Healthy People 2020

- In this chapter, we examine data for 11 Healthy People 2020 (HP2020) objectives—10 for CKD and one for diabetes—spanning 20 total indicators for which the USRDS serves as the official data source. As in previous Annual Data Reports (ADR), we present data overall and stratified by race, sex, and age groups.

- In 2015, 12 of the 19 HP2020 indicators with specific targets met the established goals.

- This year we introduce an examination of Objective CKD-5—*Increase the proportion of persons with diabetes and chronic kidney disease who receive recommended medical treatment with angiotensin-converting enzyme inhibitors or angiotensin II receptor blockers* (Table 5). Progress is still needed to meet the established hypertension treatment target of 76.3%.

- State-level comparison maps showed marked geographic variation for HP2020 Objectives CKD-10 (*Proportion of ESRD patients receiving care from a nephrologist at least 12 months before the start of renal replacement therapy*; Figure 1) and CKD-13.1 (*Proportion of patients receiving a kidney transplant within three years of end-stage renal disease*; Figure 2). Forty-five states achieved the HP2020 target for CKD-10, while nine achieved the target for CKD-13.1.

- For HP2020 objectives relating to vascular access, we present data from CROWNWeb examining HP2020 Objectives CKD 11-1 (*Proportion of adult hemodialysis patients who use arteriovenous fistulas as the primary mode of vascular access*; Table 10) and CKD 11-2 (*Proportion of adult hemodialysis patients who use catheters as the only mode of vascular access*; Table 11). In 2015, the overall proportion of prevalent patients using an arteriovenous fistula was 63.8%, essentially unchanged from 2013 and 2014.

- The all-cause mortality among prevalent dialysis patients in 2015 was 174.4 deaths per 1,000 patient years (HP2020 objective CKD-14.1, Table 16). Although this rate was a slight increase from 2014, it indicates a 16.2% decrease in the mortality rate since 2006. This increase, although slight, represents the first increase in dialysis mortality since 2001 (data not shown). In the pediatric population (aged <18 years), mortality rates have improved by over 40% in the past decade.

Introduction

For more than three decades, the Healthy People initiative has served as the nation's agenda for health promotion and disease prevention. Coordinated by the United States (U.S.) Department of Health and Human Services, the initiative provides a vision and strategy for improving the health of all Americans by setting priorities, identifying baseline data and 10-year targets for specific objectives, monitoring outcomes, and evaluating progress. In each decade since its inaugural iteration in 1980, the Healthy People program has released updated plans that reflect emerging health priorities, and have helped to align health promotion resources, strategies, and research.

Healthy People 2020 (HP2020) was launched on December 2, 2010 (HP2020, 2010). It represents the fourth-generation plan, and encompasses more than 1,000 health objectives organized into 42 different topic areas. Built on the success of the three previous initiatives, HP2020 seeks to achieve the following overarching goals:

- to assist all Americans in attaining high-quality, longer lives free of preventable disease, disability, injury, and premature death,

- to achieve health equity, eliminate disparities, and improve the health of all groups,

- to create social and physical environments that promote good health for all, and

- to promote quality of life, healthy development, and healthy behaviors across all life stages (HP2020, 2010).

One of the key priorities of the HP2020 initiative is to "reduce new cases of chronic kidney disease (CKD) and its complications, disability, death, and economic costs." The development of CKD and its progression to end-stage renal disease (ESRD) is a major source of diminished quality of life in the U.S., and is responsible for significant premature mortality. The HP2020 CKD objectives were designed to reduce the long-term burden of kidney disease, increase lifespan, improve quality of life, and to eliminate related health care disparities. To accomplish these goals the HP2020 program developed 14 objectives related to CKD, encompassing 24 total indicators with targets designed to evaluate the program's success. Herein, we provide data for 10 of these objectives, for which USRDS serves as the official data source, as well as information on urine albumin testing in non-CKD patients diagnosed with diabetes mellitus (DM).

It is important to highlight that one of the four overarching goals of HP2020 is to eliminate health care disparities. While much of the data showed promising trends relevant to this goal, overall progress did not always translate into reduced differences across groups. To facilitate comparisons we present data overall and by racial, ethnic, sex, and age subgroups. In many cases, while the overall population may have met an objective, one or more subgroups may have fallen well short. Conversely, for some objectives the overall findings may have been stable, yet with significant improvements observed in some subgroups.

Table A presents the current targets for each of the 11 objectives (with 20 total indicators). Many of these targets are based on percentage changes from an index value or year, e.g. a 10% reduction in the number of new cases of ESRD per million population from the 2007 value (CKD-8). We have updated these targets to reflect the changes in the index values that have resulted from recent data, change in the standard population year for adjusted analyses, and improved methodology. Additional information on the HP2020 program CKD objectives is available on the [Healthy People 2020 website](#).

HP2020 Table A HP2020 CKD Objectives

Objective	Indicator	Target
CKD-1*	Reduce the proportion of the U.S. population with chronic kidney disease	13.3%
CKD-2*	Increase the proportion of persons with chronic kidney disease (CKD) who know they have impaired renal function	13.4%
CKD-3	Increase the proportion of hospital patients who incurred acute kidney injury who have follow-up renal evaluation in 6 months post discharge	12.3%
CKD-4 Increase the proportion of persons with diabetes and chronic kidney disease who receive recommended medical evaluation	**4.1** Increase the proportion of persons with chronic kidney disease who receive medical evaluation with serum creatinine, lipids, and microalbuminuria	28.4%
	4.2 Increase the proportion of persons with type 1 or type 2 diabetes and chronic kidney disease who receive medical evaluation with serum creatinine, microalbuminuria, A1c, lipids, and eye examinations	25.3%
CKD-5	Increase the proportion of persons with diabetes and chronic kidney disease who receive recommended medical treatment with angiotensin-converting enzyme (ACE) inhibitors or angiotensin II receptor blockers (ARBS)	76.3%
CKD-6* Improve cardiovascular care in persons with chronic kidney disease	**6.1** Reduce the proportion of persons with chronic kidney disease who have elevated blood pressure	17.6%
	6.2 Increase the proportion of adults aged 50 years and over with chronic kidney disease who currently take statins to lower their blood cholesterol	25.6%
CKD-7*	Reduce the number of deaths among persons with chronic kidney disease	Not applicable
CKD-8	Reduce the number of new cases of end-stage renal disease (ESRD)	352.0 PMP
CKD-9 Reduce kidney failure due to diabetes	**9.1** Reduce kidney failure due to diabetes	154.4 PMP
	9.2 Reduce kidney failure due to diabetes among persons with diabetes	2354.4 PMP
CKD-10	Increase the proportion of chronic kidney disease patients receiving care from a nephrologist at least 12 months before the start of renal replacement therapy	30.0%
CKD-11 Improve vascular access for hemodialysis patients	**11.1** Increase the proportion of adult hemodialysis patients who use arteriovenous fistulas as the primary mode of vascular access	50.6%
	11.2 Reduce the proportion of adult hemodialysis patients who use catheters as the only mode of vascular access	26.1%
	11.3 Increase the proportion of adult hemodialysis patients who use arteriovenous fistulas or have a maturing fistula as the primary mode of vascular access at the start of renal replacement therapy	34.8%
CKD-12	Increase the proportion of dialysis patients waitlisted and/or receiving a deceased donor kidney transplant within 1 year of end-stage renal disease (ESRD) start (among patients under 70 years of age)	18.7%
CKD-13 Increase the proportion of patients with treated chronic kidney failure who receive a transplant	**13.1** Increase the proportion of patients receiving a kidney transplant within 3 years of end-stage renal disease (ESRD)	20.1%
	13.2 Increase the proportion of patients who receive a preemptive transplant at the start of ESRD	Not applicable
CKD-14 Reduce deaths in persons with end-stage renal disease (ESRD)	**14.1** Reduce the total number of deaths for persons on dialysis	187.4 per 1000 patient years
	14.2 Reduce the number of deaths in dialysis patients within the first 3 months of initiation of renal replacement therapy	335.0 per 1000 patient years
	14.3 Reduce the number of cardiovascular deaths for persons on dialysis	81.3 per 1000 patient years
	14.4 Reduce the total number of deaths for persons with a functioning kidney transplant	27.8 per 1000 patient years
	14.5 Reduce the number of cardiovascular deaths in persons with a functioning kidney transplant	4.5 per 1000 patient years

*Data Source: https://www.healthypeople.gov/2020/topics-objectives/topic/chronic-kidney-disease/objectives. Abbreviation: PMP, per million population. * These objectives use a data source other than USRDS, and are therefore not reported in this chapter.*

Recommended Care

Acute kidney injury (AKI) has become established as an important risk factor for the subsequent development, or worsening, of CKD. This association is apparent even for less severe stages of AKI and continues after apparent recovery from AKI. Unfortunately, the published literature suggests that the rate of post-AKI renal follow-up is quite low. This objective aims to promote improved renal follow-up within six months after an episode of AKI. Post-AKI follow-up allows for early identification of CKD development and provides an opportunity to institute renoprotective measures early in the course of evolving disease.

Over the past decade, there has been a steady increase in the percentage of Medicare patients with

AKI who received follow-up renal evaluation, reaching 17.4% in 2015 (see Table 1). This is the fifth consecutive year that the HP2020 goal of 12.3% has been achieved. While these trends are encouraging, the absolute rates of follow-up remained quite low.

Men were more likely to receive post-AKI follow-up renal evaluation as compared with women, and a slightly higher proportion of Blacks/African Americans had follow-up compared to Whites. The proportion of patients receiving post-AKI renal evaluation decreased with older age. Among patients aged 65-74, 22.1% received follow-up evaluation, compared to 18.2% of patients aged 75-84, and only 9.7% of those aged 85 and older.

HP2020 Table 1 CKD-3 Increase the proportion of hospital patients who incurred acute kidney injury who have follow-up renal evaluation in 6 months post discharge: Target 12.3%

	2006 (%)	2007 (%)	2008 (%)	2009 (%)	2010 (%)	2011 (%)	2012 (%)	2013 (%)	2014 (%)	2015 (%)
All	10.4	11.2	10.5	11.4	11.8	12.6	12.7	15.9	16.2	17.4
Race/Ethnicity										
American Indian or Alaska Native	13.2	12.0	15.2	6.9	11.1	17.4	9.5	9.3	10.2	17.5
Asian	19.2	15.1	11.3	16.1	15.3	16.0	14.7	22.5	20.8	19.1
Black/African American	9.0	11.1	10.2	12.1	11.3	12.0	13.2	15.8	17.0	18.9
White	10.5	11.1	10.4	11.2	11.8	12.5	12.5	15.6	15.8	16.9
Hispanic or Latino	10.1	11.8	16.0	13.1	12.9	16.6	15.8	23.1	22.4	24.7
Sex										
Male	11.2	12.5	11.9	12.4	12.7	13.8	13.9	17.4	17.5	18.6
Female	9.7	10.0	9.3	10.5	11.0	11.5	11.7	14.6	15.0	16.2
Age										
65-74	14.6	16.1	14.8	16.0	16.5	17.5	17.3	20.8	21.0	22.1
75-84	10.4	11.1	10.7	11.3	12.3	13.2	13.0	16.7	17.2	18.2
85+	5.1	5.1	5.0	6.4	5.9	6.2	6.9	8.8	8.6	9.7

Data Source: Special analyses, Medicare 5 percent sample. Medicare patients aged 65 & older with a hospitalized AKI event in a given year.
Abbreviation: CKD, chronic kidney disease.

It is recommended that patients with DM have urine albumin measurement to detect early diabetic nephropathy. In the Medicare population, there has been steady improvement in the proportion of patients with diagnosed DM who received this test annually. The rate reached 47.6% in 2015, once again meeting the HP2020 target (see Table 2).

The increase in urine albumin measurements occurred across all age and race groups, and in both men and women. However, the proportion of patients with DM who had urine albumin measurements declined with age, falling from 51.9% in the 65-74 age group to 34.1% in patients older than 85 years. Proportions were somewhat similar when examined by race, with the exception of American Indians or Alaska Natives. While this group had a low rate of 30.1%, testing in this population may have been under-reported as services rendered through the Indian Health Service (IHS) are not included in the claims reported to the Medicare system.

HP2020 Table 2 D-12 Increase the proportion of persons with diagnosed diabetes who obtain an annual urinary microalbumin measurement: Target 37.0%

	2006 (%)	2007 (%)	2008 (%)	2009 (%)	2010 (%)	2011 (%)	2012 (%)	2013 (%)	2014 (%)	2015 (%)
All	31.3	33.6	35.6	37.3	38.8	40.7	42.6	45.0	46.2	47.6
Race/Ethnicity										
American Indian or Alaska Native	19.8	21.2	21.5	24.2	23.8	24.9	24.3	27.6	27.8	30.1
Asian	33.8	35.2	37.5	39.8	42.1	43.9	47.5	49.3	50.4	53.4
Black/African American	29.5	31.9	33.7	35.7	37.0	39.3	41.0	43.1	43.8	46.0
White	31.4	33.8	35.8	37.4	38.9	40.8	42.6	44.9	46.3	47.5
Hispanic or Latino	31.5	33.6	35.7	38.1	40.4	42.6	44.3	48.0	48.8	50.5
Sex										
Male	32.2	34.6	36.6	38.2	39.8	41.7	43.4	46.0	47.3	48.6
Female	30.5	32.7	34.8	36.5	38.0	39.9	41.9	44.0	45.2	46.8
Age										
65-74	35.2	37.7	40.0	41.9	43.3	45.3	47.2	49.5	50.6	51.9
75-84	29.6	31.8	33.7	35.3	37.1	39.1	41.0	44.4	45.8	47.2
85+	18.1	20.5	22.2	23.5	25.0	26.7	28.0	31.4	32.5	34.1

Data Source: Special analyses, Medicare 5 percent sample. Medicare patients with diabetes mellitus, aged 65 & older. Abbreviation: D, diabetes mellitus.

HP2020 CKD Objective 4.1 examines the proportion of patients with CKD who receive recommended medical testing, including for serum creatinine, urine albumin, and lipids (Table 3). In the Medicare population aged 65 and older, 33.8% of CKD patients underwent serum creatinine, lipid, and urine albumin testing in 2015, surpassing the HP2020 goal of 28.4% for the sixth consecutive year. This represents a 10-percentage point increase (23.5%-33.8%) over the base year of 2006.

Similar to trends for other recommended measures, the proportion of patients receiving these tests declined with rising age; testing occurred in 41.3%, 35.7%, and 20.6% of individuals in the 65-74, 75-84, and 85 years and older age groups. As compared to females, a higher proportion of males had recommended testing. When examining race and ethnicity, Asians had the highest proportion of recommended testing, followed by Hispanic or Latino patients. American Indians or Alaska Natives had the lowest proportion, although once again this may relate to lack of data capture from the IHS.

HP2020 Table 3 CKD-4.1 Increase the proportion of persons with chronic kidney disease who receive medical evaluation with serum creatinine, lipids, and microalbuminuria: Target 28.4%

	2006 (%)	2007 (%)	2008 (%)	2009 (%)	2010 (%)	2011 (%)	2012 (%)	2013 (%)	2014 (%)	2015 (%)
All	23.5	25.8	26.8	28.2	29.1	30.3	31.2	33.1	33.7	33.8
Race/Ethnicity										
American Indian or Alaska Native	15.6	17.2	17.4	18.6	20.2	21.0	18.5	23.3	22.0	24.2
Asian	32.9	35.3	34.0	37.8	37.1	39.6	41.2	43.8	44.9	45.3
Black/African American	24.5	26.8	28.0	30.2	30.6	32.3	33.0	35.0	35.5	35.8
White	22.9	25.2	26.3	27.4	28.4	29.5	30.4	32.2	32.8	32.9
Hispanic or Latino	31.5	32.9	32.3	36.2	36.7	39.3	41.5	44.1	44.7	44.3
Sex										
Male	24.6	27.2	28.4	29.6	30.6	32.0	33.0	35.0	35.7	35.6
Female	22.4	24.4	25.3	26.8	27.7	28.8	29.6	31.4	32.0	32.1
Age										
65-74	31.7	34.0	35.4	37.0	37.9	39.1	39.9	41.5	42.0	41.3
75-84	23.7	26.2	27.3	28.9	30.1	31.5	32.7	34.8	35.6	35.7
85+	11.1	13.0	14.2	15.1	15.9	17.2	18.0	19.8	20.2	20.6

Data Source: Special analyses, Medicare 5 percent sample. Medicare patients aged 65 & older with CKD. Abbreviation: CKD, chronic kidney disease.

Patients with both CKD and type 1 or type 2 DM require comprehensive laboratory monitoring to assess for the development of complications. The glycosylated hemoglobin (HbA1c) test provides an assessment of blood glucose control over prolonged periods. Diabetic retinopathy, an early sign of poor glucose control, can be detected through regular eye examinations, and lipid levels can be used to estimate cardiovascular risk. In 2015, 30.1% of Medicare patients with CKD and DM received serum creatinine, urine albumin, HbA1c, and lipid testing, as well as an eye examination (see Table 4). This continues the annual increases observed over the past decade, surpassing the HP2020 goal of 25.3% for the sixth consecutive year.

Once again, the proportion of patients tested declined with rising age; testing occurred in 32.4%, 31.7%, and 22.3% of individuals in the 65-74, 75-84, and 85 years and older age groups.

HP2020 Table 4 CKD-4.2 Increase the proportion of persons with type 1 or type 2 diabetes and chronic kidney disease who receive medical evaluation with serum creatinine, microalbuminuria, A1c, lipids, and eye examinations: Target 25.3%

	2006 (%)	2007 (%)	2008 (%)	2009 (%)	2010 (%)	2011 (%)	2012 (%)	2013 (%)	2014 (%)	2015 (%)
All	21.2	23.0	23.6	25.1	26.5	26.9	27.6	29.7	29.8	30.1
Race/Ethnicity										
American Indian or Alaska Native	12.4	10.4	11.5	11.7	15.1	14.1	11.5	17.1	17.2	18.0
Asian	26.2	26.6	25.3	27.1	29.5	30.7	32.6	37.0	34.4	32.9
Black/African American	18.8	19.7	21.0	22.4	23.7	25.0	25.1	27.0	26.6	27.6
White	21.4	23.5	24.1	25.6	27.0	27.1	27.8	29.8	30.1	30.2
Hispanic or Latino	20.3	22.0	21.9	24.6	24.1	27.0	25.4	29.8	30.0	32.1
Sex										
Male	21.4	23.5	23.6	25.5	26.7	27.2	27.7	30.0	30.2	30.4
Female	20.9	22.5	23.6	24.7	26.2	26.6	27.4	29.4	29.4	29.8
Age										
65-74	24.6	26.4	27.0	28.3	29.9	29.9	30.2	32.1	32.2	32.4
75-84	21.4	23.3	24.1	25.9	27.3	28.0	29.3	31.6	31.5	31.7
85+	12.3	14.1	15.0	16.6	17.6	18.7	18.9	21.4	21.7	22.3

Data Source: Special analyses, Medicare 5 percent sample. Medicare patients aged 65 & older with CKD & diabetes mellitus. Abbreviations: CKD, chronic kidney disease; A1c, glycosylated hemoglobin.

The use of angiotensin-converting enzyme (ACE) inhibitors or angiotensin II receptor blockers (ARBs) is a recommended part of the medical management of patients with CKD and DM. In 2015, 71% of Medicare patients aged 65 and older received one of these agents. This was a slight decrease from 2014, and fell short of the HP2020 goal of 76.3%. The treatment rate of approximately 70% has remained essentially unchanged since 2007.

A slightly higher proportion of females received ACE inhibitor or ARB therapy as compared to males. Those of White race had the lowest proportion of use at 70.2%, compared to 72.3% of Blacks and 77.1% of Hispanic or Latino patients. Use of ACE inhibitors and ARBs decreased with increasing age group.

HP2020 Table 5 CKD-5 Increase the proportion of persons with diabetes and chronic kidney disease who receive recommended medical treatment with angiotensin-converting enzyme (ACE) inhibitors or angiotensin II receptor blockers (ARBS): Target 76.3

	2006 (%)	2007 (%)	2008 (%)	2009 (%)	2010 (%)	2011 (%)	2012 (%)	2013 (%)	2014 (%)	2015 (%)
All	63.6	69.4	70.1	71.1	70.6	70.4	70.7	71.6	72.0	71.1
Race/Ethnicity										
American Indian or Alaska Native	60.2	70.5	75.6	77.2	73.7	73.7	71.9	72.5	70.8	74.4
Asian	70.3	76.4	77.0	76.0	78.0	76.5	78.5	79.4	77.8	76.5
Black/African American	66.7	71.4	70.7	72.6	71.5	72.5	71.8	72.3	72.7	72.3
White	62.2	68.3	69.3	70.2	69.7	69.3	69.8	70.8	71.2	70.2
Hispanic or Latino	69.1	73.2	73.0	75.5	76.4	77.5	79.3	77.6	78.5	77.1
Sex										
Male	60.4	66.9	68.4	69.3	68.9	68.5	69.6	70.6	71.2	70.5
Female	65.8	71.1	71.3	72.4	71.9	71.9	71.9	72.5	72.8	71.6
Age										
65-74	67.3	73.3	73.9	74.6	74.4	74.0	74.7	75.3	75.4	74.7
75-84	62.2	68.2	69.1	70.1	69.2	70.0	69.3	70.8	71.8	70.6
85+	56.7	61.5	62.1	64.2	64.2	62.4	61.7	64.0	63.8	62.3

Data Source: Special analyses, Medicare 5 percent sample. Medicare patients aged 65 & older with CKD & diabetes mellitus. Abbreviation: CKD, chronic kidney disease.

Incidence of End-Stage Renal Disease

The rate of new cases of ESRD declined from 2006 through 2012, although the 2015 rate of 361.6 incident cases per million population (PMP) remained above the target of 352.0, established as a 10% decrease from the 2007 value of 391.1. As shown in Table 6, substantial variation in the incidence of ESRD across race and ethnicity continued as a persistent challenge. Consistent with previous years, in 2015 higher rates of incident ESRD were seen among Blacks, at 895.0 new cases PMP and Native Hawaiians and Pacific Islanders, with 2,516.7 PMP, as compared to Whites with 294.0 and Asians with 314.9. The most substantial decline in 2015 occurred among Blacks, where incidence decreased from 917.5 to 895.0 new cases PMP. Although the overall incidence rates remained largely unchanged from 2012 to 2015, they declined for every race group except Whites, who saw a slight increase. Thus, as compared to Whites, the ESRD rate ratio for American Indians and Alaska Natives fell from 1.6 to 1.3 during these years, while the rate ratio for Blacks decreased from 3.3 to 3.0.

It should be noted that the extraordinarily high incidence rates among Native Hawaiians and Pacific Islanders might in part result from differential race reporting between the Census Bureau and the ESRD Medical Evidence Report form (CMS 2728) data collections. Although in the Census one-half of Native Hawaiians and Pacific Islanders self-identified as of multiple races, only 7% did so in the CMS 2728. At 492.0 PMP, the rate of incident ESRD among Hispanics was 35.2% greater than for non-Hispanics, at 364.0 PMP. This represents an additional narrowing of the gap of 38.3% seen in 2014.

Rates between the sexes remained stable, with 457.7 new cases PMP among men, which is 61.9% higher than the rate of 282.7 cases PMP among women. This represents an overall gap increase as compared to 2006 levels, when males had a rate 53.3% higher than females.

Kidney Failure Resulting from Diabetes

In 2015, the overall rate of kidney failure due to DM was 164.1 PMP. This was the third consecutive year of increase, and rates remained above the target of 154.4 PMP (Table 7). Males continued to have a higher rate of diabetic kidney failure than did females, at 201.8 compared with 132.1 PMP.

The degree of kidney failure due to DM varied widely by race, and was markedly higher in Blacks as compared to Whites, at 393.5 versus 139.8 PMP. However, rates in Blacks have decreased by 21.7% since 2006 while remaining roughly constant among Whites. American Indians and Alaska Natives are also at high risk for kidney failure due to DM. As recently highlighted by the Centers for Disease Control and Prevention (CDC, 2017), however, Native Americans have also experienced the greatest improvement in this area, with a 25.0% decline since 2006. The extraordinarily high rates among Native Hawaiians and Pacific Islanders again may have been influenced by differential race reporting between the Census Bureau and the CMS 2728 data collections.

HP2020 Table 6 CKD-8 Reduce the rate of new cases of end-stage renal disease (ESRD): Target 352.0 new cases per million population

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
All	398.9	391.1	386.7	389.9	382.0	365.8	360.0	360.5	360.9	361.6
Race										
American Indian or Alaska Native	526.9	541.3	544.0	528.5	488.2	459.0	465.4	414.3	407.2	376.0
Asian	355.4	357.3	355.9	366.2	355.7	347.4	338.2	336.1	326.3	314.9
Native Hawaiian or Pacific Islander~	2846.9	2402.3	2203.9	2433.0	2608.7	2381.0	2552.9	2599.5	2558.4	2516.7
Black/African American	1114.4	1092.1	1073.3	1072.9	1033.2	993.3	949.6	936.0	917.5	895.0
White	312.1	306.6	304.2	307.8	304.3	291.3	287.7	289.1	291.2	294.0
Two or more races	147.5	149.3	158.4	145.1	140.6	115.2	13.7	*	*	*
Ethnicity										
Hispanic/Latino	610.5	593.6	589.7	586.4	579.6	566.8	533.0	525.9	498.7	492.0
Non-Hispanic	382.5	375.9	372.3	377.1	369.9	354.3	354.5	357.3	360.6	364.0
Non-Hispanic Black/African American	1132.6	1111.7	1093.1	1093.4	1053.9	1013.0	972.2	960.7	945.2	922.6
Non-Hispanic White	281.3	275.8	272.1	275.3	270.9	257.0	256.4	258.0	262.3	265.9
Sex										
Male	494.1	486.8	483.8	489.0	480.9	460.9	452.8	456.2	457.5	457.7
Female	322.4	314.8	309.1	310.5	302.6	288.4	284.6	282.7	281.6	282.7
Age										
<18	11.6	12.3	12.2	12.0	11.6	11.7	11.6	11.5	10.8	10.2
0-4	8.9	10.9	10.0	10.8	11.0	11.2	11.3	11.1	10.7	10.7
5-11	6.6	7.0	7.8	7.2	7.2	7.0	7.5	7.9	7.1	5.3
12-17	19.6	19.5	19.2	18.6	17.2	17.5	16.8	16.0	15.3	15.5
18-44	120.9	119.3	118.8	122.5	118.8	115.2	113.9	115.0	119.8	120.2
18-24	43.5	43.0	41.4	40.7	39.9	39.6	36.2	37.2	34.7	35.2
25-44	148.0	146.1	145.8	151.1	146.4	141.7	141.1	142.2	149.5	150.0
45-64	611.5	597.1	592.4	592.8	575.3	556.3	557.1	557.0	557.5	559.4
45-54	402.8	390.0	386.3	389.0	373.6	371.9	369.6	382.5	386.1	393.8
55-64	820.3	804.1	798.5	796.6	777.0	740.7	744.6	731.4	728.9	725.1
65+	1655.7	1623.5	1599.6	1609.4	1600.6	1520.3	1460.8	1459.9	1435.7	1436.5
65-74	1414.5	1379.3	1351.8	1359.3	1352.7	1269.9	1238.5	1244.3	1235.2	1214.9
75-84	1914.4	1879.1	1855.0	1865.6	1860.8	1786.4	1698.1	1697.8	1659.3	1685.1
85+	1480.8	1510.2	1523.3	1548.6	1478.4	1364.8	1310.2	1237.3	1205.2	1166.0

Data Source: Special analyses, USRDS ESRD Database and CDC Bridged Race Intercensal Estimates Dataset, Incident ESRD patients. Rates adjusted for: overall, age/sex/race; rates by age adjusted for sex/race; rates by sex adjusted for age/race; rates by race/ethnicity adjusted for age/sex. Standard population: 2012 patients. "." Zero values in this cell. ~Estimate shown is imprecise due to small sample size and may be unstable over time. Abbreviations: CDC, Centers for Disease Control and Prevention; CKD, chronic kidney disease.

HP2020 Table 7 CKD-9.1 Reduce kidney failure (or end-stage renal disease, ESRD) due to diabetes: Target 154.4 per million population

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
All	177.4	171.5	168.9	169.6	166.8	159.8	157.9	159.3	160.5	164.1
Race										
American Indian or Alaska Native	367.7	380.7	390.3	383.5	347.6	321.3	322.5	299.3	290.3	275.8
Asian	177.4	172.8	179.9	180.5	172.5	173.3	170.3	172.6	170.5	163.3
Native Hawaiian or Pacific Islander~	1737.2	1504.7	1327.4	1530.7	1642.6	1450.8	1517.6	1674.4	1642.9	1606.5
Black/African American	502.3	478.3	473.2	471.2	456.4	436.0	412.0	401.8	396.2	393.5
White	139.6	136.2	134.0	135.1	134.4	129.3	130.0	133.0	135.0	139.8
Two or more races	74.2	81.4	78.4	76.2	68.4	58.4	6.6	.	.	*
Ethnicity										
Hispanic/Latino	377.3	367.2	367.6	359.9	355.9	346.8	324.5	318.8	305.3	302.6
Non-Hispanic	164.1	158.6	156.2	157.7	155.1	148.3	147.8	149.7	152.1	156.2
Non-Hispanic Black/African American	509.7	486.1	481.5	480.0	465.1	444.2	421.5	411.6	407.3	404.6
Non-Hispanic White	116.4	112.9	109.4	110.4	109.2	103.6	105.8	108.7	111.4	116.8
Sex										
Male	206.7	202.3	200.6	203.1	200.6	193.5	191.2	195.1	198.6	201.8
Female	152.7	145.8	142.4	141.5	138.5	131.4	129.5	129.1	128.2	132.1
Age										
<18	*	*	*	*	0.1	*	0.1	0.1	0.1	0.1
0-4	*	*	.	*	*	*	*	*	0.4	0.4
5-11	.	.	*	.	.	.	*	.	.	.
12-17	*	*	*	*	*	*	*	*	.	*
18-44	38.3	37.8	37.7	39.9	39.6	39.6	38.2	39.3	41.8	42.7
18-24	3.2	2.7	2.4	2.6	2.5	2.3	2.5	2.5	1.8	2.5
25-44	50.6	50.1	50.0	53.0	52.6	52.7	50.8	52.2	55.9	56.7
45-64	323.6	309.8	308.1	306.8	295.1	281.9	284.5	282.0	282.6	286.7
45-54	189.6	178.9	178.6	180.3	175.7	173.6	175.5	182.7	183.6	190.3
55-64	457.7	440.8	437.7	433.3	414.5	390.3	393.5	381.4	381.7	383.2
65+	706.8	691.6	674.1	673.4	679.6	647.5	617.2	629.1	626.9	644.1
65-74	725.6	697.8	677.7	674.8	669.0	632.5	613.6	622.0	617.0	611.7
75-84	722.7	717.9	700.3	700.4	720.1	691.5	647.7	665.9	666.0	706.8
85+	359.9	367.2	376.7	390.4	381.6	358.5	349.2	332.5	335.7	341.0

*Data Source: Special analyses, USRDS ESRD Database and CDC Bridged Race Intercensal Estimates Dataset, Incident ESRD patients. Adjusted for age/sex/race; standard population: 2012. "." Zero values in this cell. *Values for cells with 10 or fewer patients are suppressed. ~Estimate shown is imprecise due to small sample size and may be unstable over time. Abbreviations: CDC, Centers for Disease Control and Prevention; CKD, chronic kidney disease.*

In 2015 the adjusted rate of kidney failure among persons with DM was 2378 PMP (adjustment by age, sex, and race; see Table 8), failing to achieve the HP2020 target of 2354.4 PMP. This was the third consecutive year in which an increase in rate was observed, and the first year since 2009 when the rate was above the HP2020 target.

Rates in 2015 varied among races, and remained highest in Blacks with DM at 3497 PMP, compared to 2148 PMP in their White counterparts. Of note, rates in Whites have increased annually since 2011. In contrast, rates of kidney failure in Blacks with DM have fallen each year since 2007, an overall 21.9% decrease during that period.

Nephrologist Care

At 36.0%, the proportion of CKD patients in 2015 receiving care from a nephrologist at least 12 months before the start of renal replacement therapy exceeded the HP2020 goal of 30.0%, which was based on a 10% increase over the 2007 proportion (Table 9). Percentages by ethnicity were lowest among Hispanics and Latinos, at 28.1%. Variations by race continued to be observed, with Whites (37.0%) and Asians (37.6%) having a greater proportion of care than Blacks (32.0%) and Native Hawaiians and Pacific Islanders (31.5%). As overall percentages have increased, the gap between the race groups receiving the least and most nephrologist care has increased from a 5.2% difference (22.7-27.9%) in 2006 to 6.1% (31.5-37.6%) in 2015.

Greater variation was observed by age, with the proportions ranging from 29.3% among those aged 18-44 to 48.3% among those under age 18. In contrast to the differences seen by race and age, percentages of pre-ESRD nephrologist care were similar by sex, at 35.4% among males and 35.9% among females.

HP2020 Table 8 CKD-9.2 Reduce kidney failure (or end-stage renal disease, ESRD) due to diabetes among persons with diabetes: Target 2,354.4 per million population

	2007	2008	2009	2010	2011	2012	2013	2014	2015
All	2616	2486	2401	2344	2271	2264	2297	2306	2378
Race									
American Indian or Alaska Native	2559	2926	2931	2594	2246	2286	2034	1742	1719
Asian	2067	2185	2207	2106	2070	2164	2311	2297	2252
Native Hawaiian or Pacific Islander~	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Black/African American	4476	4335	4242	3978	3820	3704	3582	3572	3497
White	2276	2138	2047	2025	1971	1983	2036	2055	2148
Two or more races	610	553	517	484	463	52	*	*	*
Ethnicity									
Hispanic/Latino	3313	3177	2960	2898	2900	2810	2808	2719	2728
Non-Hispanic	2518	2391	2321	2261	2179	2176	2211	2230	2304
Non-Hispanic Black/African American	4686	4528	4473	4191	4057	3910	3770	3779	3725
Non-Hispanic White	2049	1899	1822	1799	1729	1762	1825	1855	1965
Sex									
Male	2927	2744	2621	2541	2521	2540	2608	2622	2688
Female	2327	2235	2177	2139	2019	1990	1988	1985	2064
Age									
<18	11	34	34	51	35	30	42	57	90
0-4	*	*	*	*	*	*	*	*	*
5-11	.	*	*	*	*	22	*	.	*
12-17	16	32	12	37	28	21	34	.	27
18-44	1613	1531	1507	1461	1557	1515	1562	1712	1709
18-24	341	268	285	290	334	294	281	205	290
25-44	1748	1677	1642	1578	1665	1651	1714	1899	1877
45-64	2377	2257	2195	2134	2068	2116	2129	2144	2216
45-54	2005	1846	1854	1864	1875	1887	1963	1972	2038
55-64	2643	2571	2436	2308	2179	2257	2227	2243	2318
65+	3101	2939	2800	2720	2574	2508	2558	2504	2587
65-74	3186	2990	2894	2771	2619	2565	2624	2564	2533
75-84	3351	3156	2934	2873	2799	2721	2854	2771	3070
85+	1946	2073	1976	2073	1765	1695	1508	1517	1654

*Data Source: Special analyses, USRDS ESRD Database and CDC Bridged Race Intercensal Estimates Dataset, Incident ESRD patients. Adjusted for age/sex/race; Standard population 2012. National Health Interview Survey 2006–2015 used to estimate diabetes mellitus prevalence. "." Zero values in this cell; *Values for cells with 10 or fewer patients are suppressed. Abbreviations: CDC, Centers for Disease Control and Prevention; CKD, chronic kidney disease.*

HP2020 Table 9 CKD-10 Increase the proportion of chronic kidney disease patients receiving care from a nephrologist at least 12 months before the start of renal replacement therapy: Target 30.0%

	2006 (%)	2007 (%)	2008 (%)	2009 (%)	2010 (%)	2011 (%)	2012 (%)	2013 (%)	2014 (%)	2015 (%)
All	26.4	27.3	28.6	28.6	29.5	31.0	33.1	34.2	34.9	35.6
Race										
American Indian or Alaska Native	27.3	25.9	27.9	26.9	23.8	27.6	30.4	30.2	30.1	34.9
Asian	23.9	26.6	27.5	29.1	29.7	31.4	31.6	35.4	35.5	37.6
Native Hawaiian or Pacific Islander	25.2	24.0	22.5	23.9	25.2	27.0	27.1	29.9	32.2	31.5
Black/African American	23.2	24.0	24.7	24.9	25.5	27.2	29.6	30.2	30.7	32.0
White	27.9	28.8	30.3	30.1	31.3	32.7	34.7	35.9	36.6	37.0
Two or more races	22.7	24.6	29.2	28.6	31.3	31.6	30.2	*	*	*
Ethnicity										
Hispanic/Latino	21.1	21.2	22.2	22.5	23.6	25.0	25.6	27.0	26.9	28.1
Non-Hispanic	27.2	28.2	29.6	29.5	30.6	32.1	34.4	35.5	36.3	36.9
Non-Hispanic Black/African American	23.2	24.1	24.8	25.0	25.6	27.2	29.7	30.3	30.8	32.0
Non-Hispanic White	29.4	30.5	32.3	32.0	33.3	34.7	37.1	38.2	39.2	39.3
Sex										
Male	26.5	27.3	28.4	28.3	29.6	30.7	33.1	34.1	34.7	35.4
Female	26.4	27.3	28.8	28.9	29.5	31.3	33.1	34.3	35.2	35.9
Age										
<18	35.4	34.3	39.4	38.5	36.8	44.2	40.8	46.1	43.1	48.3
0-4	20.5	25.0	27.0	22.3	22.6	25.4	27.5	27.7	25.4	28.4
5-11	47.6	40.4	51.7	47.6	47.6	59.1	51.7	58.1	52.9	57.2
12-17	36.2	35.9	39.4	41.3	38.2	46.3	42.2	49.0	47.3	55.5
18-44	22.9	23.5	24.4	23.9	24.2	25.6	27.8	27.6	29.3	29.3
18-24	22.9	24.6	23.8	24.4	25.3	27.3	26.5	27.2	30.2	30.4
25-44	22.9	23.4	24.5	23.8	24.0	25.4	27.9	27.6	29.3	29.2
45-64	26.1	26.6	27.3	27.4	27.9	29.4	31.1	32.1	32.3	33.5
45-54	24.9	25.5	25.3	25.7	26.3	28.4	29.5	30.5	31.2	32.0
55-64	26.9	27.4	28.6	28.4	29.0	30.1	32.1	33.1	33.0	34.5
65+	27.5	28.7	30.5	30.5	32.0	33.4	35.8	37.2	38.2	38.6
65-74	28.4	28.9	30.6	30.7	32.0	33.4	35.7	36.6	37.9	38.1
75-84	27.3	28.9	31.2	30.9	32.7	33.9	36.6	38.3	38.8	39.6
85+	24.1	26.7	27.5	28.4	29.7	31.5	34.0	36.3	37.6	37.7

Data Source: Special analyses, USRDS ESRD Database. Incident patients with a valid ESRD Medical Evidence CMS 2728 form; nephrologist care determined from Medical Evidence form. Abbreviations: CMS, Centers for Medicare and Medicaid Services; CKD, chronic kidney disease.

Substantial geographic variation was also observed in the proportion of CKD patients receiving care from a nephrologist at least 12 months before the start of renal replacement therapy (Figure 1). While in 2015, 45 of the U.S. states met or exceeded the HP2020 target of 30.4%, percentages varied by nearly 50% from the

twentieth percentile (34.2%) to the eightieth percentile (50.1%). In general, the highest percentages of patients receiving this care were observed in the North Atlantic and Northern Plains regions, with the lowest occurring in the Mid-South and Southern Plains states.

HP2020 Figure 1 CKD-10: Geographic distribution of the adjusted proportion of chronic kidney disease patients receiving care from a nephrologist at least 12 months before the start of renal replacement therapy, by state, in the U.S. population, 2015: Target 30.0%
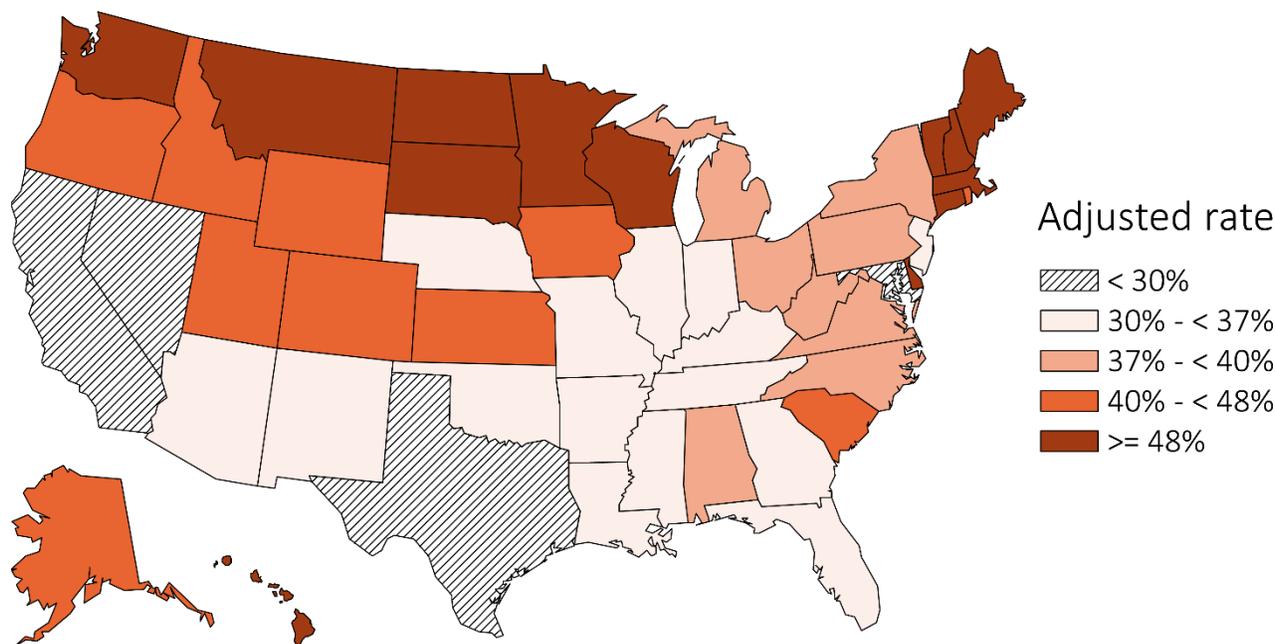
Adjusted rate

- < 30%
- 30% - < 37%
- 37% - < 40%
- 40% - < 48%
- >= 48%

Data Source: Special analyses, USRDS ESRD Database. Incident hemodialysis patients with a valid ESRD Medical Evidence CMS 2728 form; nephrologist care determined from Medical Evidence form. Adjusted for age, sex, and race. Abbreviations: CKD, chronic kidney disease; CMS, Centers for Medicare and Medicaid Services.

Vascular Access

In the 2014 ADR, we introduced data from CROWNWeb, a dialysis data reporting system launched by CMS in 2012. Prior to the 2014 ADR, we derived data regarding vascular access from the ESRD Clinical Performance Measures (CPM) Project that only collected this information through 2007.

Vascular access is an important aspect of hemodialysis care, and arteriovenous (AV) fistulas are clinically established as the primary access of choice. The HP2020 CKD Objective 11.1 examines the use of AV fistulas among prevalent hemodialysis patients (see Table 10).

In 2015, 63.8% of prevalent adult hemodialysis patients were using an AV fistula as their primary

access. This rate decreased slightly from 2014, yet was more than double the proportion reported in ESRD CPM data for 2000 (29.9%) and well above the last available ESRD CPM data from 2007 (49.6%; USRDS, 2012). This overall prevalence exceeded the previous HP2020 target of 50.6%, although comparisons should be made with caution as this target was derived from a different data source (ESRD CPM).

Among race groups, Blacks had the lowest percentage of AV fistula use at 59.2%, compared to 65.9% of Whites, 68.6% of Asians, 76.4% of American Indians or Alaska Natives, and 69.3% of Native Hawaiians or other Pacific Islanders. The proportion of males with an AV fistula was higher than females, at 69.6% compared to 56.3%.

HP2020 Table 10 CKD-11.1: Increase the proportion of adult hemodialysis patients who use arteriovenous fistulas as the primary mode of vascular access: Previous data source target 50.6%

	2012 (%)	2013 (%)	2014 (%)	2015 (%)
All	62.0	63.5	64.1	63.8
Race				
American Indian or Alaska Native	72.4	75.0	75.6	76.4
Asian	66.9	68.7	69.1	68.6
Native Hawaiian or Pacific Islander	65.7	68.6	69.4	69.3
Black/African American	57.5	58.8	59.5	59.2
White	64.3	65.8	66.3	65.9
Two or more races	70.1	69.8	71.6	71.1
Ethnicity				
Hispanic/Latino	67.9	68.8	69.2	69.0
Non-Hispanic	60.7	62.3	62.9	62.7
Non-Hispanic Black/African American	57.4	58.8	59.4	59.2
Non-Hispanic White	62.6	64.4	64.9	64.5
Sex				
Male	68.3	69.5	69.8	69.6
Female	54.0	55.8	56.6	56.3
Age				
18-44	66.2	67.0	67.6	67.0
18-24	65.2	67.1	68.4	67.2
25-44	66.3	67.0	67.5	67.0
45-64	63.9	65.4	65.9	65.9
45-54	65.7	67.0	67.7	67.5
55-64	62.6	64.2	64.7	64.7
65+	57.7	59.5	60.1	60.0
65-74	59.8	61.6	62.1	62.1
75-84	56.3	58.1	58.9	58.6
85+	46.2	48.8	49.3	49.2

Data Source: Special analyses, CROWNWeb. Prevalent hemodialysis patients with a valid ESRD Medical Evidence CMS 2728 form, vascular access type determined from CROWNWeb. Abbreviations: CMS, Centers for Medicare and Medicaid Services; ESRD, end-stage renal disease.

In comparison to AV fistulas, reliance on hemodialysis catheters as primary vascular access is associated with increased morbidity and mortality. HP2020 CKD Objective 11.2 aims to reduce the proportion of hemodialysis patients that are dependent on catheters. Data for this objective were also obtained from CROWNWeb and thus interpretation of target achievement may be limited, as the former HP2020 target was derived from a different data source (ESRD CPM Project).

In 2015, 16.3% of prevalent adult hemodialysis patients were using catheters as the primary mode of access (Table 11), at about the same rate as in 2014. This represents an improvement from the most recent available data from the ESRD CPM project, which found that 27.7% of prevalent hemodialysis patients were using a catheter as their primary access in 2007.

Percentage of catheter use was highest among Whites at 17.4% compared to 15.3% in Blacks, 13.3% in Asians, 11.5% in American Indian or Alaska Natives, and 14.2% in Native Hawaiians or Pacific Islanders. The proportion of patients with catheter access increased by age group after the age of 45, rising from 14.5% among those aged 45-54 years to 27.2% in those aged 85 years and older.

Programs such as HP2020 and the Fistula First Initiative (a U.S. national quality improvement program initiated in 2003) continue to work to increase the use of fistulas, and to promote early placement prior to initiation of ESRD therapy. In 2015, 35.5% of incident hemodialysis patients had a maturing arteriovenous fistula, or were using one as their primary vascular access (see Table 12). This was a slight rate decrease from a high of 37.3% in 2013, yet it represents an overall relative increase of 11.6% since 2006, and marks the fifth consecutive year meeting the target for this objective.

By race, in 2015 Blacks had the lowest proportion of AV fistula at 33.3%, compared to 36.0% in Whites, 43.2% in American Indian or Alaska Natives, 38.6% in Asians, and 37.5% in Native Hawaiians or Pacific Islanders. By age group, patients aged 65-74 had the highest proportion at 37.3%, compared to just 22.8% in patients aged 18-24.

HP2020 Table 11 CKD-11.2: Reduce the proportion of adult hemodialysis patients who use catheters as the only mode of vascular access: Previous data source target 26.1%

	2012 (%)	2013 (%)	2014 (%)	2015 (%)
All	15.2	14.6	16.2	16.3
Race				
American Indian or Alaska Native	12.3	11.5	12.4	11.5
Asian	13.2	12.7	13.4	13.3
Native Hawaiian or Pacific Islander	14.2	14.0	14.1	14.2
Black/African American	14.4	13.7	15.1	15.3
White	16.1	15.4	17.3	17.4
Two or more races	9.6	9.2	8.0	9.1
Ethnicity				
Hispanic/Latino	13.2	12.9	14.5	14.6
Non-Hispanic	15.7	15.0	16.6	16.7
Non-Hispanic Black/African American	14.4	13.7	15.1	15.3
Non-Hispanic White	17.4	16.6	18.6	18.7
Sex				
Male	13.3	12.8	14.5	14.5
Female	17.7	16.8	18.4	18.7
Age				
18-44	14.5	13.8	15.3	15.7
18-24	17.5	15.8	16.6	17.8
25-44	14.1	13.5	15.2	15.5
45-64	14.1	13.5	15.0	15.1
45-54	13.4	12.7	14.2	14.5
55-64	14.7	14.1	15.6	15.6
65+	17.0	16.3	18.1	18.1
65-74	15.4	14.7	16.9	16.7
75-84	17.8	17.1	18.4	18.7
85+	27.0	25.5	27.1	27.2

Data Source: Special analyses, CROWNWeb. Prevalent hemodialysis patients with a valid ESRD Medical Evidence CMS 2728 form, vascular access type determined from CROWNWeb. Abbreviations: CMS, Centers for Medicare and Medicaid Services; ESRD, end-stage renal disease.

HP2020 Table 12 CKD-11.3 Increase the proportion of adult hemodialysis patients who use arteriovenous fistulas or have a maturing fistula as the primary mode of vascular access at the start of renal replacement therapy: Target 34.8%

	2006 (%)	2007 (%)	2008 (%)	2009 (%)	2010 (%)	2011 (%)	2012 (%)	2013 (%)	2014 (%)	2015 (%)
All	31.8	31.6	31.2	32.2	33.8	35.1	36.7	37.3	35.9	35.5
Race										
American Indian or Alaska Native	39.0	37.7	41.5	41.4	41.1	40.4	40.8	42.5	40.4	43.2
Asian	37.7	35.2	35.9	35.5	37.3	37.2	38.0	41.3	38.5	38.6
Native Hawaiian or Pacific Islander	34.7	35.2	32.8	32.4	32.7	36.2	37.4	39.9	34.8	37.5
Black/African American	29.3	29.7	29.2	30.6	32.1	33.9	35.8	35.7	34.3	33.3
White	32.7	32.2	31.7	32.7	34.3	35.3	36.8	37.5	36.2	36.0
Two or more races	36.3	33.0	28.8	36.2	37.6	38.6	41.5	*	*	*
Ethnicity										
Hispanic/Latino	32.3	29.9	29.7	30.9	32.8	33.4	34.0	34.7	33.1	33.1
Non-Hispanic	31.9	31.9	31.4	32.5	34.0	35.4	37.1	37.7	36.3	35.8
Non-Hispanic Black/African American	29.2	29.7	29.1	30.5	32.0	33.9	35.8	35.7	34.3	33.3
Non-Hispanic White	32.9	32.8	32.3	33.2	34.8	36.0	37.7	38.5	37.2	36.9
Sex										
Male	35.0	34.9	33.9	34.9	36.4	37.9	39.2	39.3	38.0	37.9
Female	27.8	27.5	27.6	28.8	30.4	31.4	33.3	34.5	32.9	32.1
Age										
18-44	29.3	28.2	27.4	29.2	31.1	31.8	32.6	33.0	32.3	30.9
18-24	21.9	20.8	21.1	22.6	23.4	24.9	25.8	27.4	27.5	22.8
25-44	30.1	28.9	28.1	29.8	31.8	32.5	33.2	33.5	32.6	31.5
45-64	33.2	32.7	32.5	33.2	34.4	35.9	37.9	38.0	36.5	36.2
45-54	33.0	32.4	32.2	32.8	34.1	35.9	37.2	37.6	36.2	36.4
55-64	33.4	32.8	32.6	33.4	34.5	35.9	38.3	38.3	36.7	36.1
65+	31.4	31.6	31.0	32.2	33.9	35.2	36.7	37.6	36.2	35.8
65-74	33.4	34.0	32.9	34.2	35.9	37.0	38.8	39.2	37.5	37.3
75-84	30.6	30.6	30.8	31.9	33.7	34.9	36.2	37.7	36.2	35.5
85+	25.2	25.4	24.3	25.5	26.7	28.5	29.2	30.1	29.5	29.8

*Data Source: Special analyses, USRDS ESRD Database. Incident hemodialysis patients aged 18 & older. *Values for cells with 10 or fewer patients are suppressed.*

Transplantation

The proportion of ESRD patients younger than age 70 who were wait-listed or received a kidney transplant from a deceased donor within one year of initiating dialysis therapy decreased between 2013 (17.3%) and 2015 (15.7%; Table 13). Across race categories, the HP2020 target of 18.7% was only exceeded by those of Asian race (28.7%). Males (16.3%) were closer to the target than females (14.7%). Groups furthest from the target included American Indians or Alaska Natives (9.9%), those aged 65-69 (10.5%), Blacks (12.8%) and Native Hawaiians and Pacific Islanders (12.9%). Gaps between groups with the highest and lowest percentages have remained stable, showing only minor decreases over time.

At 13.2%, the proportion of 2012 patients younger than age 70 who received a kidney transplant within three years of starting ESRD therapy remained well below the HP2020 target of 20.1%, which was based on a 10% improvement over the value in 2004 (see Table 14). This continued the slow but consistent decrease observed since 2004, when 18.3% of patients received a transplant within three years of initiating ESRD therapy.

Rates were lowest among Blacks (7.0%), and American Indians and Alaska Natives (7.2%), and were highest among Whites (16.2%) and Asians (16.2%). At 13.5%, males were slightly more likely to receive a transplant than females, at 12.7%. The percentage of patients receiving transplants decreased with age, from 74.4% in pediatric patients to 7.0% among those aged 65-69.

HP2020 Table 13 CKD-12 Increase the proportion of dialysis patients waitlisted and/or receiving a kidney transplant from a deceased donor within 1 year of end-stage renal disease (ESRD) start (among patients under 70 years of age): Target 18.7% of dialysis patients

	2006 (%)	2007 (%)	2008 (%)	2009 (%)	2010 (%)	2011 (%)	2012 (%)	2013 (%)	2014 (%)	2015 (%)
All	16.9	17.0	16.8	17.1	16.8	17.4	17.3	17.3	16.7	15.7
Race										
American Indian or Alaska Native	10.3	11.4	10.6	11.4	11.4	11.1	12.3	11.8	8.8	9.9
Asian	31.4	30.8	31.0	31.9	31.6	32.8	31.7	32.8	30.2	28.7
Native Hawaiian or Pacific Islander	14.9	14.9	14.3	14.8	15.1	14.5	16.3	17.8	15.0	12.9
Black/African American	13.1	13.3	13.2	13.9	13.8	14.4	14.7	14.6	14.1	12.8
White	18.5	18.5	18.2	18.2	17.7	18.3	18.1	18.0	17.5	16.4
Two or more races	19.5	13.6	23.7	24.3	22.4	18.6	15.4	*	*	*
Ethnicity										
Hispanic/Latino	17.6	17.9	17.5	18.1	17.4	18.4	17.5	17.4	16.0	15.5
Non-Hispanic	16.7	16.7	16.5	16.8	16.6	17.1	17.1	17.1	16.6	15.5
Non-Hispanic Black/African American	13.0	13.2	13.2	13.8	13.7	14.3	14.6	14.5	14.0	12.7
Non-Hispanic White	18.7	18.8	18.3	18.1	17.8	18.1	18.2	18.2	18.0	16.8
Sex										
Male	18.1	17.9	17.6	18.1	17.6	18.3	18.2	17.9	17.7	16.3
Female	15.5	15.8	15.7	15.9	15.7	16.2	16.1	16.4	15.3	14.7
Age										
<18	59.5	57.0	61.0	58.9	57.1	55.6	57.4	59.1	61.3	52.0
0-4	43.0	36.7	42.5	46.2	40.8	37.4	34.8	37.2	33.2	29.0
5-11	65.3	66.5	69.1	65.5	61.3	63.1	63.2	68.7	73.7	60.2
12-17	62.9	60.6	64.4	61.0	62.1	60.0	64.9	63.9	68.8	62.5
18-44	26.3	25.8	25.3	25.8	25.0	26.7	25.3	25.6	24.9	23.6
18-24	32.8	32.3	29.6	32.3	32.1	32.2	32.6	34.8	33.9	33.5
25-44	25.7	25.2	24.9	25.2	24.3	26.2	24.7	24.7	24.1	22.7
45-64	15.6	15.8	15.5	15.8	15.6	16.2	16.5	16.1	15.4	14.6
45-54	18.3	18.5	17.3	18.3	17.8	18.4	18.6	18.3	17.6	16.9
55-64	13.8	14.0	14.3	14.2	14.2	14.8	15.1	14.7	14.0	13.2
65+	9.0	9.4	9.9	10.9	10.9	10.8	10.8	11.6	11.5	10.5
65-69	9.0	9.4	9.9	10.9	10.9	10.8	10.8	11.6	11.5	10.5

*Data Source: Special analyses, USRDS ESRD Database. Incident ESRD patients younger than age 70. *Values for cells with 10 or fewer patients are suppressed.*

HP2020 Table 14 CKD-13.1 Increase the proportion of patients receiving a kidney transplant within 3 years of end-stage renal disease (ESRD): Target 20.1%

|	2003 (%)	2004 (%)	2005 (%)	2006 (%)	2007 (%)	2008 (%)	2009 (%)	2010 (%)	2011 (%)	2012 (%)
All	18.1	18.3	17.8	17.2	16.5	15.6	14.7	14.1	13.8	13.2
Race										
American Indian or Alaska Native	8.8	9.3	8.7	10.0	10.1	7.0	7.2	7.2	6.4	7.2
Asian	22.1	20.6	18.6	19.1	17.5	18.0	16.9	17.6	17.0	16.2
Native Hawaiian or Pacific Islander	11.7	12.7	9.8	9.6	10.5	11.1	8.3	7.5	8.0	8.1
Black/African American	9.2	10.0	9.6	9.1	9.0	8.7	7.7	7.6	7.3	7.0
White	23.0	22.7	22.2	21.4	20.6	19.3	18.1	17.2	16.9	16.2
Two or more races			17.1	16.6	14.7	17.9	18.4	14.9	17.7	17.7
Ethnicity										
Hispanic/Latino	14.8	14.9	15.0	14.7	14.0	12.8	11.8	11.3	11.4	11.0
Non-Hispanic	18.4	18.6	18.0	17.3	16.8	15.9	14.8	14.3	13.9	13.2
Non-Hispanic Black/African American	9.2	9.9	9.5	8.9	8.9	8.6	7.7	7.6	7.2	6.9
Non-Hispanic White	25.4	25.0	24.4	23.7	23.0	21.6	20.4	19.4	19.0	18.1
Sex										
Male	19.7	19.6	19.2	18.5	17.5	16.2	15.3	14.5	14.3	13.5
Female	16.1	16.5	15.9	15.4	15.3	14.8	13.8	13.5	12.9	12.7
Age										
<18	78.1	76.3	76.7	78.1	78.3	76.7	78.1	74.6	75.1	74.4
0-4	79.8	78.1	75.5	77.3	75.9	68.7	76.9	71.2	69.1	62.5
5-11	83.8	84.1	82.1	83.0	86.9	85.6	83.0	81.1	85.6	84.0
12-17	75.1	72.5	75.1	76.8	76.0	76.2	76.9	73.3	73.4	75.7
18-44	28.9	29.3	27.7	26.7	25.4	23.9	22.6	21.8	21.4	21.2
18-24	42.5	42.2	40.4	37.3	35.2	33.1	34.1	33.8	30.6	31.9
25-44	27.4	27.8	26.3	25.6	24.2	22.8	21.4	20.5	20.3	20.1
45-64	15.0	15.2	15.0	14.5	14.0	13.2	12.3	11.8	11.5	11.0
45-54	18.4	18.5	17.6	17.1	16.9	15.6	14.8	13.8	13.4	12.8
55-64	12.4	12.6	13.1	12.6	11.9	11.6	10.7	10.5	10.3	9.9
65+	7.7	8.1	7.9	8.4	8.3	8.3	7.9	8.0	7.9	7.0
65-69	7.7	8.1	7.9	8.4	8.3	8.3	7.9	8.0	7.9	7.0

Data Source: Special analyses, USRDS ESRD Database. Incident ESRD patients younger than age 70.

Geographic variation in the proportion of patients receiving a kidney transplant within three years of ESRD was also observed (Figure 2). In 2012, nine of the U.S. states met or exceeded the HP2020 target of 20.1%; these were almost exclusively located in the North Atlantic and Northern Plains regions. States with the lowest percentages were generally observed throughout the South and in the West.

In 2015, the percentage of patients receiving a preemptive transplant at the start of ESRD remained stable at 3.6%, consistent with the previous four years (see Table 15). Not surprisingly, preemptive transplants were most common in pediatric patients, reaching 38% among those aged 5 to 11. Proportions were equivalent between females at 3.6% and males at 3.7%. Broad variation was observed by race, however, ranging from 0.9% among Blacks and 1.4% for American Indian and Alaska Natives to 3.8% among Whites and 3.9% for Asians.

HP2020 Figure 2 HP2020 CKD-13.1 Geographic distribution of the adjusted proportion of patients receiving a kidney transplant within 3 years of end-stage renal disease (ESRD), by state, in the U.S. population, 2012: Target 20.1%
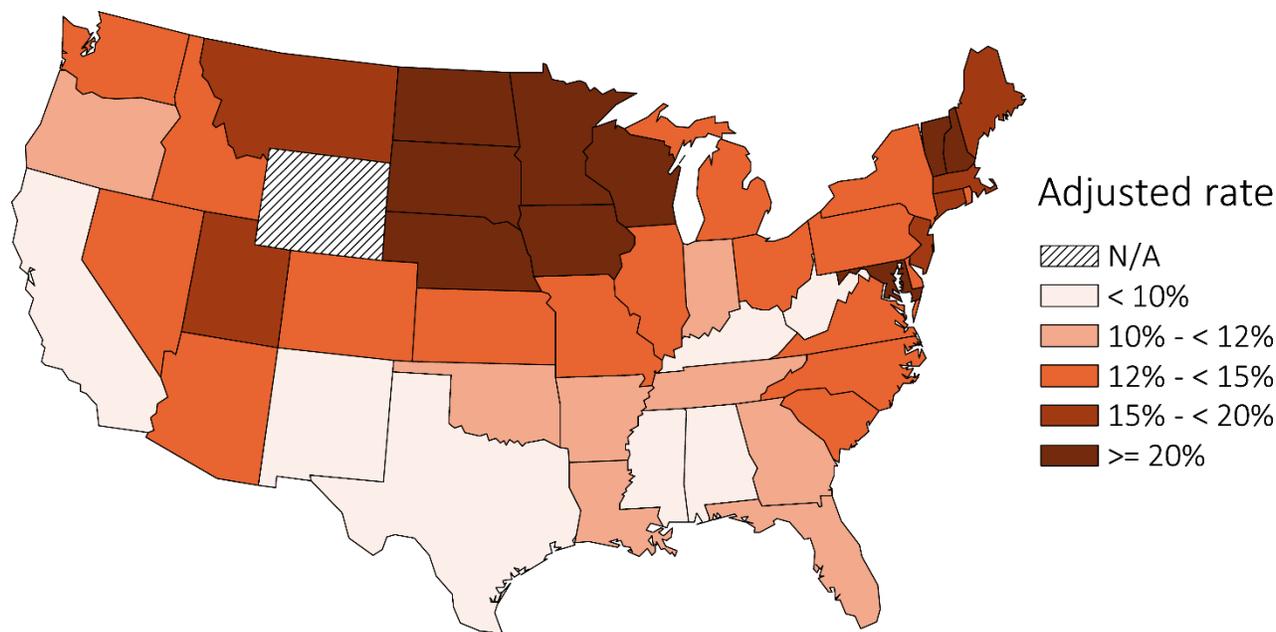
Data Source: Special analyses, USRDS ESRD Database. Incident ESRD patients younger than age 70. Adjusted for age, sex, and race. Alaska, Hawaii, and Wyoming are not reported due to small sample size.

HP2020 Table 15 CKD-13.2 Increase the proportion of patients who receive a preemptive transplant at the start of end-stage renal disease (ESRD): No applicable target

	2006 (%)	2007 (%)	2008 (%)	2009 (%)	2010 (%)	2011 (%)	2012 (%)	2013 (%)	2014 (%)	2015 (%)
All	4.1	4.0	3.9	3.8	3.8	3.9	3.6	3.7	3.7	3.6
Race										
American Indian or Alaska Native	1.5	1.2	1.1	1.7	0.9	1.6	1.3	1.2	1.3	1.4
Asian	3.0	3.0	3.6	3.2	3.5	3.8	3.3	4.5	3.9	3.9
Native Hawaiian or Pacific Islander	1.5	1.9	2.8	1.9	1.3	0.8	0.6	0.8	1.2	0.8
Black/African American	1.0	1.1	1.2	1.1	1.2	1.3	1.0	1.2	1.0	0.9
White	5.2	5.3	5.0	4.7	4.8	4.8	4.5	4.4	4.2	3.8
Two or more races	2.9	1.6	2.3	4.0	3.4	3.5	6.1	*	*	*
Ethnicity										
Hispanic/Latino	2.3	2.2	2.1	2.2	2.2	2.4	2.2	2.2	2.0	2.2
Non-Hispanic	4.0	4.1	3.9	3.7	3.8	3.9	3.5	3.6	3.5	3.3
Non-Hispanic Black/African American	1.0	1.1	1.1	1.1	1.2	1.2	1.0	1.1	1.0	0.9
Non-Hispanic White	6.1	6.3	6.0	5.5	5.7	5.7	5.3	5.2	5.1	4.4
Sex										
Male	4.2	4.2	3.9	3.8	3.8	3.9	3.6	3.5	3.6	3.7
Female	4.0	3.8	4.0	3.7	3.9	3.9	3.8	3.9	3.9	3.6
Age										
<18	24.0	21.2	20.9	24.9	22.5	24.0	24.0	24.3	22.9	26.8
0-4	17.6	19.7	10.6	18.8	15.0	18.4	17.4	18.8	14.2	16.0
5-11	32.1	30.7	30.7	33.0	31.2	28.3	30.0	32.1	31.8	38.0
12-17	23.2	18.1	20.9	24.1	21.8	24.7	24.4	23.1	22.7	28.1
18-44	6.4	6.0	6.0	5.7	5.5	5.9	5.5	5.4	5.8	5.8
18-24	10.0	8.1	8.6	8.9	8.7	9.2	9.0	8.0	10.3	9.5
25-44	6.0	5.8	5.8	5.4	5.1	5.5	5.1	5.1	5.4	5.4
45-64	3.5	3.6	3.5	3.3	3.5	3.4	3.1	3.2	3.2	3.2
45-54	4.3	4.6	4.3	4.0	4.4	4.0	3.8	3.7	3.8	3.9
55-64	2.9	3.0	3.0	2.8	2.9	2.9	2.7	2.8	2.9	2.7
65+	2.0	1.8	2.0	1.9	2.2	2.3	2.2	2.4	2.3	2.0
65-69	2.0	1.8	2.0	1.9	2.2	2.3	2.2	2.4	2.3	2.0

*Data Source: Special analyses, USRDS ESRD Database. Incident ESRD patients younger than age 70. *Values for cells with 10 or fewer patients are suppressed.*

Mortality

As demonstrated in Table 16, the total death rate among prevalent patients on dialysis has fallen by more than 19%, from 216.7 deaths per 1,000 patient years in 2006 to 174.4 in 2015, remaining below the HP2020 target of 187.4 for the fifth consecutive year. In 2015, mortality was slightly lower among males at 172.6 deaths per 1,000 patient years, compared to females, at 176.9 deaths. The lowest morality rate occurred in 2014 at 172.0 per 1,000 patient years.

Since 2006, reductions in mortality rates have been observed across all age groups, with the largest reduction—approximately 42.4% fewer deaths—for patients younger than 18 years. This rate decreased from 43.9 deaths per 1,000 patient years in 2006, to 25.3 deaths 2015. Patients aged 0-4 experienced more than a 50% reduction in mortality rates, although this decrease represents a relatively small numbers of deaths, due to the relatively low death rates and proportion of patients in this group. Overall rates were highest among patients aged 65 and older, at 260.4 deaths per 1,000 patient years.

Mortality rates among Whites were highest, and continued to exceed the target at 207.4 deaths per 1,000 patient years. Rates were lowest among Native Hawaiians and Pacific Islanders (115.5 deaths per 1,000 patient years), Asians (126.4 deaths per 1,000), and Hispanics (128.5 per 1,000).

Since 2006, the rate of mortality among dialysis patients in the first three months after initiation has fallen by 18.3%, from 381.2 deaths per 1,000 patient years to 311.5 in 2015. For the fourth year in a row, the rate was below the HP2020 target of 335.0 deaths per 1,000 patient years (see Table 17). Whites remained the only racial group who exceeded the target rate at 366.2 deaths per 1,000 patient years. Rates were lowest among American Indians and Alaska Natives, with 134.9 deaths. Native Hawaiians and Pacific Islanders showed a rate of 139.4 deaths per 1,000 patient years at risk, and those with Hispanic or Latino ethnicity, with 192.6 deaths. Males had slightly lower mortality rates than females, at 309.1 deaths per 1,000 patient years compared to 314.9. Mortality rates were highest among those aged 85 years or older, at 865.0 deaths per 1,000 patient years.

HP2020 Table 16 CKD-14.1 Reduce the total number of deaths for persons on dialysis: Target 187.4 deaths per 1,000 patient years

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
All	216.7	208.2	200.9	195.7	188.8	184.8	177.5	173.7	172.0	174.4
Race										
American Indian or Alaska Native	171.1	163.2	167.5	169.7	152.1	146.0	145.2	143.4	150.3	152.9
Asian	153.7	150.7	137.8	139.2	130.8	133.1	128.1	122.9	124.3	126.4
Native Hawaiian or Pacific Islander	159.6	157.6	146.0	152.4	148.6	135.5	132.4	119.8	124.7	115.5
Black/African American	170.9	164.3	157.9	153.4	145.8	141.0	136.2	133.8	132.2	135.8
White	258.1	247.2	238.9	232.1	225.9	222.4	212.9	208.4	205.5	207.4
Two or more races	162.4	144.6	149.1	144.9	133.2	127.8	120.3	121.3	135.9	119.4
Ethnicity										
Hispanic/Latino	156.9	147.0	140.6	140.0	131.7	130.2	130.1	125.5	125.2	128.5
Non-Hispanic	178.8	158.3	137.8	135.2	133.0	132.3	129.5	109.0	104.8	100.3
Non-Hispanic Black/African American	171.1	164.8	158.3	154.0	146.3	141.5	136.0	133.9	132.5	136.0
Non-Hispanic White	289.2	279.5	272.3	264.8	260.5	258.0	247.0	242.8	239.4	240.7
Sex										
Male	212.5	204.9	198.5	195.0	187.3	183.8	176.8	171.7	170.1	172.6
Female	221.7	212.2	203.8	196.5	190.6	186.1	178.4	176.4	174.5	176.9
Age										
<18	43.9	36.8	35.8	41.6	36.5	29.3	31.6	30.0	33.1	25.3
0-4	117.7	86.4	94.8	100.7	77.3	60.1	60.1	67.7	65.2	53.0
5-11	34.2	34.7	40.8	49.5	42.8	35.5	34.9	32.5	41.0	28.2
12-17	29.0	24.8	16.8	19.2	20.4	15.6	18.8	12.6	15.4	10.3
18-44	79.3	75.7	70.8	70.0	63.2	61.3	59.6	57.7	57.3	58.8
18-24	48.8	48.1	43.9	39.7	36.8	37.6	33.7	32.9	32.6	32.5
25-44	81.7	77.9	73.0	72.5	65.3	63.2	61.6	59.6	59.1	60.6
45-64	160.0	151.2	144.9	141.2	135.6	132.5	127.2	122.7	122.2	123.5
45-54	131.3	125.4	117.3	113.6	107.0	105.6	98.3	96.3	95.1	95.6
55-64	181.9	170.6	165.3	161.1	155.8	151.0	146.6	140.1	140.0	141.7
65+	325.3	315.3	305.9	296.7	287.6	281.6	268.9	263.5	258.3	260.4
65-74	257.6	247.6	242.2	236.9	227.7	221.8	212.7	210.3	207.4	208.8
75-84	374.2	361.2	348.9	335.7	326.1	319.5	303.7	297.6	291.7	296.7
85+	518.3	513.8	488.0	468.4	457.4	452.6	435.3	423.9	416.0	422.1

*Data Source: Special analyses, USRDS ESRD Database. Period prevalent dialysis patients. *Values for cells with 10 or fewer patients are suppressed.*

HP2020 Table 17 CKD-14.2 Reduce the number of deaths in dialysis patients within the first 3 months of initiation of renal replacement therapy: Target 335.0 deaths per 1,000 patient years at risk

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
All	381.2	372.2	369.6	362.5	362.7	343.5	326.2	322.4	323.0	311.5
Race										
American Indian or Alaska Native	174.7	179.0	247.8	174.4	163.5	164.6	227.4	206.1	147.6	134.9
Asian	217.2	247.2	197.1	216.6	217.8	178.9	193.1	188.3	199.2	171.2
Native Hawaiian or Pacific Islander	215.7	169.9	160.8	200.7	163.9	183.3	117.7	161.1	139.8	139.4
Black/African American	272.7	257.7	259.1	251.4	247.8	231.4	214.2	223.3	226.4	218.9
White	445.8	439.0	436.2	429.6	431.2	411.8	390.9	380.4	379.6	366.2
Two or more races	308.8	312.6	310.7	219.2	279.5	283.2	248.2	*	*	*
Ethnicity										
Hispanic/Latino	222.4	222.7	214.6	204.9	208.7	206.5	195.4	184.9	179.0	192.6
Non-Hispanic	400.4	391.9	390.0	383.2	384.7	364.4	344.5	344.2	345.1	329.9
Non-Hispanic Black/African American	268.4	256.8	254.9	247.7	247.0	231.2	210.8	222.3	225.7	218.9
Non-Hispanic White	494.4	486.8	489.0	482.2	485.7	466.0	439.6	431.7	431.1	409.0
Sex										
Male	376.5	373.3	370.4	366.7	359.7	343.0	321.8	320.4	315.8	309.1
Female	387.0	370.9	368.6	357.0	366.8	344.1	332.1	325.2	332.9	314.9
Age										
<18	63.1	*	*	68.7	*	*	*	*	*	*
0-4	*	*	*	*	*	*	*	*	*	*
5-11	*	*	*	*	*	*	*	*	*	*
12-17	*	*	*	*	*	*	*	*	*	*
18-44	106.0	103.0	103.1	108.2	96.3	92.8	73.8	79.7	72.6	81.4
18-24	95.6	70.3	60.2	45.8	64.9	55.7	29.7	55.4	40.9	46.9
25-44	107.1	106.6	107.6	114.5	99.5	96.8	78.3	82.3	75.5	84.6
45-64	214.9	204.5	214.3	210.0	212.8	198.5	189.9	191.4	188.1	182.2
45-54	164.9	157.7	175.8	161.7	166.7	156.7	144.5	142.6	140.7	138.2
55-64	250.4	236.4	240.1	241.8	241.9	225.2	217.7	222.0	217.2	208.8
65+	594.2	587.9	573.8	561.6	558.2	535.3	513.1	499.4	504.6	480.0
65-74	428.1	422.2	423.6	416.6	408.9	389.1	380.0	372.5	378.0	355.8
75-84	688.4	680.6	640.8	637.4	649.6	616.5	592.0	574.2	593.3	564.8
85+	1026.3	999.4	1003.6	939.8	910.9	917.6	869.7	883.3	864.1	865.0

*Data Source: Special analyses, USRDS ESRD Database. Incident dialysis patients, unadjusted. *Values for cells with 10 or fewer patients are suppressed. Abbreviation: CKD, chronic kidney disease.*

Since 2006, the overall rate of cardiovascular death among those on dialysis has fallen by approximately 30%. In 2015, with a rate of 67.0, the HP2020 goal of 81.3 cardiovascular deaths per 1,000 patient years at risk was met for the sixth year in a row (see Table 18). Though both exceeded the target, 2015 rates were lower among females (65.7 deaths per 1,000) as compared with males (68.0 deaths). Rates were lowest among Blacks with 54.4 deaths per 1,000 and Asians, with 57.3 deaths. Cardiovascular death continued to be highest among Whites, at 76.9 deaths per 1,000 patient years. Since 2006, large reductions in rates by age have been observed. The largest reduction— approximately 33% fewer deaths—was seen for patients older than 65 years in 2015, with 94.1 deaths per 1,000 patient years, compared to the 2006 rate of 140.6 deaths.

The total death rate for patients with a functioning transplant has not improved since 2006, and in 2015, at 32.7 deaths per 1,000 patient years at risk, still remained above the HP2020 target of 27.8 (Table 19). Consistent with previous trends, in 2015 males experienced higher rates of 34.9 deaths per 1,000 patient years, as compared with females at 29.5 deaths per 1,000. Rates were lowest among Asians (23.5 per 1,000) and highest among Whites (34.3 per 1,000), and American Indians and Alaska Natives (32.0 per 1,000). Death rates for patients with a functioning transplant were highest among those aged 65 and older, at 73.4 deaths per 1,000 patient years compared with those aged 45-64, at 24.8, and those aged 18-44, at 6.9 deaths.

HP2020 Table 18 CKD-14.3 Reduce the number of cardiovascular deaths for persons on dialysis: Target 81.3 deaths per 1,000 patient years at risk

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
All	95.6	90.3	85.6	82.8	80.0	76.7	74.3	71.5	67.8	67.0
Race										
American Indian or Alaska Native	73.1	68.8	61.0	68.9	63.0	58.2	57.2	56.3	58.4	62.9
Asian	70.5	69.0	66.2	66.9	60.8	61.9	58.4	56.6	55.1	57.3
Native Hawaiian or Pacific Islander	88.0	79.2	71.3	79.9	78.6	66.6	65.7	62.4	60.2	59.2
Black/African American	77.3	72.4	69.5	66.7	63.1	59.6	59.2	57.1	54.4	54.4
White only	112.1	105.9	99.6	96.1	93.9	90.7	87.1	83.7	78.6	76.9
Two or more races	72.2	65.6	69.1	64.0	65.8	58.4	51.2	48.5	57.7	50.3
Ethnicity										
Hispanic/Latino	72.7	67.3	64.5	65.0	61.3	59.6	59.1	58.2	57.7	56.0
Non-Hispanic	100.0	94.8	89.9	86.6	84.0	80.5	77.9	74.7	70.3	69.7
Non-Hispanic Black/African American	77.5	72.7	69.8	67.0	63.5	60.0	59.3	57.3	54.8	54.6
Non-Hispanic White	124.4	118.6	111.9	107.5	106.1	102.9	98.9	94.4	87.5	86.0
Sex										
Male	96.5	91.1	87.3	85.0	81.6	78.4	76.3	73.2	69.0	68.0
Female	94.6	89.3	83.5	80.1	77.8	74.5	71.8	69.3	66.2	65.7
Age										
<18	19.0	10.0	10.2	18.2	8.4	7.5	10.5	7.5	12.8	*
0-4	51.8	*	*	50.4	*	*	*	*	*	*
5-11	*	*	*	*	*	*	*	*	*	*
12-17	13.9	*	*	*	*	*	*	*	*	*
18-44	35.4	32.8	30.9	31.1	29.3	26.9	27.2	26.2	25.2	26.3
18-24	18.6	18.5	15.8	17.9	19.3	18.7	13.6	14.7	12.4	12.5
25-44	36.7	34.0	32.1	32.2	30.1	27.5	28.2	27.1	26.2	27.2
45-64	73.5	68.3	65.4	63.5	60.8	58.9	57.2	55.3	53.5	52.4
45-54	59.9	56.6	53.4	51.7	47.6	48.1	45.0	43.8	43.0	42.0
55-64	83.9	77.1	74.2	72.0	70.2	66.4	65.3	62.8	60.5	59.1
65+	140.6	134.1	126.4	121.3	117.6	112.3	107.8	102.8	95.6	94.1
65-74	115.0	108.9	104.8	101.7	97.0	93.3	90.0	86.9	81.2	81.2
75-84	158.0	152.2	140.2	132.6	131.1	124.4	117.8	113.5	106.0	102.6
85+	217.9	204.0	191.3	182.7	174.9	166.6	164.5	149.0	137.1	136.6

*Data Source: Special analyses, USRDS ESRD Database. Period prevalent dialysis patients; unadjusted. *Values for cells with 10 or fewer patients are suppressed. Abbreviations: CKD, chronic kidney disease.*

HP2020 Table 19 CKD-14.4 Reduce the total number of deaths for persons with a functioning kidney transplant: Target 27.8 deaths per 1,000 patient years at risk

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
All	31.5	30.9	29.7	31.0	30.8	31.1	31.4	31.3	32.3	32.7
Race										
American Indian or Alaska Native	44.8	37.1	37.3	54.1	45.3	43.9	43.6	35.7	34.3	32.0
Asian	18.9	24.0	18.7	16.5	16.5	21.8	22.0	18.2	20.9	23.5
Native Hawaiian or Pacific Islander	18.0	16.4	16.7	26.8	17.4	17.7	21.2	26.5	24.6	24.0
Black/African American	34.0	30.1	31.1	30.2	30.1	30.4	30.4	30.4	30.4	30.3
White	31.9	32.1	30.2	32.2	32.2	32.0	32.5	32.5	33.8	34.3
Two or more races	20.4	15.0	22.4	21.8	21.8	23.7	25.8	30.2	24.6	28.9
Ethnicity										
Hispanic/Latino	24.6	21.4	22.1	22.5	22.7	22.6	22.4	24.0	23.0	23.4
Non-Hispanic	29.3	30.0	28.9	30.1	30.8	31.6	32.7	32.7	34.1	34.7
Non-Hispanic Black/African American	30.8	28.2	28.9	27.8	29.5	30.3	30.3	30.3	30.8	30.6
Non-Hispanic White	29.7	31.3	29.7	31.7	32.4	32.8	34.3	34.7	36.6	37.3
Sex										
Male	33.4	32.7	31.4	32.5	32.9	33.1	33.5	33.0	34.4	34.9
Female	28.7	28.3	27.3	28.8	27.7	28.1	28.4	28.8	29.2	29.5
Age										
<18	3.9	*	3.0	3.5	6.4	3.0	3.0	*	2.6	4.3
0-4	*	*	*	*	*	*	*	*	*	*
5-11	*	*	*	*	*	*	*	*	*	*
12-17	*	*	*	*	6.2	*	*	*	*	*
18-44	11.3	10.4	9.5	9.8	8.9	8.1	7.8	7.4	7.6	6.9
18-24	8.2	5.9	5.8	6.3	6.2	4.2	4.7	4.7	3.6	5.4
25-44	11.7	10.9	9.9	10.2	9.2	8.6	8.2	7.8	8.1	7.1
45-64	31.7	29.8	28.3	28.0	27.1	27.6	25.6	25.2	24.7	24.8
45-54	24.6	21.9	21.4	21.4	19.1	18.7	16.6	16.7	16.0	16.5
55-64	39.5	38.1	35.3	34.4	34.6	35.7	33.5	32.6	32.0	31.6
65+	79.8	79.1	72.5	75.6	74.2	72.2	75.4	72.3	74.2	73.4
65-74	70.7	70.4	62.8	65.5	64.7	61.4	63.4	60.2	62.6	59.8
75-84	127.3	119.8	116.9	119.6	112.1	112.8	118.2	116.0	112.2	118.0
85+	149.0	214.5	135.3	146.5	165.8	159.0	195.7	167.2	189.7	186.5

*Data Source: Special analyses, USRDS ESRD Database. Period prevalent transplant patients, unadjusted. *Values for cells with 10 or fewer patients are suppressed. Abbreviation: ESRD, end-stage renal disease.*

In 2015, for the eighth consecutive year, the HP2020 target of 4.5 cardiovascular deaths per 1,000 patient-years was met among transplant recipients. The rate of cardiovascular mortality among transplant recipients has fallen by 47.1% since 2006, to the observed 2.7 deaths per 1,000 patient-years in 2015 (see Table 20). Rates were lowest among Hispanics or Latinos at 1.9 per 1,000 patient-years. Blacks and Whites had higher rates, at 2.7 and 2.8 deaths per 1,000 patient-years. Also consistent with prior trends, rates were lower among females at 2.5 deaths per 1,000 patient-years, compared with males at 2.9 per 1,000 patient-years, although both remained below the HP2020 target.

HP2020 Table 20 CKD-14.5 Reduce the number of cardiovascular deaths in persons with a functioning kidney transplant: Target 4.5 deaths per 1,000 patient years at risk

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
All	5.1	5.0	4.0	4.1	4.2	3.4	3.3	2.9	2.6	2.7
Race										
American Indian or Alaska Native	*	*	*	*	*	*	*	6.3	*	*
Asian	3.6	3.7	*	*	1.8	2.1	2.2	1.3	1.3	2.4
Native Hawaiian or Pacific Islander	*	*	*	*	*	*	*	*	*	*
Black/African American	5.8	5.4	4.9	4.9	4.9	4.1	3.9	3.4	3.1	2.7
White	5.1	5.1	3.9	4.0	4.2	3.4	3.2	2.9	2.6	2.8
Two or more races	4.4	*	3.8	3.7	*	*	*	*	*	*
Ethnicity										
Hispanic/Latino	4.3	3.2	3.3	3.2	2.7	2.9	2.1	2.2	1.9	1.9
Non-Hispanic	5.1	5.2	4.1	4.2	4.5	3.6	3.6	3.1	2.9	3.1
Non-Hispanic Black/African American	5.9	5.2	4.8	4.8	4.8	4.0	3.9	3.4	3.3	2.9
Non-Hispanic White	4.9	5.3	4.1	4.2	4.7	3.6	3.6	3.2	2.9	3.2
Sex										
Male	5.4	5.7	4.5	4.1	4.7	3.8	3.3	3.2	3.0	2.9
Female	4.7	4.1	3.3	4.0	3.5	2.8	3.2	2.4	2.2	2.5
Age										
<18	*	*	*	*	*	*	*	*	*	*
0-4	*	*	*	*	*	*	*	*	*	*
5-11	*	*	*	*	*	*	*	*	*	*
12-17	*	*	*	*	*	*	*	*	*	*
18-44	1.9	1.9	1.7	1.3	1.3	1.0	1.1	1.2	0.8	0.6
18-24	*	*	*	*	*	*	*	*	*	*
25-44	2.0	2.0	1.8	1.4	1.4	1.0	1.2	1.3	0.9	0.5
45-64	5.5	5.1	4.1	3.8	4.0	3.3	2.8	2.6	2.2	2.4
45-54	4.1	4.3	3.2	3.1	2.8	2.1	1.9	1.9	1.4	1.9
55-64	7.0	5.9	5.1	4.5	5.1	4.4	3.6	3.2	2.9	2.8
65+	11.5	11.6	8.3	9.4	9.1	7.2	7.2	5.6	5.5	5.5
65-74	9.9	10.2	7.6	8.2	8.6	6.8	6.2	5.0	4.7	4.9
75-84	20.3	18.0	11.6	15.4	10.9	8.6	11.5	8.2	8.6	7.3
85+	*	*	*	*	*	*	*	*	*	16.4

*Data Source: Special analyses, USRDS ESRD Database. Period prevalent transplant patients, unadjusted. *Values for cells with 10 or fewer patients are suppressed. Abbreviation: CKD, chronic kidney disease.*

Methods

The findings presented in this chapter were drawn from multiple data sources, including the Centers for Medicare & Medicaid Services (CMS), the Organ Procurement and Transplantation Network (OPTN), the Centers for Disease Control and Prevention (CDC), and the United States Census.

This section describes the analytical methods used to generate the study cohorts, figures, and tables in this chapter. Downloadable Microsoft Excel and PowerPoint files containing the data and graphics for these figures and tables are available on the [USRDS website](#).

OBJECTIVE CKD-3: INCREASE THE PROPORTION OF HOSPITAL PATIENTS WHO INCURRED ACUTE KIDNEY INJURY WHO HAVE FOLLOW-UP RENAL EVALUATION IN 6 MONTHS POST-DISCHARGE

Data for this objective include all patients in the Medicare 5% sample who are aged 65 and older and who have hospitalized acute kidney injury (AKI) events in the given year (2006-2015). Hospitalized AKI is defined by the presence of ICD-9-CM diagnosis code 584 or by the presence of ICD-10-CM diagnosis code N17 in any field of the inpatient claims, and renal evaluation is identified by a microalbumin test. Patients are followed from the discharge date to the earliest date of death, ESRD, end of Medicare coverage, or six months after the discharge date. CPT codes for urinary microalbumin measurement are identified from HEDIS 2008 specifications (HEDIS 2008, an NCQA program, is used to monitor the performance of managed health care plans), and include 82042, 82043, 82044, and 84156.

OBJECTIVE D-12: INCREASE THE PROPORTION OF PERSONS WITH DIAGNOSED DIABETES WHO OBTAIN AN ANNUAL URINE ALBUMIN MEASUREMENT

The cohort includes general Medicare patients diagnosed with diabetes mellitus (DM) in each year, continuously enrolled in Medicare Parts A and B during the whole year, and aged 65 or older at the beginning of the year. CPT codes for urinary microalbumin measurement are those used in Objective CKD-3, above. Testing is tracked during each year. Diabetes is defined by a qualifying ICD-9-CM diagnosis code of DM on one or more Part A

institutional claims (inpatient, skilled nursing facility, or home health agency), or two or more institutional outpatient claims and/or physician/supplier claims within a one-year observation period. Methods of defining DM are described in the CKD Analytical Methods chapter of Volume 1: Chronic Kidney Disease (CKD) in the United States.

OBJECTIVE CKD-4.1: INCREASE THE PROPORTION OF PERSONS WITH CHRONIC KIDNEY DISEASE WHO RECEIVE MEDICAL EVALUATION WITH SERUM CREATININE, LIPIDS, AND URINE ALBUMIN

The cohort here is similar to that used for Objective D-12, but includes all CKD patients. Testing is tracked during each year. Patients are excluded if they are enrolled in a managed care program (HMO), acquire Medicare as secondary payer, are diagnosed with ESRD during the year, have a missing date of birth, or do not live in the 50 states, the District of Columbia, Puerto Rico, or the U.S. territories. Racial and ethnic categories are mutually exclusive. Methods of defining CKD are described in the CKD Analytical Methods chapter of Volume 1: Chronic Kidney Disease (CKD) in the United States. Serum creatinine is identified through CPT codes 80047–80050, 80053–80054, 80069, and 82565, while lipid testing is identified through CPT codes 80061, 82465, 82470, 83695, 83705, 83715–83721, 84478, 83700, 83701, and 83704. CPT codes for urinary microalbumin measurement are the same as those used for Objective CKD-3 above.

OBJECTIVE CKD-4.2: INCREASE THE PROPORTION OF PERSONS WITH TYPE 1 OR TYPE 2 DIABETES AND CHRONIC KIDNEY DISEASE WHO RECEIVE MEDICAL EVALUATION WITH SERUM CREATININE, URINE ALBUMIN, HbA1c, LIPIDS, AND EYE EXAMINATIONS

Methods and codes used to determine rates of HbA1c testing and eye examinations are taken from HEDIS 2008 specifications. CPT codes 83036 and 83037 are used to identify HbA1c testing. Codes used to identify diabetic eye examinations are as follows: CPT codes, 92002, 92004, 92012, 92014, 92018, 92019, 92225, 92226, 92230, 92235, 92240, 92250, 92260, 67101, 67105, 67107, 67108, 67110, 67112, 67141, 67145, 67208, 67210, 67218, 67227, 67228, 67028, 67030, 67031, 67036, 67038, 67039, 67041, 67042, 67043, 67113, 67121, 67221, 67228, S0625, S0620, S0621, and S3000; ICD-9-CM

procedure codes, 14.1–14.5, 14.9, 95.02, 95.03, 95.04, 95.11, 95.12, and 95.16; and ICD-9-CM diagnosis code V72.0. The cohort is similar to that used for Objective CKD-4.1, but includes all diabetic CKD patients. Methods of defining DM are described in the CKD Analytical Methods chapter of Volume 1: Chronic Kidney Disease (CKD) in the United States.

OBJECTIVE CKD-5: INCREASE THE PROPORTION OF PERSONS WITH DIABETES AND CHRONIC KIDNEY DISEASE WHO RECEIVE RECOMMENDED MEDICAL TREATMENT WITH ANGIOTENSIN-CONVERTING ENZYME (ACE) INHIBITORS OR ANGIOTENSIN II RECEPTOR BLOCKERS (ARBS)

The cohort includes general Medicare patients diagnosed with both diabetes and chronic kidney disease (CKD) in each year, continuously enrolled in the Medicare inpatient/outpatient and physician/supplier program during the entire year, age 65 or older at the beginning of the year, and enrolled in Medicare Part D during the entire year. Use of angiotensin-converting enzyme inhibitors (ACEIs) or angiotensin II receptor blockers (ARBS) is defined by at least one prescription fill from either drug class during the year.

OBJECTIVE CKD-8: REDUCE THE RATE OF NEW CASES OF END-STAGE RENAL DISEASE

Incident rates are calculated using the methods described for Chapter 1 of Volume 2: End-stage Renal Disease (ESRD) in the United States. Overall rates are adjusted by age, sex, and race; rates by age are adjusted for sex and race; rates by sex are adjusted for age and race; and rates by race and ethnicity are adjusted by age and sex.

OBJECTIVE CKD-9.1: REDUCE KIDNEY FAILURE DUE TO DIABETES

Rates of kidney failure due to DM are also calculated using the methods described for Chapter 1 of Volume 2: End-stage Renal Disease (ESRD) in the United States, and adjustments are the same as those described for Objective CKD-8, above.

OBJECTIVE CKD-9.2: REDUCE KIDNEY FAILURE DUE TO DIABETES AMONG PERSONS WITH DIABETES

This table uses data from the National Health Interview Survey; all ages are included. Three-year data are used to estimate the prevalence of DM in the middle year, and the size of the population with DM is based on U.S. Census data. The incident rate per million of ESRD caused by DM is calculated as the number of incident ESRD patients with a primary cause of ESRD of DM, divided by the size of the population with DM in that group.

OBJECTIVES CKD-10: INCREASE THE PROPORTION OF CHRONIC KIDNEY DISEASE PATIENTS RECEIVING CARE FROM A NEPHROLOGIST AT LEAST 12 MONTHS BEFORE THE START OF RENAL REPLACEMENT THERAPY & CKD-11.3: INCREASE THE PROPORTION OF ADULT HEMODIALYSIS PATIENTS WHO USE ARTERIOVENOUS FISTULAS OR HAVE A MATURING FISTULA AS THE PRIMARY MODE OF VASCULAR ACCESS AT THE START OF RENAL REPLACEMENT THERAPY

These tables and figure use data from the newest version of the Center for Medicare and Medicaid Services (CMS) Medical Evidence form (CMS 2728). The cohorts include incident HD patients, with CKD-11.3 limited to those aged 18 and older at initiation who have a known vascular access at that time. CKD-10 includes only patients for whom it is known whether they saw a nephrologist prior to initiation.

OBJECTIVES CKD-11.1: INCREASE THE PROPORTION OF ADULT HEMODIALYSIS PATIENTS WHO USE AN ARTERIOVENOUS FISTULA AS THE PRIMARY MODE OF VASCULAR ACCESS & CKD-11.2: DECREASE THE PROPORTION OF ADULT HEMODIALYSIS PATIENTS WHO USE CATHETERS AS THE ONLY MODE OF VASCULAR ACCESS

These tables use data from CROWNWeb. The cohort includes prevalent HD patients from 2012 to 2015, who are aged 18 and older. Access type represents the last access type used in the year, according to CROWNWeb data.

OBJECTIVE CKD-12: INCREASE THE PROPORTION OF DIALYSIS PATIENTS WAIT-LISTED AND/OR RECEIVING A DECEASED DONOR KIDNEY TRANSPLANT WITHIN 1 YEAR OF END-STAGE RENAL DISEASE START (AMONG PATIENTS UNDER 70 YEARS OF AGE)

The cohort includes patients from 2006-2015 who are younger than 70 at the initiation of ESRD. Percentages are calculated as the number of patients placed on the deceased donor organ waiting list or receiving a deceased donor transplant within one year of initiation, divided by the number of patients without a living donor available (i.e., patients receiving a living donor transplant are excluded), and are estimated using the Kaplan-Meier methodology.

OBJECTIVE CKD-13.1: INCREASE THE PROPORTION OF PATIENTS RECEIVING A KIDNEY TRANSPLANT WITHIN 3 YEARS OF END-STAGE RENAL DISEASE

The cohort in Table 14 and Figure 2 includes patients from 2003–2012 who are younger than 70 at the initiation of ESRD. Patients are followed from ESRD certification to transplant, censoring at death or three years after the initiation of ESRD. Percentages are calculated using the Kaplan-Meier methodology.

OBJECTIVE CKD-13.2: INCREASE THE PROPORTION OF PATIENTS WHO RECEIVE A PRE-EMPTIVE TRANSPLANT AT THE START OF END-STAGE RENAL DISEASE

The cohort includes patients from 2006–2015 who are younger than 70 at the initiation of ESRD. Pre-emptive transplants are those in which ESRD initiation date is the date of transplant. Percentages are calculated as 100 (N/D), where N=the number of preemptive transplants in the year and D=the number of ESRD patients in the year.

OBJECTIVES CKD-14.1: REDUCE THE TOTAL DEATH RATE FOR PERSONS ON DIALYSIS & CKD-14.3: REDUCE THE CARDIOVASCULAR DEATH RATE FOR PERSONS ON DIALYSIS

Cohorts for these tables include period prevalent dialysis patients in each calendar year, 2006–2015, whose first ESRD service date is at least 90 days prior to the beginning of the year (point prevalent patients on January 1) or who reach day 91 of ESRD treatment during the year (incident patients). We exclude patients with unknown age or sex and those with an age calculated to be less than zero, as well as patients who are not residents of the 50 states, the District of Columbia, Puerto Rico, or the U.S. territories. Age is calculated on January 1, and race is defined from the Medical Evidence form. Cardiovascular mortality is defined using codes from past and current Death Notification forms: 01, 02, 03, 04, 1, 2, 3, 4, 23, 25, 26, 27, 28, 29, 30, 31, 32, 36, and 37. Patients are followed from January 1 (for point prevalent dialysis patients) or day 91 of ESRD (for incident dialysis patients) until death, transplant, or December 31 of the year. Rates are estimated as the number of patients who die from any cause (Objective 14.1) and who die from cardiovascular disease (Objective 14.3) in each year, per 1,000 patient years at risk.

OBJECTIVE CKD-14.2: REDUCE THE DEATH RATE IN DIALYSIS PATIENTS WITHIN THE FIRST 3 MONTHS OF INITIATION OF RENAL REPLACEMENT THERAPY

Cohorts here include incident dialysis patients in each calendar year, 2006–2015. In addition to applying the same exclusion criteria described for Objectives 14.1 and 14.3, we further exclude patients with recovered kidney function. Age is calculated on the first ESRD service date. Patients are followed from the first service date until death, transplant, or 90 days after ESRD. Rates are estimated as the number of patients who die from any cause per 1,000 patient years at risk.

OBJECTIVES CKD-14.4: REDUCE THE TOTAL DEATH RATE FOR PERSONS WITH A FUNCTIONING KIDNEY TRANSPLANT & CKD-14.5: REDUCE THE CARDIOVASCULAR DEATH RATE IN PERSONS WITH A FUNCTIONING TRANSPLANT

Patient cohorts here include period prevalent transplant patients, 2006–2015, whose first ESRD service date is at least 90 days prior to the beginning of the year (point prevalent patients on January 1) or who reach day 91 of ESRD treatment (incident patients). Exclusion criteria are the same as those described for Objectives 14.1 and 14.3. Patients are followed from January 1 (for point prevalent dialysis patients) or day 91 of ESRD (for incident dialysis patients) until death or December 31 of the year. Rates are estimated as the number of patients who die from any cause (Objective 14.4) and who die from cardiovascular disease (Objective 14.5) in each year, per 1,000 patient years at risk.

References

Centers for Disease Control and Prevention (CDC). *Native Americans with Diabetes* https://www.cdc.gov/vitalsigns/aian-diabetes/index.html. Accessed 10/13/17.

Centers for Medicare & Medicaid Services. *2007 Annual Report, End Stage Renal Disease Clinical Performance Measures Project*. Department of Health and Human Services, Centers for Medicare & Medicaid Services, Office of Clinical Standards & Quality, Baltimore, Maryland, December 2007.

Healthy People 2020 (HP2020). *About Healthy People.* https://www.healthypeople.gov/2020/About-Healthy-People. Accessed 7/15/17.

Healthy People 2020 (HP2020). *Chronic Kidney Disease.* https://www.healthypeople.gov/2020/topics-objectives/topic/chronic-kidney-disease. Accessed 10/8/17.

U.S. Renal Data System. *USRDS 2013 Annual Data Report: Atlas of Chronic Kidney Disease and End-Stage Renal Disease in the United States*. National Institutes of Health, National Institute of Diabetes and Digestive and Kidney Diseases, Bethesda, MD, 2013.

Notes