Chapter III

Incidence and Causes of Treated ESRD

This chapter describes the characteristics and trends of newly treated incident end-stage renal disease (ESRD) patients through 1992, the most recent year for which USRDS patient data are considered to be complete. Treated ESRD, as used in this chapter and throughout the *ADR*, refers specifically to patients requiring and receiving chronic dialysis or a kidney transplant and who were reported to the USRDS.

The incidence rate of treated ESRD has increased every year included in this report: 1984 to 1992. In 1992, the adjusted incidence rate of treated ESRD was 214 per million population per year, yielding a growth rate of 8.7 percent per year since 1984. The year 1992 marked the 20th year since most of the U.S. population has been eligible for ESRD treatment though the Medicare program. The incidence rate of treated ESRD completely expected to stabilize by this time as the pool of eligible patients was identified and accepted into treatment. However, the incidence of treated ESRD has not shown any sign of reaching a plateau. The persistent growth of ESRD is troubling because of the associated social and economic burdens faced by patients and society. Furthermore, the increasing incidence of ESRD runs contrary to the declining incidence and mortality of other diseases with similar risk factors, such as coronary heart disease and stroke.

As described in more detail below, ESRD appears to be growing in an exponential fashion. The absolute incidence and incidence growth rates have been greatest in the older age groups, although substantial growth has also occurred among younger adults. ESRD incidence rates are disproportionately high among Blacks and Native Americans, although ESRD incidence is growing among all racial groups. ESRD is more common in men than women although recent growth in incidence is similar for men and women. Among attributed causes of ESRD, the highest incidence and fastest growth have occurred with diabetes and hypertension. There are unexplained geographic differences in the incidence of ESRD which are relatively consistent over time.

Measuring the Incidence of Treated ESRD

All patients who are registered in the USRDS as beginning treatment for irreversible chronic renal failure in the United States are included in estimates of the incidence of ESRD. The registration of ESRD patients is complete for those who have insurance coverage, or are eligible for it, representing an estimated 93 percent of treated ESRD patients in the U.S. In addition, most new patients who started receiving ESRD treatment through the Veteran's Administration Facilities or who receive medical insurance coverage through the Department of Veteran's Affairs have been registered in the USRDS since 1990.

Patients who are not registered in the USRDS include many with medical insurance provided through a private source or through Medicaid. There may be an undercount of patients who die before they are eligible for Medicare coverage, usually by 60 to 90 days after the start of ESRD therapy. Further, since the USRDS is a treatment-based registry, it does not include information for patients who die of kidney failure without receiving replacement treatment. Once estimated to be nearly as high as the treated ESRD incidence (Kjellstrand 1988), the number of untreated patients dying of chronic renal failure in the U.S. may have diminished over time in light of the steady growth observed in the rate of ESRD. Thus, the incidence of treated ESRD is defined as the number of patients starting ESRD therapy each year

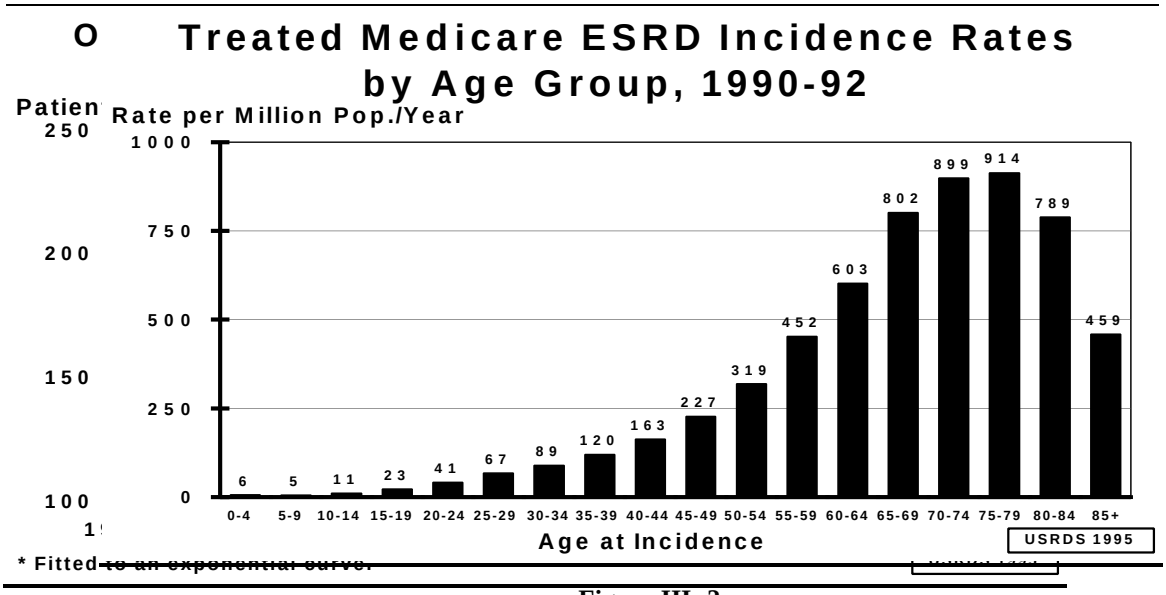

Figure III -2
Figure III -1

Total treated Medicare incidence, by age group, 1990-92. Rates adjusted for race and sex. Rates do not include patients from Puerto Rico or the U.S. Territories. Medicare patients only. Source: Observed and projected incidence rates of treated ESRD per million population by age group, 1984-1992. Rates are unadjusted. Rates do not include patients from Puerto Rico or U.S. Territories. Medicare patients only. Source: Table A.8. Table A.3, special analysis.

who are subsequently registered. This definition corresponds to the term "ESRD acceptance rate" used by European Dialysis and Transplant Association Registry. See Chapter XIV for further discussion of the completeness of the USRDS database.

This chapter reports the annual incidence of treated ESRD as both counts and rates per U.S. population during the year. The incidence counts establish the absolute numbers of patients starting treatment for ESRD during a year, while the incidence rates are generally more useful when considering differences in the incidence of treated ESRD over time or among particular groups of patients.

Overall incidence rates are computed as the incidence count during a year divided by the U.S. resident population count on July 1 of that year. Adjustments for age, race, or sex are typically made using direct standardization, although the indirect method is used for calculating incidence by state and ESRD Network as described in Chapter XIV in order to improve the stability of the computations. The incidence rate for a particular group is based on the ESRD incident count and the U.S. population count for that particular group. Since population counts are not consistently reported for specific age and race groups in Puerto Rico and U.S. territories, all incidence rates exclude patients from these regions. For all incidence rates reported in this *ADR*, including estimates by state and ESRD Network, patient residence is determined as of the start of ESRD therapy.

This chapter presents current estimates of the incidence of treated ESRD and describes recent trends by demographic characteristics, primary cause of ESRD, geographic region and by selected combinations of these factors.

Trends in Overall Incidence

In 1992 a total of 55,377 patients were registered as starting ESRD therapy in the United States. As shown in Figure III-1, the incidence rate of treated Medicare ESRD increased from 111 to 214 new patients per million population between 1984 and 1992. This trend suggests exponential growth in the incidence of treated ESRD at a rate of 8.7 percent annually over the 1984-92 time period, based on data currently available. (A stable growth rate yields an exponential pattern of growth.)

In some cases the USRDS receives information about a new patient several years after the date of first treatment for ESRD. This may be at least partially due to delays in the reporting to Medicare of patients who initially have other types of medical insurance. This delay in reporting means that current data yield a slight undercount of the complete incidence count. (See Chapter XIV for further details.)

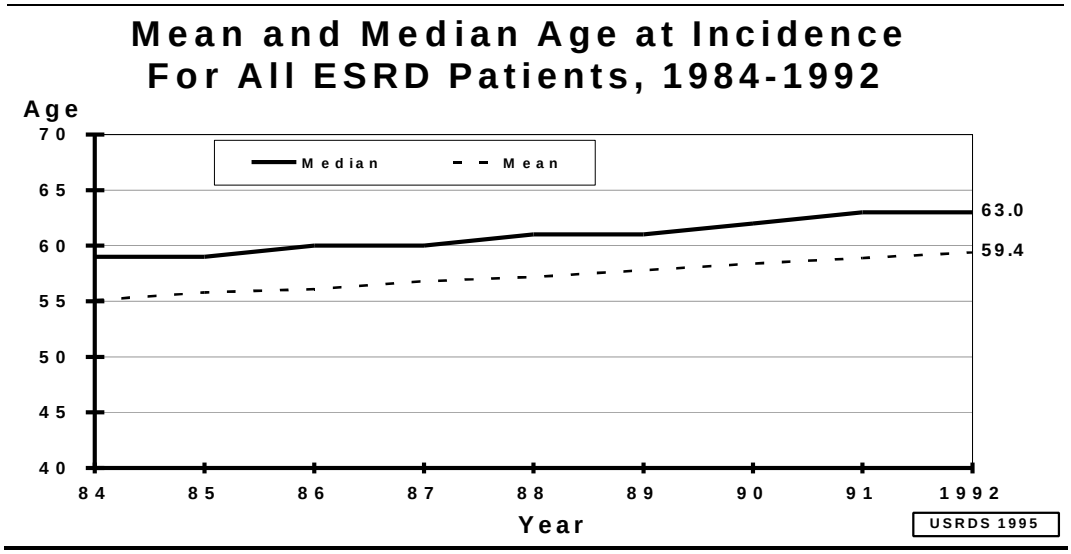

Figure III -4

Mean and median age at incidence of ESRD by year, 1984-1992. Includes patients from Puerto Rico and U.S. Territories. Medicare patients only. Soure: Reference Table A.22.

Based on preliminary incidence counts for 1993 and the delay in data reporting observed over the last several years, the growth in the true incidence of treated ESRD in Figure III-1 is projected to be somewhat higher at an estimated 9.1 percent annually. At this rate of increase the overall incidence of treated ESRD is expected to reach more than 240 new patients per million population, or more than 62,000 new patients during 1993.

Age

The incidence rate of treated ESRD rises markedly with age between ages 5 and 80, as shown by five-year age groups in Figure III-2. The rate per

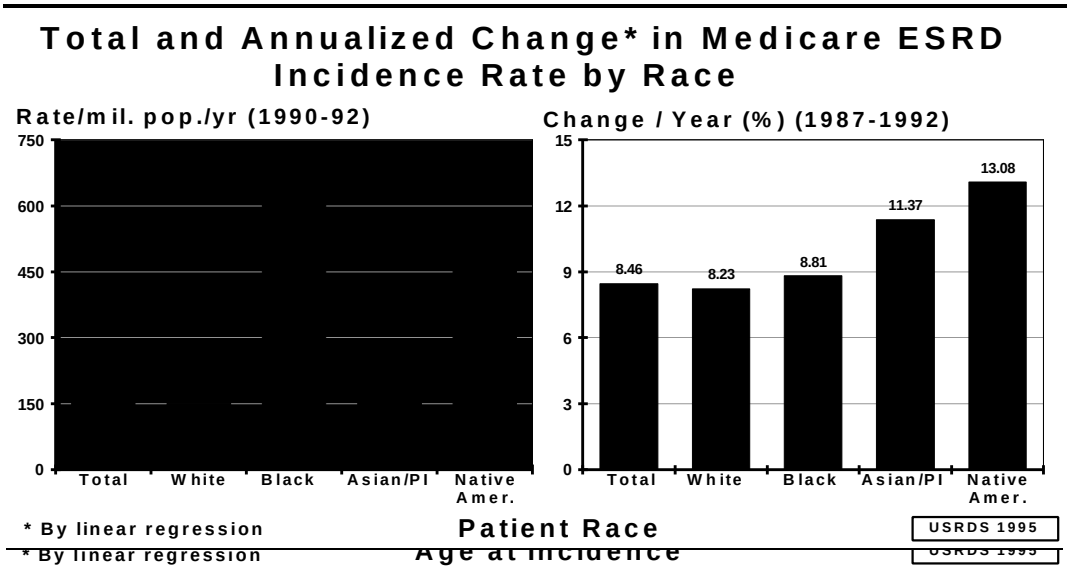

Figure III -5
Figure III -3

Total treated ESRD incidence by race, 1990-92, and annualized change in incidence by race, 1987-92. Overall rates adjusted for age, by age group, 1987-92. Rates adjusted for sex and age. Annualized change rates adjusted for age, by age group, 1987-92. Rates adjusted for sex and age. Rates do not include patients from Puerto Rico or the U.S. Territories. Medicare patients only. Source: Reference Tables A.39, special analysis. Special Analysis.

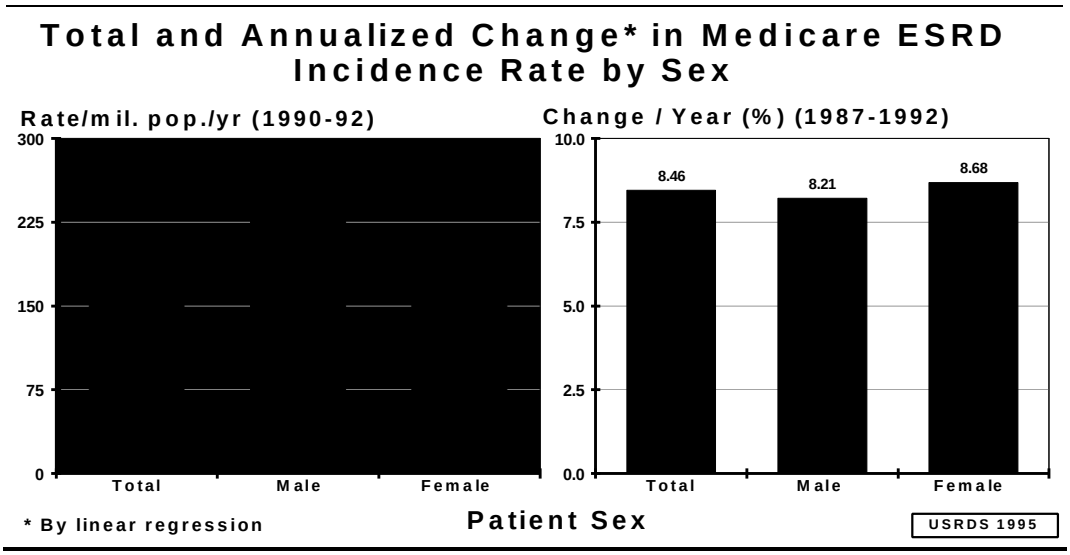

Figure III -6

Total treated ESRD incidence by sex, 1990-92, and annualized change in incidence, by sex, 1987-92. Overall rates adjusted for age, race, and sex. Rates by sex adjusted for race and age. Rates do not include patients from Puerto Rico or the U.S. Territories. Medicare patients only. Source: Reference Table A.39, special analysis.

million population is lowest among pediatric patients (ranging from 5 to 23) and highest among patients 65 to 84 years old (ranging between 789 and 914). The incidence of treated ESRD among patients age 70-74 years is ten times higher than for patients age 30-34 years and 80 times higher than for patients age 10-14 years.

Figure III-3 indicates that the incidence rate of treated ESRD is rising rapidly among the older population. Between 1987 and 1992, the fastest annual growth in the treated ESRD incidence rate occurred from ages 55-59 years (8.5 percent per year) through ages 85 years and older (17.1 percent per year). The incidence count of older ESRD patients is likely to grow in the future, from the combined effects of the higher incidence rate and the increasing size of the elderly population in the U.S.

As a result of the rapid and sustained growth in the rate of ESRD among older patients in particular, the 'typical' ESRD patient is several years older than during the early 1980s. The median and mean age of newly treated ESRD patients has risen steadily over the last ten years from 59 to 63 years of age and from 55 to 59 years of age, respectively (Figure III-4). As a point of reference, the median age of the general U.S. population was 33 years in 1991 (U.S. Bureau of the Census 1993).

Race

The age- and sex-adjusted incidence of treated ESRD in Figure III-5 (left side) is three to four times higher among Blacks and Native Americans compared to Whites over the combined 1990-92 period. During 1992, Blacks and Native Americans comprised 28.9 percent and 1.4 percent of all new ESRD patients; by comparison, corresponding estimates for the U.S. general population in 1991 were 12.4 and 0.8 percent, respectively (U.S. Bureau of the Census 1993).

The trend over the recent five-year period in Figure III-5 (right side) indicates that the growth in treated ESRD incidence rates was highest for Native Americans (13.1 percent per year) and Asians/Pacific Islanders (11.4 percent per year). The growth in treated ESRD incidence rates is slightly higher for Blacks (8.8 percent per year) compared to Whites (8.2 percent per year). The overall four-fold higher rate of ESRD for Blacks has not diminished in recent years and may even be growing slightly larger. As shown below, racial differences in the rate of treated ESRD vary considerably by the primary disease causing ESRD.

Sex

The incidence rate of treated ESRD was approximately 50 percent higher in men than in

Incidence of treated ESRD by Detailed Primary Disease, Age, Sex, Race and One-Year Transplant and Death Status for all Patients, 1989-1992

					Percent by Race				Percent	
Primary Disease	Total 1989-92[1]	% of Total	Median Age	% Male	White	Black	Asian	Native Amer.	Tx'ed in 1st year[2,3]	Died in 1st year[2,3]
All ESRD, (reference)	234296	100.0	62	54.0	100.0	100.0	100.0	100.0	11.3	13.0
Diabetes	80834	36.2	61	47.3	36.1	34.8	37.2	63.7	8.9	15.9
Hypertension	67239	30.1	68	57.8	26.6	40.0	23.6	13.0	6.0	11.4
Glomerulonephritis	28739	12.9	54	61.5	13.8	10.3	20.4	9.8	19.4	7.0
Goodpasture's Syndrome	719	0.3	65	47.4	0.4	0.1	0.1	0.2	7.7	11.3
Focal glomerulosclerosis, focal GN	3512	1.6	40	65.3	1.3	2.2	1.3	0.8	20.8	6.9
Membranous nephropathy	1083	0.5	56	69.8	0.5	0.4	0.3	0.2	21.1	4.9
Membranoproliferative GN	881	0.4	42	61.1	0.5	0.2	0.7	0.5	30.8	5.1
All other glomerulonephritis	22544	10.1	56	61.0	11.0	7.4	18.0	8.0	18.9	7.1
Cystic Kidney Diseases	6978	3.1	54	53.1	4.0	1.2	2.2	1.7	24.4	3.7
Interstitial Nephritis	7011	3.1	63	46.6	3.8	1.6	3.2	1.9	16.9	9.5
Analgesic nephropathy	1884	0.8	64	46.5	1.0	0.5	0.7	0.5	14.6	13.2
All other interstitial nephritis	5127	2.3	63	46.6	2.8	1.1	2.5	1.4	17.7	8.2
Obstructive Nephropathy	4792	2.1	68	73.1	2.6	1.2	1.6	1.3	12.1	13.0
Collagen Vascular Diseases	4982	2.2	41	27.0	2.2	2.4	3.1	1.4	10.0	12.8
Lupus erythematosus	3147	1.4	35	18.9	1.1	2.1	2.8	1.0	11.0	9.0
Scleroderma	546	0.2	58	24.7	0.3	0.1	0.1	0.1	4.0	31.0
Wegener's granulomatosis	557	0.2	63	55.1	0.3	0.0	0.0	0.2	11.4	14.5
Hemolytic uremic syndrome / TTP	483	0.2	49	34.8	0.3	0.1	0.1	0.0	6.0	21.0
Polyarteritis	127	0.1	58	57.5	0.1	0.0	0.0	0.0	9.5	21.6
Henoch-Schonlein Purpura	93	0.0	27	59.1	0.1	0.0	0.1	0.0	21.2	5.8
Rheumatoid arthritis	29	0.0	64	51.7	0.0	0.0	0.0	0.0	6.7	13.3
Malignancies	2962	1.3	68	61.7	1.6	0.8	0.6	0.5	1.2	32.5
Multiple myeloma, chain disease	1986	0.9	68	58.7	1.0	0.6	0.5	0.4	0.1	36.7
Renal and urinary tract neoplasms	929	0.4	67	67.9	0.5	0.2	0.1	0.1	2.6	24.9
Lymphomas	47	0.0	66	68.1	0.0	0.0	0.0	0.0	9.5	33.3
Metabolic Diseases	1143	0.5	62	60.5	0.6	0.2	0.3	0.2	10.2	26.7
Amyloidosis	808	0.4	65	57.5	0.5	0.1	0.2	0.2	5.3	33.8
Gouty / Uric acid nephropathy	125	0.1	65	72.0	0.1	0.1	0.0	0.0	10.0	15.0
Oxalate nephropathy	89	0.0	57	53.9	0.1	0.0	0.0	0.0	19.3	8.8
Cystinosis	51	0.0	12	51.0	0.0	0.0	0.0	0.0	30.0	20.0
Fabry's disease	56	0.0	42	96.4	0.0	0.0	0.0	0.0	34.5	7.3
Macroglobulinemia	14	0.0	67	64.3	0.0	0.0	0.0	0.0	0.0	33.3
Congenital/Other Hereditary Dis.	1611	0.7	22	69.6	0.9	0.3	0.6	0.7	33.9	4.1
Congenital obstructive uropathy	409	0.2	27	76.3	0.2	0.1	0.1	0.2	25.1	4.3
Renal dysgenesis, agenesis, dysplasia	382	0.2	22	59.7	0.2	0.1	0.2	0.2	31.8	7.0
Alport's Syndrome	820	0.4	21	70.9	0.5	0.1	0.3	0.3	38.7	2.9
Sickle Cell Disease	206	0.1	37	53.9	0.0	0.3	0.0	0.0	2.2	18.0
AIDS-Related	950	0.4	36	83.5	0.1	1.4	0.1	0.0	0.2	49.2
Other ESRD	2808	1.3	67	62.8	1.6	0.5	0.5	0.8	6.5	25.0
Cause Labeled Unknown	13153	5.9	65	58.8	6.2	5.0	6.6	5.1	13.7	12.3
Missing Information	10888	.	51	54.6	.	.	.	.	15.2	13.0

[1]Divide total by 4 to determine average annual counts. Note these figures include patients in Puerto Rico and U.S. Territories.
See introduction to Section A of the Reference Tables for an explanation.
[2]Comparisons of death and transplant rates across primary disease should be done with caution as rates do not adjust for age, sex or race.
[3]Only patients ages 20-64.
Medicare Patients Only.

Table III -1

women (Figure III-6, left), consistent with long-standing trends. The rate of growth of ESRD, adjusted for age and race, was similar for men and women (Figure III-6, right). The sex ratio varies by attributed diagnosis, as discussed below.

Diagnosis

Information about the cause of ESRD is derived from the Medicare ESRD Medical Evidence Form

that providers are required to submit for new patients. For patients whose treatment is not covered by Medicare (e.g. Department of Veterans Affairs, Medicaid, Prisoners), submission of a Medicare Medical Evidence form is optional. The listed cause of ESRD is often based on a clinical diagnosis. It is important to note that the criteria for clinical diagnosis of renal disease are neither uniform nor validated and reporting biases are possible. These limitations must be considered when interpreting data on the diagnosis of incident ESRD patients. A new Medical Evidence form being introduced in 1995 provides a more inclusive and organized list of renal diagnoses that will refine the diagnostic classification of ESRD in the future.

Annualized Change* in Medicare ESRD Incidence Rates for Selected Diagnoses, 1990-92

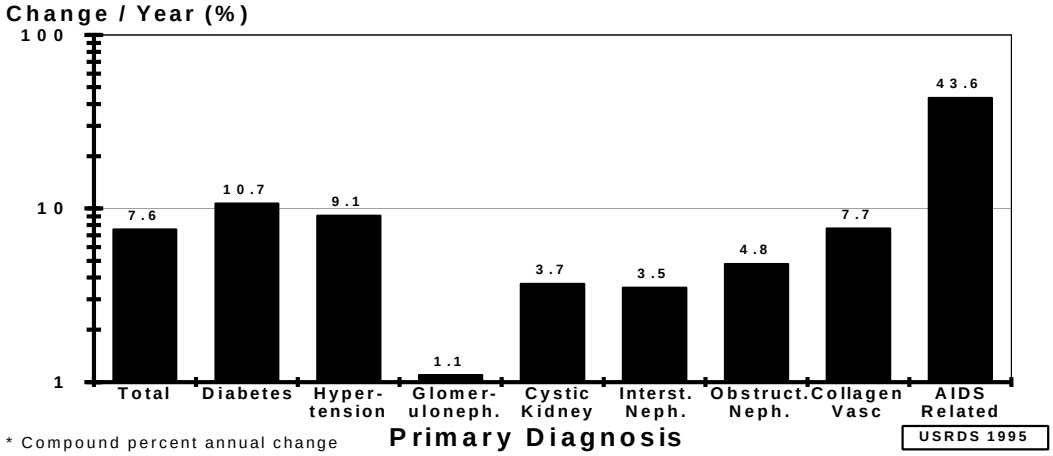

Figure III -8

Annualized change in treated ESRD incidence rates for selected primary diagnoses, 1990-92. Semi-log scale. Rates are unadjusted. Rates do not include patients treated in Puerto Rico or U.S. Territories. Medicare patients only. Source special analysis.

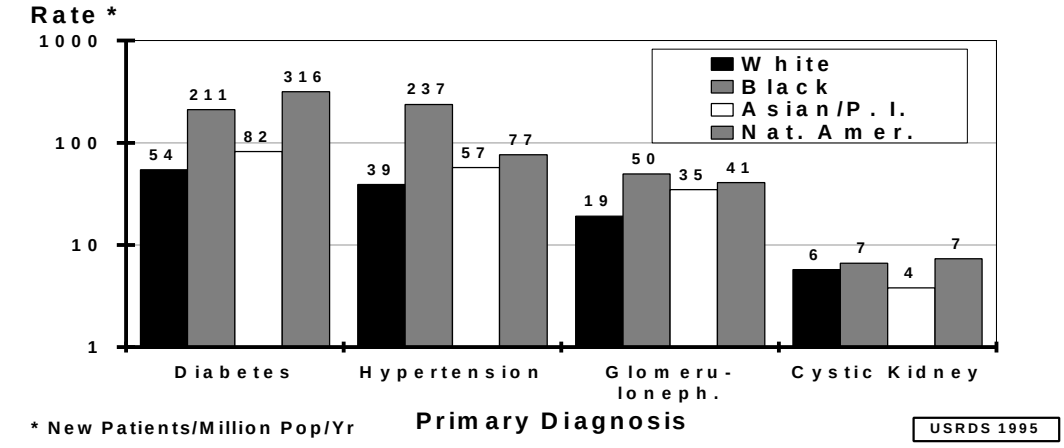

Figure III -9

Treated ESRD incidence rates by primary diagnosis, race, and age. Adjusted for age and sex. Rates do not include patients in Puerto Rico or U.S. Territories. Medicare patients only. Source: Reference Tables A.45,A.47

Table III-1 contains a comprehensive listing of attributed causes of ESRD. Figure III-7 displays the adjusted incidence of ESRD for several specific diagnoses and Figure III-8 shows the rate of growth by diagnosis. Interactions between diagnosis and race are displayed in Figures III-9 and III-10 and interactions between diagnosis and sex are shown in Figure III-11. Figure III-12 shows the incidence of ESRD by age group for selected diagnoses.

Diabetes continues to be the most common cause of treated ESRD, accounting for 35.7 percent of new cases in 1992 (Table III-1, Figure III-7). New cases of diabetic ESRD have increased by 10.7 percent annually from 1990-92 (Figure III-8). The adjusted incidence rate of diabetic ESRD is highest in Black

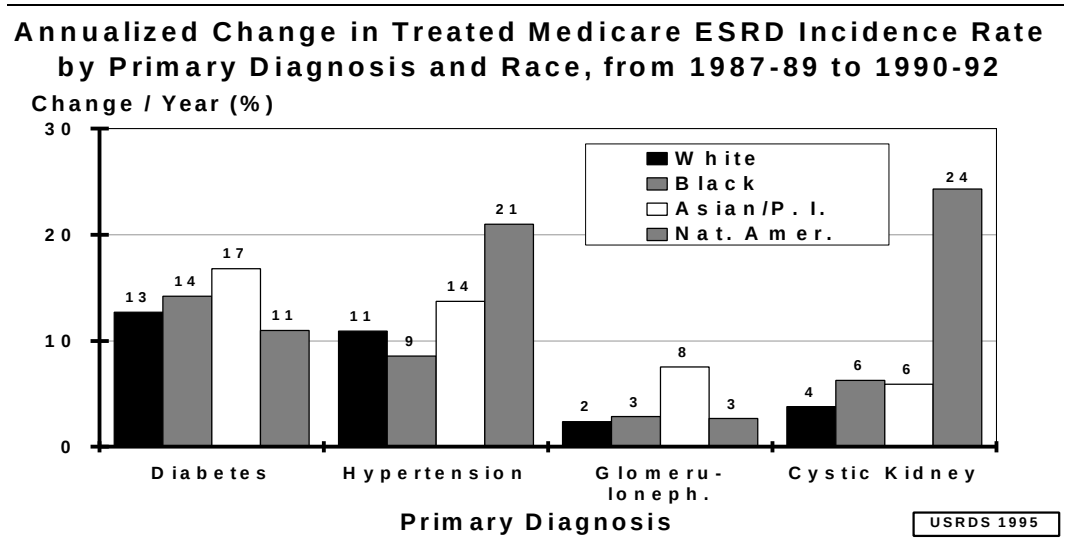

Figure III -10

Annualized change in treated ESRD incidence rates for selected primary diagnoses, by race, 1987-89 to 1990-92. Adjusted for age and sex. Rates do not include patients in Puerto Rico or U.S. Territories. Medicare patients only. Source: Reference Tables A.45,A.47.

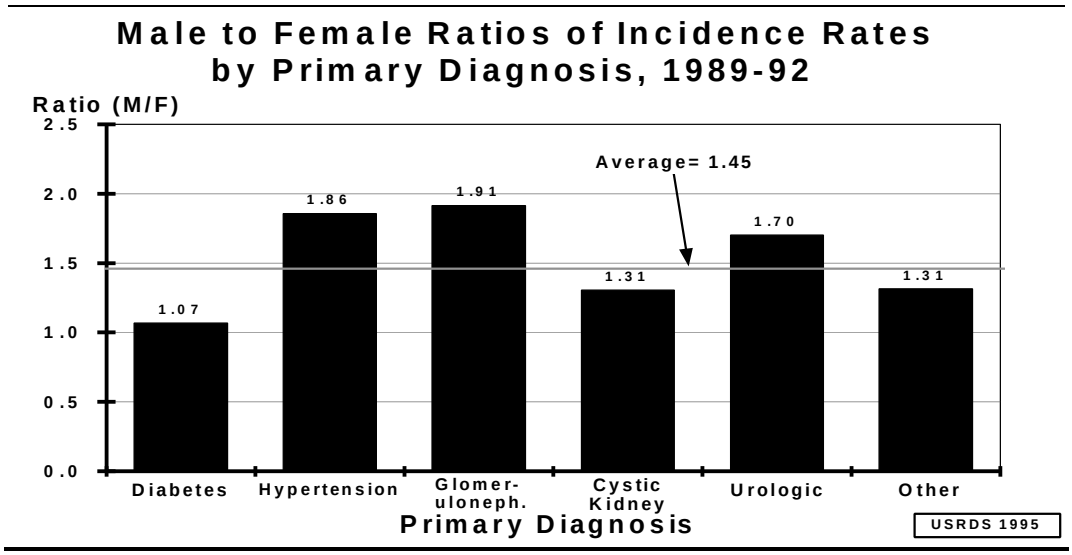

Figure III -11

Male to female ratios of treated ESRD incidence rates for selected primary diagnoses, 1989-92. Rates adjusted for age and race. Rates do not include patients in Puerto Rico or U.S. Territories. Medicare patients only. Source: Reference Tables A.14,A.15,A.16.

and Native Americans (Figure III-9) and is growing at double-digit rates in all race groups (Figure III-10).

The male-to-female sex ratio for diabetic ESRD is close to 1.0 and is much lower than the overall ESRD average (Figure III-11). As shown in Figure III-12, diabetic ESRD was uncommon before age 20-24 (Figure III-12). Thereafter, the incidence increased steadily to a peak at age 65-69 years.

The clinical diagnosis of diabetic nephropathy appears to be relatively accurate given the distinctive clinical features of diabetes and the associated nephropathy. In agreement with this general notion, the USRDS Data Validation Special Study found a 97 percent concordance between the reported diagnosis and the diagnosis determined by chart abstraction for diabetic ESRD (USRDS 1991).

Hypertension was the second most common reported cause of ESRD (Table III-1, Figure III-7). Furthermore, hypertensive ESRD has been increasing by 9.1 percent per year (Figure III-8). The reported incidence of hypertensive ESRD is three-to-six-fold higher for Blacks than for other race groups when adjusting for age and sex (Figure III-9; note log scale). Although hypertensive renal disease is more common in Blacks than in other racial groups, it also appears that physicians are more likely to list hypertension as the cause of ESRD in Blacks than Whites (Perneger 1993). Interestingly, hypertensive ESRD is growing fastest among Whites, Asian/Pacific Islanders, and, especially, Native Americans (Figure III-10). The male to female sex ratio is higher than average for hypertensive ESRD (Figure III-11). ESRD attributed to hypertension became quantitatively important in patients as young as 20 years-old (Figure III-12). The incidence rose steadily to peak at age 75-79. Hypertension was the most common ESRD diagnosis in patients older than 70 years.

The increase in hypertensive ESRD has been viewed with special interest given that the recognition and treatment of hypertension have improved over this time period and the incidence and mortality of other hypertension-related cardiovascular diseases have been decreasing. However, the clinical features of hypertensive ESRD are not distinct and the clinical diagnosis may be uncertain in individual cases.

Glomerulonephritis was the third ranked cause of ESRD (Table III-1, Figure III-7). As classified in the USRDS, this category includes primary causes of glomerulonephritis such as idiopathic membranous nephropathy, idiopathic focal glomerular sclerosis, IgA nephropathy, and undifferentiated chronic glomerulonephritis. Secondary causes of glomerulonephritis such as systemic lupus erythematosus and vasculitis are classified as collagen vascular diseases.

The proportion of total ESRD cases attributed to glomerulonephritis has decreased over the years. The absolute incidence of ESRD attributed to glomerulonephritis increased by just 1.1 percent per

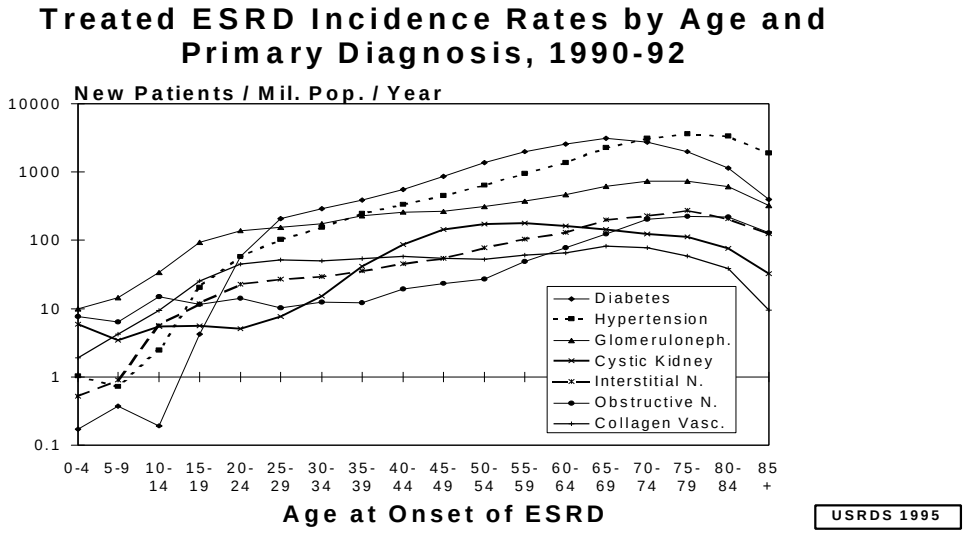

Figure III -12

Treated ESRD incidence rates by age and primary diagnosis, 1990-92. Semi-log scale. Rates are unadjusted. Rates do not include patients from Puerto Rico or U.S. Territories. Medicare patients only. Source: Special Analysis.

year from 1990-92 (Figure III-8). The incidence of glomerulonephritis was highest in Blacks, although to a much smaller extent than hypertension (Figure III-9). ESRD attributed to glomerulonephritis grew slowly for all racial groups except Asian/Pacific Islanders in whom growth was 8 percent per year. The male-to-female sex ratio was higher for glomerulonephritis than for any other major cause of ESRD (Figure III-11). Glomerulonephritis was the most common cause of ESRD until age 20-24 (Figure III-12). Thereafter, glomerulonephritis rose more slowly with age than did diabetes and hypertension.

The USRDS Data Validation Special Studies found a relatively low concordance of 77 percent between the reported diagnosis and the diagnosis abstracted from the medical record for this entity (USRDS 1991). It appears therefore that the diagnosis of glomerulonephritis is often made on clinical grounds. Even though it may be expected that a kidney biopsy would be most commonly done for a patient with suspected glomerulonephritis.

Together, diabetes, hypertension, and glomerulonephritis make up 77 percent of incident cases of treated ESRD. The remaining specific causes each constitute less than three percent of the total and are often combined in the "Other" disease category in various USRDS summary reports and tables. However, the incidence and growth rates for other attributed causes of ESRD are of interest and are discussed further below.

Cystic kidney disease is composed predominately of autosomal dominant adult polycystic kidney disease (ADPKD). Although ADPKD is often described as one of the most common human genetic diseases, only 2.9 percent of new ESRD cases were in the cystic disease category (Table III-1, Figure III-7). As a cause of ESRD, cystic disease grew by 3.7 percent per year between 1990 and 1992 (Figure III-8). While much lower than the overall rate of ESRD growth, the increase in this largely genetically determined category merits notice. The incidence and growth rates of ESRD due to cystic disease were very similar by racial groups except for Native Americans who showed a phenomenal 24 percent growth rate. This rate is based on small numbers and should be monitored for stability in the future. The male-to-female sex ratio was lower than average for cystic kidney disease. Although women and men have equal probabilities of carrying the polycystic gene, it appears that men are more likely to develop ESRD. Cystic kidney disease was an unusual cause of ESRD prior to age 30 or 40; many of these younger cases may have been due to cystic diseases other than ADPKD (Figure III-12). The incidence of ESRD attributed to cystic kidney disease was relatively stable after age 45 until the eighth decade.

Chronic interstitial nephritis was listed as the cause of ESRD in 2.9 percent of incident ESRD cases (Figure III-7) and grew by 3.5 percent per year (Figure III-8). Interstitial nephritis was less common in men than women (crude sex ratio 0.92). ESRD

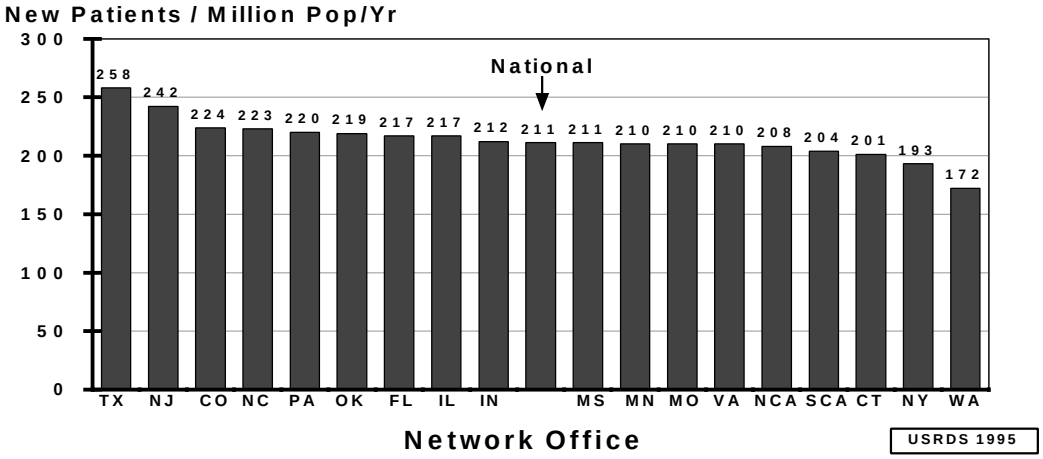

Figure III -13

Treated ESRD incidence rates by ESRD Network, 1992. Adjusted for age, race and sex. Rates do not include patients in Puerto Rico or U.S. Territories. Medicare patients only. Source: Reference Table A.36.

attributed to interstitial nephritis gradually increased with age, reaching a peak at 75-79 years (Figure III-12). Chronic interstitial nephritis is the lesion classically associated with analgesic nephropathy. Trends in this entity are of interest because of reports that acetaminophen and non-steroidal antiinflammatory agents may contribute to chronic renal disease in the way that phenacetin did before it was removed from the market (Sandler 1991; Sandler 1989; Perneger 1994). It is possible that some ESRD cases where analgesics were a primary or contributory factor were attributed to another diagnostic category such as hypertension.

Obstructive nephropathy accounted for 1.9 percent of new ESRD cases in 1992 (Figure III-7) and grew by 4.8 percent per year. The crude sex ratio was 3.0, reflecting the higher susceptibility of men to obstructive processes. Obstructive ESRD occurred at a stable, low rate until age 55-59 when the incidence increased (Figure III-12). The peak incidence occurred at age 75-79 years.

Collagen vascular disease is the category used for secondary causes of glomerulonephritis as well as scleroderma and the hemolytic-uremic syndromes. ESRD attributed to these entities increased by 7.7 percent per year, in pace with ESRD in general. Females predominated in this diagnostic category (crude sex ratio 0.41). ESRD due to collagen vascular diseases was quite stable from age 20 to 79 years (Figure III-12).

AIDS-related renal disease accounted for a small fraction of incident ESRD cases but has shown rapid growth of 43.6 percent per year between 1990 and 1992 (from 6.7 to 13.8 new patients per ten million population). AIDS-related ESRD was most common in men (crude sex ratio 4.9). Renal disease associated with AIDS or HIV positivity may be under-reported due to confidentiality laws and practices.

The primary cause of ESRD was reported as unknown for approximately 5 percent of 1990-92 incident patients. The category is composed of patients for whom the physician who filed the Medical Evidence Form indicated that the renal diagnosis was not known. In part, this category reflects differences in the criteria used by physicians to make a clinical diagnosis. For example, it is likely that similar patients could be diagnosed as hypertensive ESRD by one physician and as unknown by another.

The missing diagnosis category is used when the data were not provided on the Medical Evidence Form. Fortunately, fewer than 4 percent of ESRD cases were entered with a missing diagnosis.

Other causes of ESRD constituted 4.0 percent of new ESRD cases in 1992. This category should be distinguished from the broader "Other Cause"

Ranking of Treated ESRD Incidence Rates by Network and Year, 1988-92 Ordered by Rank in 1992[1]

ESRD Network	Year					Change in Rank, 88 vs 92
	1988	1989	1990	1991	1992	
(TX) Net. of Texas	2	1	1	1	1	+1
(NJ) Trans-Atlantic R. C.	3	3	3	2	2	+1
(CO) Inter-mountain ESRD Net.	4	4	13	4	3	+1
(NC) Southeastern Kidney Council	12	6	10	7	4	+8
(PA) ESRD Net. Org. #4	5	9	4	8	5	0
(OK) ESRD Net. #13	8	11	7	11	6	+2
(FL) ESRD Net. of Florida	7	10	12	10	7	0
(IL) Renal Net. of Illinois	10	8	5	5	8	+2
(IN) Tri-state R. N.	6	13	8	12	9	-3
(MS) Network 8	16	12	16	15	10	+6
(MN) Renal Net. of Upper Midwest	11	7	9	13	11	0
(MO) ESRD Net. #12	15	14	14	16	12	+3
(VA) Mid Atlantic R. C.	13	16	11	9	13	0
(N-CA) Trans-Pacific ESRD Net.	1	2	2	3	14	-13
(S-CA) Southern California Net.	9	5	6	6	15	-6
(CT) Net. of New England	17	15	15	14	16	+1
(NY) Net. of N.Y.	14	18	17	18	17	-3
(WA) Northwest Renal Net.	18	17	18	17	18	0

See Chapter II for a map of the 18 ESRD Networks.

[1]Incidence rates are adjusted for age, sex and race.

Table III-2

category used in tables and reports in this *ADR* for comparisons with diabetes, hypertension and glomerulonephritis.

Geography

The adjusted incidence of treated ESRD varies across geographic boundaries. Geographic variation is illustrated by comparison of the incidence rates of ESRD for each of the 18 ESRD Networks in the U.S. (Figure III-13). There is substantial variation in incidence rates, ranging from a high of 258 patients per million population for the Network of Texas (TX) to a low of 172 new patients per million in the Northwest Renal Network (WA).

Incidence counts and adjusted rates have been calculated by state and by ESRD Network for each year from 1983 to 1992 (Reference Tables A.32-A.39). This is the first *ADR* to include longitudinal data on incidence by geographic region to allow comparisons of trends over time. As shown by Network in Table III-2, there are geographic patterns of ESRD incidence that are fairly consistent from year to year between 1988 and 1992 when adjusting for age, sex and race. For several Networks the ranking is consistently high (TX, NJ) or low (WA, NY, CT) over the five-year period. Overall the net change in rank from 1988 to 1992 is relatively small in most cases, varying within +/-1 for 9 of the 18 Networks despite some year-to-year fluctuations. For a few Networks there is substantial variation from year to year, most notably a sharp decline in 1990 for the Inter-mountain ESRD Network (CO) and in the most current year, 1992, for the Trans-Pacific (N-CA) and Southern California (S-CA) Networks. Further study will be required to determine whether these trends for N-CA and S-CA in particular are indicative of long-term trends.

Variation in ESRD incidence has also been demonstrated at the state and county levels (Rosansky 1990; Foxman 1991; Moulton 1992; Young 1994). The contribution of geographic differences in population demographics (age, race, and sex) should be minimized by the current adjustment procedure. Geographic variability could arise from differences in access to ESRD care, medical practice, environmental

factors or random variation. The apparent consistency of certain geographic effects over time suggests a social or biologic mechanism rather than random variation.

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