Chapter 2: Identification and Care of Patients With CKD

- Over half of patients from the Medicare 5 percent sample have either a diagnosis of chronic kidney disease (CKD), cardiovascular disease, or diabetes, while over 18% have two or more of these conditions.
- Of the 10.7% of Medicare patients diagnosed with CKD in 2013, nearly half also have diabetes, and over 92% also have hypertension.
- In both the Medicare 5 percent sample and the NHANES datasets, patients in older age groups, Black patients, and patients with a cardiovascular disease diagnosis tended to have a higher prevalence of CKD.
- The total population with recognized CKD from the Medicare 5 percent sample has grown steadily between 2000-2013 for all races.
- Of patients in the Medicare 5 percent sample diagnosed with CKD stage 3 in 2008, 2% had progressed to ESRD and 42% had died by 2013. In the general Medicare population without identified CKD, progression to ESRD and death was 0.13% and 22%, respectively.
- Urine albumin testing is important for monitoring patients with diabetes mellitus. Among patients with diabetes in the Medicare population, with or without a diagnosis of CKD, testing for urine albumin has been steadily rising over time though it is still done in less than half of such patients. Among all diabetes patients, the rate of albumin testing in 2008 was 32%, increasing to 40% in 2013.
- Among Medicare patients with diagnosed CKD, patients who saw a nephrologist were more likely to be tested with urine albumin or serum creatinine (59% and 94%, respectively) than those who saw only a primary care physician (39% and 92%, respectively).

Introduction

The epidemiological evaluation of care in patients with chronic kidney disease (CKD) is a significant challenge, as most large datasets lack the biochemical data (serum creatinine and urine protein) required to definitively identify the disease. A random survey sample such as the National Health and Nutrition Examination Survey (NHANES) dataset contains the necessary biochemical information, as shown in Chapter 1, to estimate the prevalence of CKD in the population. However, the cross-sectional nature of the NHANES study and relatively small sample of patients (compared to large administrative datasets) limits the precision of estimated prevalence; evaluation of long-term outcomes, adverse events, and quality of care delivered to patients with CKD; and the ability to conduct analyses on subsets of patients. In addition, the NHANES survey only includes a single measure of serum creatinine and microalbuminuria. KDIGO guidelines state that two measures over 90 days is necessary to definitively determine CKD. Thus NHANES will over estimate actual number of persons with CKD.

Analyses of USRDS data for this chapter utilize the general Medicare 5 percent sample, which includes an average of 1.2 million individuals each year, to assess the recognized CKD population. Analyses are restricted to patients aged 65 and older given that age is the main criterion for Medicare eligibility and is limited to those persons with both part A and part B fee for service coverage. Persons covered in managed care are not included due to the absence of billing

claims. The term "recognized CKD" is used because patients are identified based on the presence of a relevant diagnosis code in Medicare billing claims, meaning that either a provider or billing coder in the health care system recognized the presence of CKD and submitted a claim. As such, any observed trends may not necessarily relate to a true change in disease prevalence, but rather could represent changes in awareness or recognition of CKD, or of billing practices in general.

Identifying the recognized CKD population includes a variety of ICD-9-CM diagnosis codes, some of which are sub-codes under related comorbidities such as diabetes (250.4x) and hypertension (403.9x), and some of which are more kidney-disease specific, such as glomerular disease (583.x). In 2005, new CKD stage-specific codes (585.x) were introduced, providing an opportunity to track trends in the severity of CKD over time. Since their introduction, the CKD stage-specific codes have represented the majority of CKD diagnosis codes utilized, and there is evidence of a growing recognition of CKD over time. Studies have shown that diagnosis codes for CKD generally have excellent specificity (>90%) though their sensitivity is low (Grams et al., 2011). Table A lists the CKD-related ICD-9-CM codes used in this chapter.

Analytical Methods

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

Table A. ICD-9-CM codes for Chronic Kidney Disease (CKD) stages

ICD-9-CM code[a]	Stage
585.1	CKD, Stage 1
585.2	CKD, Stage 2 (mild)
585.3	CKD, Stage 3 (moderate)
585.4	CKD, Stage 4 (severe)
585.5	CKD, Stage 5 (excludes 585.6: Stage 5, requiring chronic dialysis[b])
CKD stage-unspecified	For these analyses, identified by multiple codes including 585.9, 250.4x, 403.9x & others

[a] For analyses in this chapter, CKD stage estimates require at least one occurrence of a stage-specific code, and the last available CKD stage in a given year is used.

[b] In USRDS analyses, patients with ICD-9-CM code 585.6 & with no ESRD 2728 form or other indication of end-stage renal disease (ESRD) are considered to have code 585.5.

Prevalence of Recognized CKD and Odds of a CKD Diagnosis Code

Table 2.1 provides the prevalence of coded CKD, diabetes, and cardiovascular comorbid conditions among patients in the Medicare population aged 65 and older. Over half of the population has at least one of these comorbid conditions, and over 18% have two or more.

vol 1 **Table 2.1 Prevalence of coded comorbid conditions (CKD, CVD & DM), (a) total, and (b) one or more, among Medicare patients aged 65+, 2013**

(a) Total coded comorbid conditions

	N	%
5% Medicare patients	1,260,903	100
Total CKD	134,254	10.6
Total CVD	499,135	39.6
Total DM	301,308	23.9

(b) One or more coded comorbid conditions

	N	%
5% Medicare patients	1,260,903	100
Only CKD	22,310	1.8
Only CVD	285,628	22.6
Only DM	117,892	9.3
CKD & DM, no CVD	17,030	1.3
CKD & CVD, no DM	47,121	3.7
DM & CVD, no CKD	118,593	9.4
CKD & CVD & DM	47,793	3.8
No CKD, no CVD, no DM	604,536	47.9

Data Source: Special analyses, Medicare 5 percent sample. Period prevalent patients, 2013, without ESRD, aged 65 and older (Medicare). Abbreviations: CKD, chronic kidney disease; CVD, cardiovascular disease; DM, diabetes mellitus. CVD is defined as presence of any of the following comorbidities: cerebrovascular accident, peripheral vascular disease, atherosclerotic heart disease, congestive heart failure, dysrhythmia or other cardiac comorbidities.

Table 2.2 presents demographic and comorbidity characteristics of patients aged 65 and older in the Medicare 5 percent sample and among those with a diagnosis of CKD. The mean age was 75.9 years overall, and 77.9 years for those with CKD. The high prevalence of comorbid conditions in the overall sample reflects the older age of these patients. For example, 60% and 24% of the total Medicare population have diagnoses of hypertension and diabetes, respectively. Among patients diagnosed with CKD, rates of comorbidity are even higher; nearly half also have diabetes and over 92% also have hypertension.

vol 1 Table 2.2 Demographic characteristics of all patients and of CKD patients, among Medicare patients aged 65+, 2013

	All patients		Patients with CKD	
	N	(%)	N	(%)
All	1,260,903	100	134,254	100
Age				
65-74	693,399	55.0	50,417	37.6
75-84	396,086	31.4	53,005	39.5
85+	171,418	13.6	30,832	23.0
Sex				
Male	543,687	43.1	63,674	47.4
Female	717,216	56.9	70,580	52.6
Race				
White	1,086,649	86.2	111,527	83.1
Black/Af Am	95,465	7.6	14,606	10.9
Native Am	5,296	0.4	598	0.5
Asian	23,890	1.9	2,739	2.0
Other	41,786	3.3	4,359	3.3
Unknown	7,817	0.6	425	0.3
Comorbidity				
DM	301,308	23.9	64,823	48.3
HTN	755,850	60.0	123,821	92.2
CVD	499,135	39.6	94,914	70.7

Data Source: Special analyses, Medicare 5 percent sample. Period prevalent patients, 2013, without ESRD, aged 65 and older (Medicare). Abbreviations: CKD, chronic kidney disease; CVD, cardiovascular disease; DM, diabetes mellitus; HTN, hypertension; Af Am, African American; Native Am, Native American. CVD is defined as presence of any of the following comorbidities: cerebrovascular accident, peripheral vascular disease, atherosclerotic heart disease, congestive heart failure, dysrhythmia or other cardiac comorbidities.

Table 2.3 presents the prevalence and adjusted odds ratio of recognized CKD in the Medicare population. Of Medicare patients aged 65 and older, 10.7% have a coded diagnosis of CKD. The prevalence of recognized CKD increases with age, from 7.32% at ages 65–74 to 18% at age 85 and older. Males have slightly higher prevalence than females. The prevalence among Black/African Americans (15.3%) is roughly 50% higher than Whites, while Asians and Native Americans have a prevalence about 10 percent higher than Whites. Results from the adjusted analyses confirm greater odds of recognized CKD in older patients, Blacks, and those with diabetes, hypertension, or cardiovascular disease.

vol 1 Table 2.3 Prevalence of CKD, and adjusted odds ratios of CKD among Medicare patients aged 65+, 2013

	Prevalence of CKD (% of overall)	Adjusted odds ratios of CKD
Overall	10.7	
Age		
65-74	7.3	Ref.
75-84	13.4	1.5
85+	18.0	2.1
Sex		
Male	11.7	1.3
Female	9.8	Ref.
Race		
White	10.3	Ref.
Black/Af Am	15.3	1.4
Native Am	11.3	1.1
Asian	11.5	1.1
Other/Unknown	10.4	1.0
Comorbidity		
DM	21.5	2.2
HTN	16.4	3.8
CVD	19.0	2.2

Data Source: Special analyses, Medicare 5 percent sample. Period prevalent patients, 2013, without ESRD, aged 65 and older (Medicare). Adjustments included are age, gender, race, and comorbidities. Abbreviations: CKD, chronic kidney disease; CVD, cardiovascular disease; DM, diabetes mellitus; HTN, hypertension; Af Am, African American; Native Am, Native American. CVD is defined as presence of any of the following comorbidities: cerebrovascular accident, peripheral vascular disease, atherosclerotic heart disease, congestive heart failure, dysrhythmia or other cardiac comorbidities.

Table 2.4 compares the prevalence of CKD in the NHANES and Medicare populations among patients aged 65 and older, according to demographic characteristics and comorbid conditions. In both datasets, patients in older age groups, Black patients, and patients with a cardiovascular disease diagnosis tended to have a higher prevalence of CKD. However, the absolute prevalence of CKD is substantially lower in Medicare versus NHANES data. This reflects the under capture of "recognized CKD" in Medicare claims as well as the over estimation of CKD in the NHANES survey.

vol 1 **Table 2.4 Percent of patients with CKD by demographic characteristics, among patients overall and with DM, HTN, or CVD, in NHANES (2011-2012) and Medicare (2013) datasets**

	Overall		DM (No HTN)		HTN (No DM)		Any CVD	
	NHANES	Medicare	NHANES	Medicare	NHANES	Medicare	NHANES[a]	Medicare[b]
Age								
65-74	26.4	7.3	7.5	9.8	31.4	12.9	40.9	21.6
75-79	50.4	13.4	*	14.0	45.4	20.1	66.7	27.7
80+	65.2	18.0	*	18.7	67.2	27.5	80.5	32.4
Race								
White	38.3	10.3	24.9	12.0	44.5	17.9	55.6	25.2
Black/Af Am	49.9	15.3	*	11.9	46.6	22.2	68.3	35.9
Native Am	-	11.3	-	11.8	-	19.0	-	29.4
Asian	-	11.5	-	12.8	-	17.8	-	30.2
Other/Unknown	42.4	10.4	18.3	11.7	47.0	16.2	70.1	28.1
Sex								
Male	37.9	11.7	29.5	13.6	41.7	20.5	44.3	27.6
Female	41.3	9.8	20.7	10.4	47.2	16.6	75.9	24.9
All	39.7	10.7	26.6	12.0	44.9	18.1	58.5	26.2

Data Source: Special analyses, Medicare 5 percent sample, aged 65 and older alive & eligible for all of 2013 and NHANES 2011-2012 participants, aged 65 and older. CKD claims as well as other diseases identified in 2013. Abbreviations: CKD, chronic kidney disease; CVD, cardiovascular disease; DM, diabetes mellitus; HTN, hypertension; Af Am, African American; Native Am, Native American.

** Values for cells with 10 or fewer patients are suppressed.*

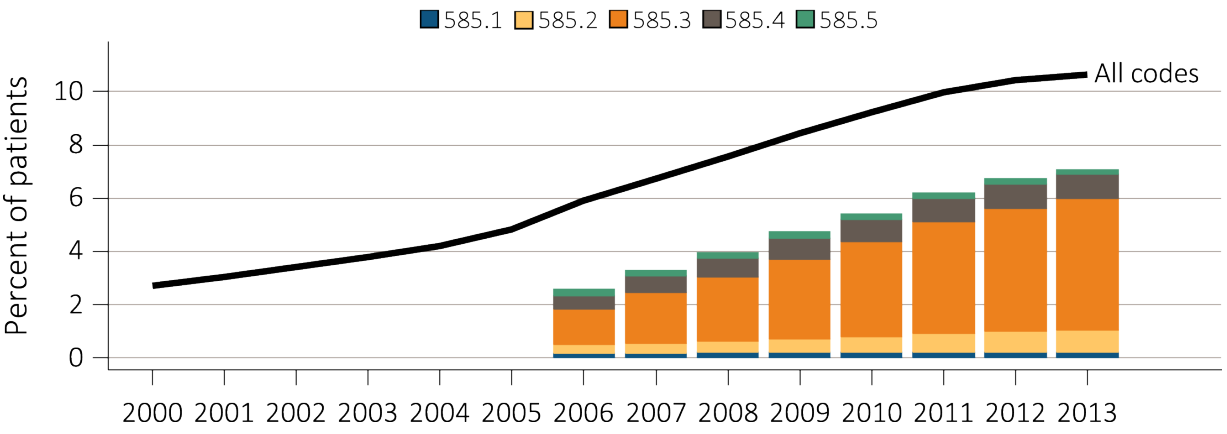
[a] CVD defined as any of the self-report diseases: angina, myocardial infarction, stroke, coronary heart disease, or congestive heart failure.

[b] CVD defined as either one of the following comorbidities: cerebrovascular accident, peripheral vascular disease, atherosclerotic heart disease, congestive heart failure, dysrhythmia or other cardiac comorbidities.

- No available data.

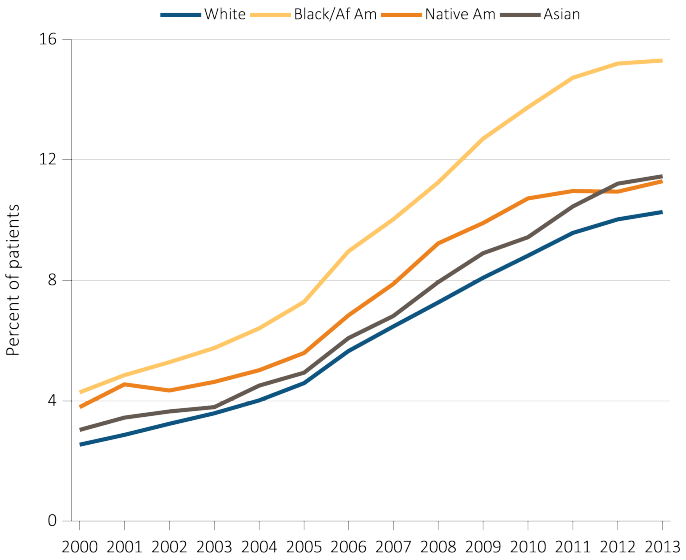
Figure 2.1 shows the temporal trend in prevalence of recognized CKD overall and by CKD stage-specific code from 2000-2013. Figure 2.2 shows CKD prevalence stratified by race, among Medicare patients aged 65 and older during the same period. These figures show that the prevalence of recognized CKD has steadily risen each year. Likewise, the prevalence of recognized CKD prevalence has risen each year in each race group.

vol 1 **Figure 2.1 Trends in prevalence of recognized CKD, overall and by CKD stage, among Medicare patients aged 65+, 2000-2013**



Data Source: Special analyses, Medicare 5 percent sample. Known CKD stages presented as bars; curve showing "All codes" includes known CKD stages (codes 585.1-585.5) and the CKD-stage unspecified codes (585.9, and remaining non-585 CKD codes). Note: In previous years, this graph reported 585.9 codes as a component of the stacked bars. Abbreviation: CKD, chronic kidney disease.

vol 1 **Figure 2.2 Trends in prevalence of recognized CKD, by race, among Medicare patients aged 65+, 2000-2013**



Data Source: Special analyses, Medicare 5 percent sample. Abbreviations: Af Am, African American; CKD, chronic kidney disease; Native Am, Native American.

CKD Progression and Outcomes, Based on Diagnosis Codes

Table 2.5 shows progression of kidney disease by CKD stage, ESRD, or death in 2012-2013 for a cohort of patients based on CKD diagnosis in 2008. Roughly a quarter of patients with early stage CKD (codes for CKD Stage 1 or 2) or CKD stage unspecified in 2008, and who were alive in 2013, did not have a CKD diagnosis code in 2012-2013.

As shown in Table 2.5, the percent of all Medicare patients from 2008 who died or were alive with ESRD by the end of 2013 (i.e., after 5 years) was 24% and 0.3%, respectively. In comparison, patients with a CKD diagnosis in 2008 were even more likely to have these outcomes. Among patients with CKD Stages 1-3 in 2008, approximately 40% had died by 2013, while 1-2% were alive with ESRD. Among patients with CKD Stages 4-5 in 2008, roughly 60% had died and 8% were alive with ESRD in 2013.

vol 1 **Table 2.5 Progression of CKD from 2008 to 2013, Medicare 5% cohort alive and not yet ESRD in 2008**

			2012-2013 status										
			Total	No CKD diagnosis	CKD Stage 1	CKD Stage 2	CKD Stage 3	CKD Stage 4	CKD Stage 5	CKD Stage-Unspecified	ESRD	Death	Lost to follow-up
2008 status	No CKD diagnosis	N	1,132,034	643,787	2,241	8,074	43,180	5,904	1,459	42,226	1,449	246,410	137,304
		%		56.9	0.2	0.7	3.8	0.5	0.1	3.7	0.1	21.8	12.1
	CKD Stage 1	N	2,462	384	109	85	342	84	12	155	41	1,033	217
		%		15.6	4.4	3.5	13.9	3.4	0.5	6.3	1.7	42.0	8.8
	CKD Stage 2	N	5,249	831	50	430	1,102	144	31	314	45	1,860	442
		%		15.8	1.0	8.2	21.0	2.7	0.6	6.0	0.9	35.4	8.4
	CKD Stage 3	N	29,329	2,410	113	518	7,745	1,764	206	1,242	629	12,439	2,263
		%		8.2	0.4	1.8	26.4	6.0	0.7	4.2	2.1	42.4	7.7
	CKD Stage 4	N	8,774	251	22	48	753	1,010	149	176	700	5,197	468
		%		2.9	0.3	0.6	8.6	11.5	1.7	2.0	8.0	59.2	5.3
	CKD Stage 5	N	2,632	185	10	14	206	67	55	93	217	1,637	148
		%		7.0	0.4	0.5	7.8	2.6	2.1	3.5	8.2	62.2	5.6
	CKD Stage-Unspecified	N	44,479	8,620	221	600	4,397	1,077	184	4,857	313	20,773	3,437
		%		19.4	0.5	1.4	9.9	2.4	0.4	10.9	0.7	46.7	7.7
	Any CKD	N	92,925	12,681	525	1,695	14,545	4,146	637	6,837	1,945	42,939	6,975
		%		13.7	0.6	1.8	15.7	4.5	0.7	7.4	2.1	46.2	7.5
	Total	N	1,224,959	656,468	2,766	9,769	57,725	10,050	2,096	49,063	3,394	289,349	144,279
		%	100	53.6	0.2	0.8	4.7	0.8	0.2	4.0	0.3	23.6	11.8

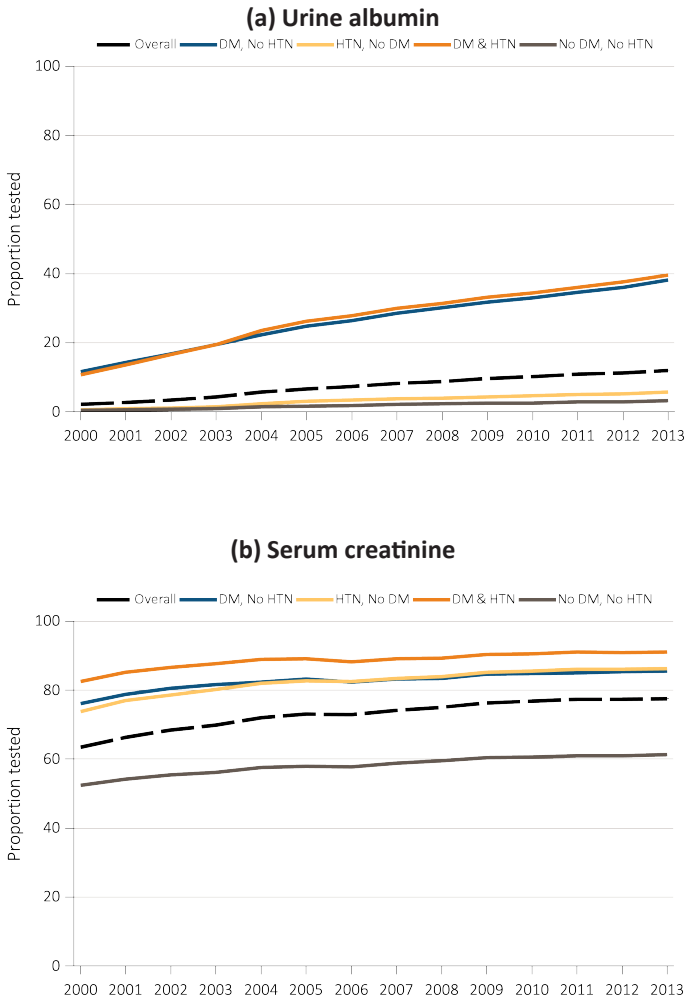
Data Source: Special analyses, Medicare 5 percent sample. Patients alive & eligible for all of 2008. Death and ESRD status were examined yearly between 2009-2013, and carried forward if present. If ESRD occurred before death, the death information was used. Among patients without death or ESRD by 2013 the last CKD diagnosis claim was used; if not available, then the last CKD diagnosis claim from 2012 was used. Lost to follow-up represents the patients that did not have 2013 data available. Abbreviations: CKD, chronic kidney disease; ESRD, end-stage renal disease.

Laboratory Testing of Patients With and Without CKD

Assessing the care of patients at high risk for kidney disease has long been a focus of the USRDS, and is now part of the Healthy People 2020 goals developed by the Department of Health and Human Services (see the Healthy People 2020 chapter in Volume 2). Although there are no recommendations to screen asymptomatic patients not at high risk for CKD, individuals at risk for CKD (most notably those with diabetes mellitus) should be screened periodically for kidney disease, and those with CKD should be monitored for progression of disease. Urine albumin and creatinine tests are valuable laboratory markers to detect signs of kidney damage, as well as to evaluate decline in kidney function. Urine testing for albumin in patients with diabetes has been recommended for some time by the American Diabetes Association (ADA). The 2012 Kidney Disease Improving Global Outcomes (KDIGO) guidelines on CKD evaluation and management recommend risk stratification of CKD patients using both the urine albumin/creatinine ratio and the estimated glomerular filtration rate (based on estimating equations incorporating serum creatinine values), emphasizing that both tests are needed to understand patients' kidney disease status and risk of death and progression to end-stage renal disease (ESRD) (Matsushita et al., 2010; Kidney Disease: Improving Global Outcomes (KDIGO) CKD Work Group, 2012).

As shown in Figure 2.3, 77.8% of Medicare patients without diagnosed CKD received serum creatinine testing in 2013, while 12% received a urine albumin test. Thirty-eight percent of patients with diabetes alone had urine albumin testing, compared to 6% of patients with hypertension alone. Having both diabetes and hypertension is known to increase the likelihood of developing CKD: among these patients, 91% had serum creatinine testing and 40% had urine albumin testing in 2013. Because urine albumin testing must be ordered separately from standard blood tests (as opposed to serum creatinine, which is usually included as part of a standard panel of tests), it may better represent intent to assess kidney disease. There has been a steady rise in use of urine albumin testing over time, particularly in those with diabetes, from 32% in 2008 to 40% in 2013.

vol 1 Figure 2.3 Trends in proportion of patients with (a) urine albumin & (b) serum creatinine testing, by year, among Medicare patients aged 65+ WITHOUT a diagnosis of CKD, 2000-2013

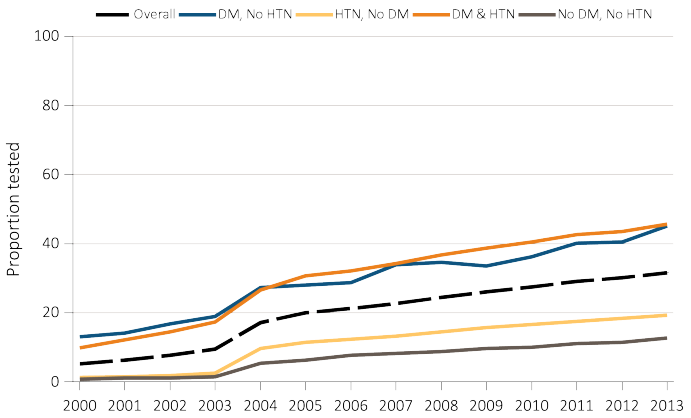


Data Source: Special analyses, Medicare 5 percent sample, aged 65 and older with Part A & B coverage in the prior year. Tests tracked during each year. Abbreviations: CKD, chronic kidney disease; DM, diabetes mellitus; HTN, hypertension.

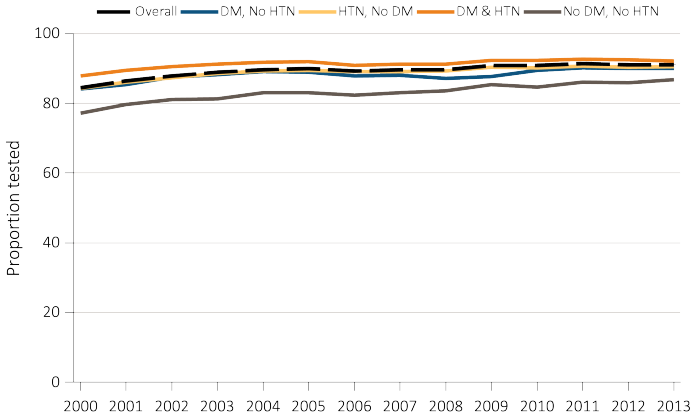
As shown in Figure 2.4, among patients with a diagnosis of CKD, patterns of testing were similar, though at somewhat higher rates than among patients without CKD. For example, in 2013, in patients with a diagnosis of CKD, 46% had urine albumin testing and 92% had serum creatinine testing among patients who also had both diabetes and hypertension.

vol 1 Figure 2.4 Trends in Proportion of patients with (a) urine albumin & (b) serum creatinine testing, by year, among Medicare patients aged 65+ WITH a diagnosis of CKD, 2000-2013

(a) Urine albumin



(b) Serum creatinine

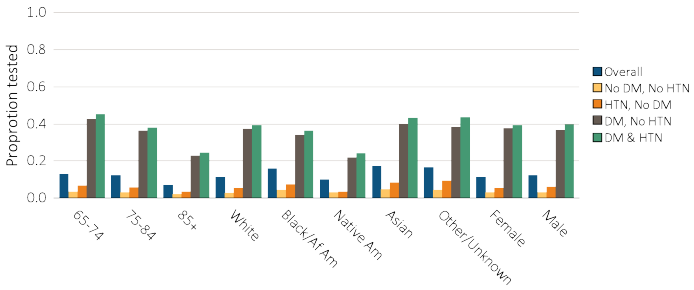


Data Source: Special analyses, Medicare 5 percent sample, aged 65 and older with Part A & B coverage in the prior year. Tests tracked during each year. Abbreviations: CKD, chronic kidney disease; DM, diabetes mellitus; HTN, hypertension.

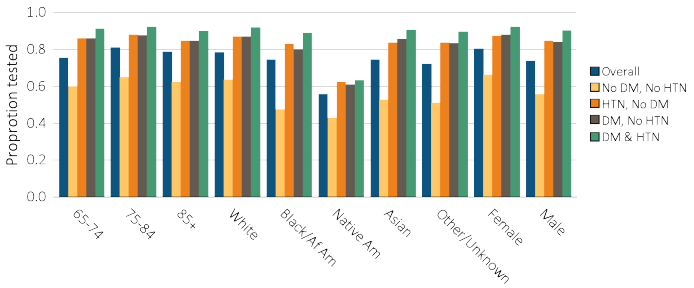
Figures 2.5 and 2.6 provide the proportions tested by demographic characteristics, among those without and with a diagnosis of CKD, respectively, using most recent available (2013) data. Both Figures 2.5 and 2.6 demonstrate lower rates of urine albumin testing with older age, and among patients of Native American or Black race. Serum creatinine testing appears uniformly high, regardless of CKD status, presence of other comorbidities, or demographics, with somewhat lower rates for Native Americans. This again may relate to the fact that serum creatinine is usually included with standard panels of routinely ordered blood tests. The lower rate for Native Americans could be reflective of these patients receiving care at Indian Health Service facilities.

vol 1 Figure 2.5 Proportion of patients with (a) urine albumin & (b) serum creatinine testing by demographic characteristics, adjusted for age, race and gender, among Medicare patients aged 65+ WITHOUT a diagnosis of CKD, 2013

(a) Urine albumin



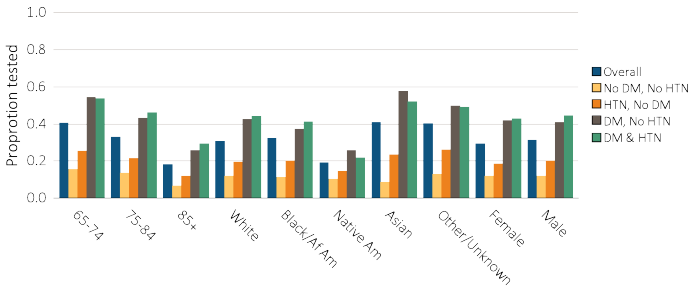
(b) Serum creatinine



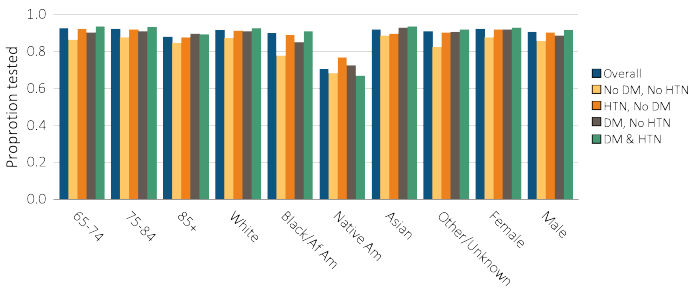
Data Source: Special analyses, Medicare 5 percent sample. Models are adjusted for age, race, and gender. Abbreviations: Af Am, African American; CKD, chronic kidney disease; DM, diabetes mellitus; HTN, hypertension; Native Am, Native American.

vol 1 Figure 2.6 Proportion of patients with (a) urine albumin & (b) serum creatinine testing by demographic characteristics, adjusted for age, race and gender, among Medicare patients aged 65+ WITH a diagnosis of CKD, 2013

(a) Urine albumin



(b) Serum creatinine



Data Source: Special analyses, Medicare 5 percent sample. Models are adjusted for age, race, and gender. Abbreviations: Af Am, African American; CKD, chronic kidney disease; DM, diabetes mellitus; HTN, hypertension; Native Am, Native American.

Physician Visits After a CKD Diagnosis

Table 2.6 indicates the proportion of patients with at least one visit to a primary care physician, cardiologist, or nephrologist in 2013, among those with a CKD diagnosis in 2012. Patients with any CKD diagnosis are far more likely to visit a primary care physician or cardiologist than a nephrologist. This may relate in part to the fact that most guidelines (including the KDIGO CKD guidelines) suggest referral to nephrology only for advanced CKD (Stage 4 CKD, i.e., once the estimated glomerular filtration rate (eGFR) falls to under 30 ml/min/1.73 m^2), unless there are other concerns such as rapid progression of disease. Indeed, fewer than one-third of patients with any CKD claim in 2012 were seen by a nephrologist over the subsequent year. However, among those with more advanced CKD, nearly half with CKD Stage 3, and roughly two-thirds with CKD Stage 4 or higher, visited a nephrologist in 2013. Whether the involvement of a nephrologist improves outcomes, and at what stage of CKD, is a matter of ongoing interest. Overall, the patterns of physician visits varied little across demographic categories. A notable exception is that patients 85 and older with CKD stages 3 or higher were less likely than younger patients to visit a nephrologist.

Table 2.7 presents the proportion of patients with CKD (based on diagnostic code) who were tested for urine albumin or serum creatinine in 2013, according to whether they saw a primary care physician or nephrologist in 2012. Patients who saw a nephrologist were more likely to be tested with urine albumin or serum creatinine than those who saw only a primary care physician. The difference in percent tested between those with and without a nephrology visit was most pronounced for patients without diabetes mellitus. This may relate to the wide promulgation of guidelines directed at primary care physicians, such as those from the ADA, for routine renal function assessment in diabetics.

vol 1 Table 2.6 Percent of patients with a physician visit in 2013 after a CKD diagnosis in 2012, among Medicare patients aged 65+

	Any CKD diagnosis			CKD diagnosis code of 585.3 (Stage 3)			CKD diagnosis code of 585.4 (Stage 4) or higher		
	Primary care	Cardiologist	Nephrologist	Primary care	Cardiologist	Nephrologist	Primary care	Cardiologist	Nephrologist
Age									
65-74	89.1	54.9	32.3	89.3	54.4	55.4	81.0	49.3	70.7
75-84	92.3	63.3	31.0	92.0	62.1	48.5	84.0	55.0	69.1
85+	93.7	64.7	24.4	93.6	63.0	36.1	87.4	54.4	57.7
Sex									
Male	91.4	60.1	29.4	91.6	59.5	48.0	83.8	53.2	66.5
Female	91.2	60.3	36.2	90.8	59.6	55.4	83.4	51.1	70.2
Race									
White	90.2	54.0	29.6	89.9	53.0	46.3	84.6	48.8	68.1
Black/Af Am	91.8	56.9	29.5	91.7	55.8	46.9	84.6	49.6	65.6
Other	90.6	62.9	31.0	91.0	62.7	50.9	82.7	56.1	69.0
Overall	91.2	59.7	30.4	91.3	59.1	48.9	83.6	52.6	67.1

Data Source: Special analyses, Medicare 5 percent sample. Patients alive & eligible for all of 2012. CKD diagnosis is at date of first CKD claim in 2012; claims for physician visits were searched during the 12 months following that date. CKD diagnosis code of 585.4 or higher represents CKD Stages 4-5. Abbreviation: CKD, chronic kidney disease; Af Am, African American; Native Am, Native American.

vol 1 Table 2.7 Proportion of CKD patients in 2012 with physician visit (nephrologist, PCP, both and neither) in 2012, with lab testing in the following year (2013), by comorbidity

	PCP Only					Nephrologist with and without PCP					Neither				
		Urine albumin testing		Serum creatinine testing			Urine albumin testing		Serum creatinine testing			Urine albumin testing		Serum creatinine testing	
	N	n	%	n	%	N	n	%	n	%	N	n	%	n	%
Overall	63,914	--	23.4	--	90.3	32,131	--	50.4	--	94.5	5,970	--	16.5	--	79.5
No DM, No HTN	4,008	318	7.9	3,450	86.1	937	346	36.9	858	91.6	667	35	5.3	482	72.3
HTN, No DM	30,449	3,143	10.3	27,180	89.3	14,144	5,794	41.0	13,353	94.4	2,913	212	7.3	2,309	79.3
DM, No HTN	1,647	683	41.5	1,498	91.0	410	228	55.6	383	93.4	190	58	30.5	155	81.6
DM & HTN	27,810	10,835	39.0	25,596	92.0	16,640	9,813	59.0	15,773	94.8	2,200	681	31.0	1,798	81.7

Data Source: Special analyses, Medicare 5 percent sample. Patients alive & eligible for all of 2013 with a CKD diagnosis claim in 2012. Abbreviations: CKD, chronic kidney disease; DM, diabetes mellitus; HTN, hypertension; PCP, primary care physician.

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Notes