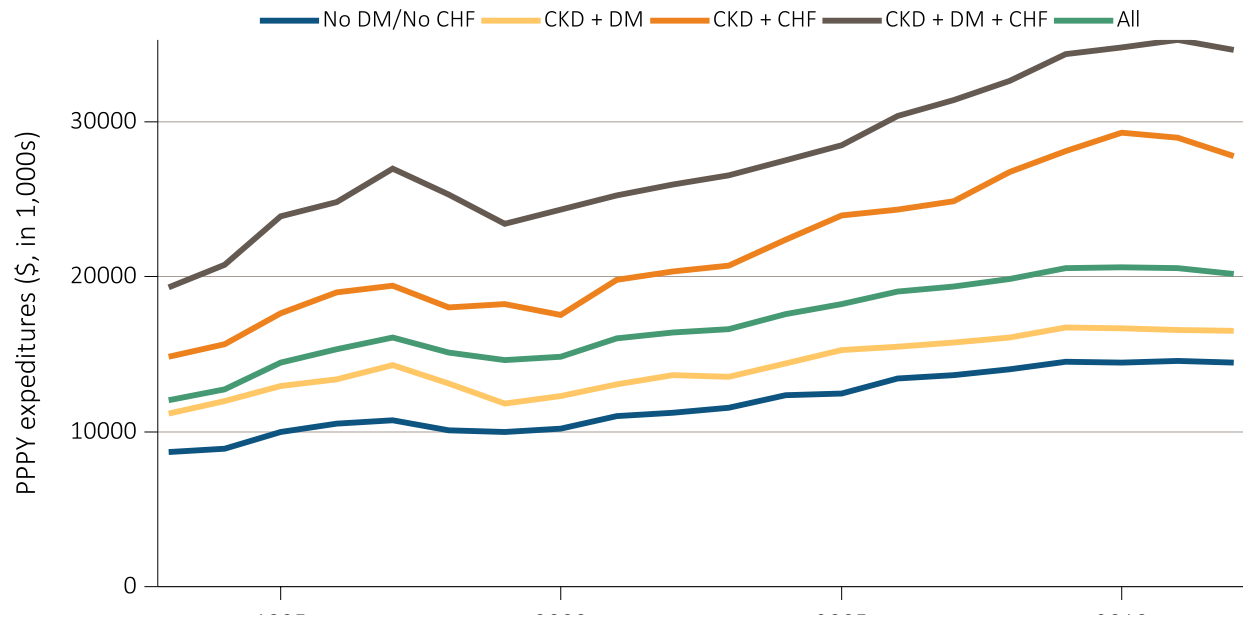
vol 1 Figure 6.4 Overall expenditures on Parts A and B services for the Medicare CHF population age 65+ and for those with CKD and CHF, by year, 1993-2012



Data Source: Medicare 5 percent sample. Abbreviations: CKD, chronic kidney disease; CHF, congestive heart failure.

Figure 6.5 illustrates per person per year costs for Medicare CKD patients aged 65 and older by the presence of DM and CHF. In 2012, PPPY costs for CKD patients varied greatly by the presence of their comorbidities. CKD patients without DM or CHF cost \$14,469 per person per year. Those with DM in addition to CKD averaged \$27,810 PPPY, and patients with CKD and CHF cost \$27,810, while expenditures for those with all three conditions reached \$34,631 PPPY.

vol 1 Figure 6.5 Per person per year expenditures on Parts A and B services for the CKD Medicare population age 65+, by DM, CHF, and year, 1993-2012



Data Source: Medicare 5 percent sample. Abbreviations: CKD, chronic kidney disease; CHF, congestive heart failure, DM, diabetes mellitus; PPPY, per person per year.

Cost growth per patient per year as shown in Figure 6.5 was considerably smaller in the 2008-2012 period than the total costs for these comorbidity combinations that were shown in Figure 6.1. These variable results indicate that the growth in overall costs was influenced more by an increase in the number of patients with these conditions, than by growth in actual PPPY costs.

Conclusion

The analysis of several years of cost data in the Medicare CKD population indicates avenues for potential cost savings, enduring racial cost disparities, and the effect of cost containment efforts in the CKD population. Potential cost savings could be achieved through the prevention of disease progression to later stages of CKD, and development of concurrent chronic conditions such as DM and CHF. Data indicate that not only are costs for CKD patients with concurrent DM or CHF higher than for patients without DM or CHF, but also that individual costs are rising at a higher rate in this population. In the Medicare CKD population, Black/African American patients continue to exhibit higher costs in all disease categories as compared to Whites. There are, however, distinct segments of the CKD population in which the percentage difference in cost between Black/

African American and White patients is decreasing. Overall, despite accounting for an increasing share of Medicare spending, recent cost data shows that there have been decreases in the overall costs of CKD per patient per year, especially for those in the later stages of the disease. This may potentially be reflective of the effectiveness of CKD management in the Medicare-covered CKD population through early-stage interventions.