
Characteristics of Connecticut Patients Receiving Services for End-Stage Uremia

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KIDNEY DISEASE affects approximately 8 million people in the United States, causing about 60,000 deaths annually (1). According to the National Kidney Foundation, the disease ranks as the fourth major cause of death, and related diseases of the genito-urinary system are the second most frequent cause of work loss; in addition, 3 million people are estimated to have unrecognized or undiagnosed kidney disease in this country (2).

Increased concern about kidney disease led to the establishment of the Committee on Chronic Kidney Disease, and the committee's final work, the Gottschalk report, is a comprehensive document containing information and data on incidence, prevalence, treatment modalities, aspects of prevention, sources of financing patient care, and the economic dimensions of kidney disease problems (3). In the report's recommendations, a national program for kidney disease treatment was outlined. In 1970, Hallan and Harris (4) published information about the potential populations of those with end-stage kidney disease for whom treatment programs must be planned.

More recently, Congress passed Public Law 92-603, the Social Security Amendments of 1972. Section 299-I defines chronic renal disease as a disabling condition and allows Social Security payments for maintenance

hemodialysis and for kidney transplants. The Social Security financing mechanism for renal disease serves to promote areawide or regional treatment centers.

Program planning for chronic kidney disease patients in the United States and elsewhere has been of concern,

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especially within recent years (5-9). Increased demand for hemodialysis programs and transplants suggests the need for regional organization of existing and future services. Basic to program and financial management planning is the necessity to characterize the population of patients who use chronic hemodialysis services.

Definitions

Before the objectives and methodology of the study are discussed, some terms used in the paper should be defined.

END-STAGE KIDNEY DISEASE. Progressive and irreversible renal destruction which is ultimately fatal without the intervention of dialysis or a kidney transplant.

UREMIA. Symptomatic renal failure which occurs when the kidneys are no longer able to excrete the waste products of metabolism and properly adjust the urinary excretion of water, salt, or other electrolytes. Uremia may result either from primary kidney disease or from secondary involvement of the kidneys in generalized diseases, especially hypertension and diabetes mellitus.

HEMODIALYSIS. A process that passes blood laden with nitrogen wastes through an artificial kidney. The artificial kidney removes these wastes while leaving the functional components of the blood intact. All artificial kidneys alter blood composition by exchanges with dialyzing fluid across a semi-permeable membrane, usually cellophane or suprophane, which may be in a tubule or coil form or may be flat. Electrolytes, water, urea creatinine, uric acid, and other diffusible substances that are byproducts of metabolism are transferred across the membrane between the blood and dialysate (dialyzing fluid). With dialysate of appropriate composition and with sufficient time for the exchange to occur, blood composition may be returned to normal.

MAINTENANCE DIALYSIS. The long-term therapy received by the patient awaiting a transplant.

CHRONIC DIALYSIS. Long-term therapy instituted for the rest of the patient's life or preferably until a successful transplant is achieved.

LIMITED CARE DIALYSIS. Usually carried out in a satellite unit located in a community hospital, multispecialty clinic building, or physician's office. In a satellite unit, the patient is assisted by trained personnel. Such care is usually provided patients who are not physically or psychologically suited for home care or who do not have a home environment that would support home dialysis care. The patient is trained to do the same procedures performed by home dialysis patients; for example, record body weight, blood pressure, temperature, and pulse rate, do self-venous punctures, and carry out maintenance of the dialysis machine.

Objectives and Methodology

Objectives. The specific objectives of this research are (a) to describe major characteristics of patients receiving end-stage uremia services with a focus on receivers of chronic hemodialysis and (b) to describe the use of services by major type of treatment modality.

Study setting. Data from this study are limited to Connecticut because the State's geographic size and the number of inpatient facilities were compatible with the financing and manpower constraints of the project. Generalizations from the study's findings, therefore, are not appropriate for other settings. Nonetheless, considerable insights can be gained about the subject matter under study.

Connecticut, with a 1972 population of 3.09 million, is among the most densely populated States in the nation (625 persons per square mile). The State is divided into 10 health service areas and has 36 non-Federal general hospitals for acute care; all are accredited by the Joint Commission on the Accreditation of Hospitals. In addition, there are 13 chronic disease and mental health facilities, three Veterans Administration hospitals, two health centers operated by the military services, and more than 200 licensed extended care or nursing home facilities.

Methodology. Data were obtained for all patients with end-stage uremia who were treated in Connecticut hemodialysis programs. The study period approximated 7 years from January 1, 1966, when the first programs were initiated, through November 30, 1972.

The Kidney Disease Foundation of Connecticut assisted in the identification of all facilities providing hemodialysis treatment services during the study period. Information was collected from each facility through (a) mail survey questionnaires, (b) interviews with medical facility professional and administrative personnel, (c) onsite observation of therapy units, and (d) a review of patient records. The responses to survey questionnaires provided information which allowed a general profile to be developed for each health care facility with operational capability for treatment of chronic kidney disease.

Results

Study findings are presented in three general areas. The first provides information about the number of patients and their residence, age, sex, and race. The second area is the utilization of services by type of treatment modality and the duration of time in dialysis. The third data area concerns the patients who received transplants.

Number of patients. A total of 353 patients with end-stage uremia were served by 12 chronic hemodialysis programs from January 1, 1966, through November 30, 1972 (table 1). Of this total, 103 patients died, 37 had successful kidney transplants and discontinued dialysis

Table 1. Patients with end-stage renal disease, Connecticut, 1966-72¹

Year	New patients	Patients carried over from previous year	Total patients treated during year	Deceased patients	Successful and deceased transplant recipients	Patients in treatment at year's end
1966	1		1			1
1967	10	1	11			11
1968	26	11	37	9	4	24
1969	40	24	64	14	7	43
1970	69	43	112	20	11	81
1971	76	81	157	24	13	120
1972	131	120	251	22	17	212
Total	353					

¹Nov. 30, 1972.

treatment, and the remaining 212 were actively receiving dialysis as of November 30, 1972; information for 1 patient was not available.

Hallan and Harris (4) estimated the number of annual potential hemodialysis patients in the 15-54 year age group to be between 67 and 84 per million population. Because the number of new patients aged 15-54 entering Connecticut programs during the first 11 months of 1972 (131 or 79 per million) is consistent with the Hallan and Harris estimates, it is suggested that Connecticut is in the unique position of providing adequate services for the population in need. This hypothesis is further supported by the results of a study which indicated the underutilization of available treatment services in the State; as of November 30, 1972, utilization of resources ranged between 66-84 percent (10). Connecticut, therefore, is probably one of the few States where hemodialysis services are not in short supply, given the claims regarding the national lack of hemodialysis services.

If one uses Connecticut's 598 deaths from renal-related diseases in 1968 as a base—a mortality of 20.2 per 100,000 (7)—the gross estimate for the entire study period is 4,200 deaths from renal-related disease among Connecticut residents. Not all of these persons had end-stage uremia, required hemodialysis treatment, or would have made suitable hemodialysis patients. Nevertheless, with only 353 patients actually receiving treatment, it appears that only in recent years have facilities been developed to meet State needs adequately.

Seventy patients among the 353 received kidney transplants. Successful transplants numbered 37; of the 33 remaining patients, 15 died and 18 returned to dialysis. As used in this study, the term "successful transplant" means that the patient had a functional transplanted kidney as of November 1972.

Table 2 shows the distribution of all patients treated for end-stage renal disease in Connecticut during 1966-72 and the caseload rate per million population

Table 2. End-stage renal disease patients and caseload per million population, by health service area, Connecticut, 1966-72

Health service area ¹	Total 1966-72		Active as of Nov. 30, 1972		Per million population ²
	Number	Percent	Number	Percent	
All areas	*353	100.0	*212	100.0	69
Greater Bridgeport	56	15.9	32	15.1	102
Housatonic Valley	20	5.7	13	6.1	92
South Central	75	21.3	49	23.1	84
Central Naugatuck Valley	37	10.5	15	7.1	69
Capitol	95	26.9	60	28.3	67
Southeastern	18	5.1	14	6.6	62
Southwestern	24	6.8	16	7.5	48
Mid-State	9	2.6	5	2.4	43
Northeastern	7	2.0	4	1.9	32
Northwestern	7	2.0	1	.5	12

¹Health service area is area of patient's residence.

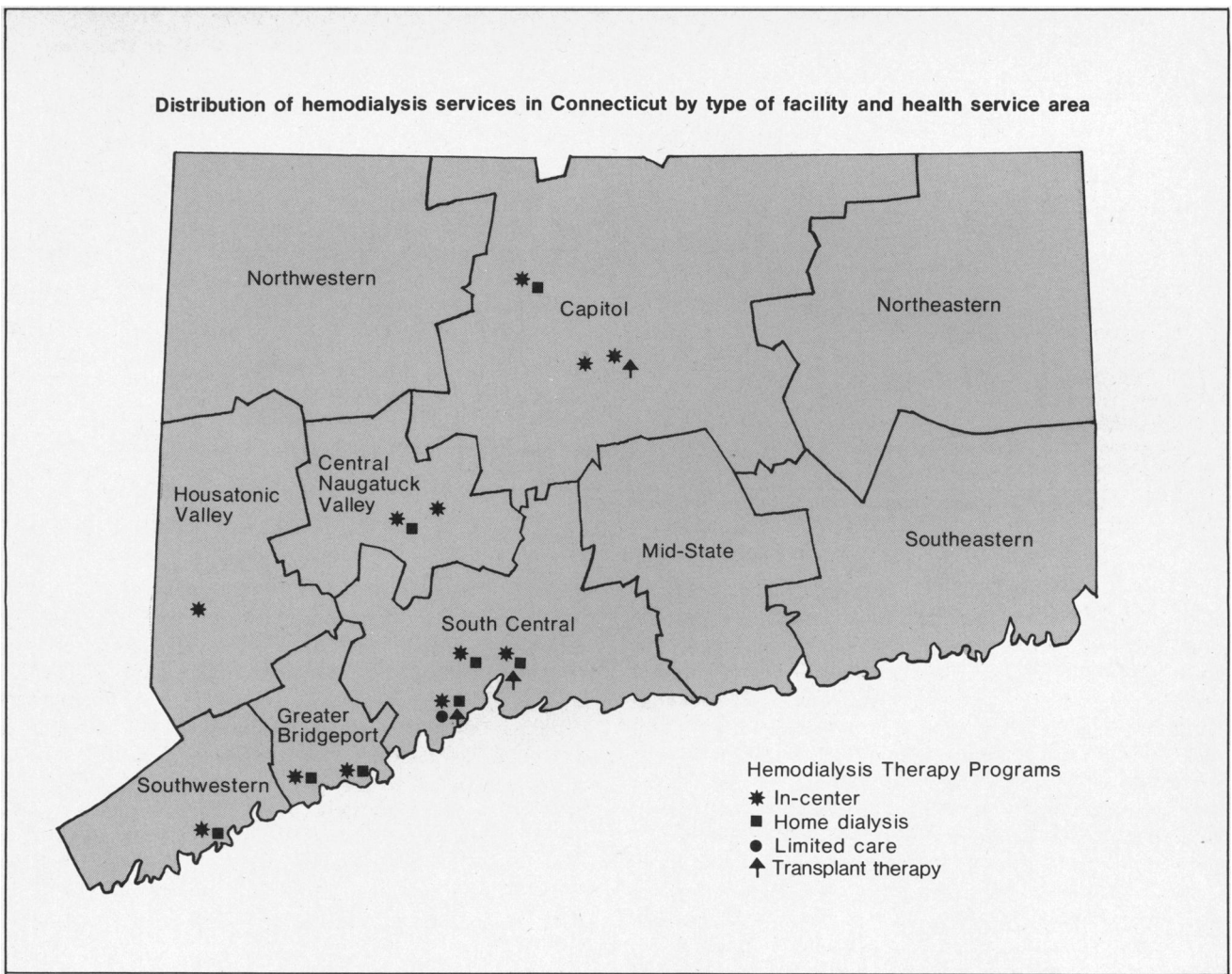
²Based on U.S. Census population data for 1970.

*Includes 5 patients not residing in Connecticut.

⁴Includes 3 patients not residing in Connecticut.

NOTE: Percents may not total because of rounding.

Distribution of hemodialysis services in Connecticut by type of facility and health service area



for the 10 health service areas (HSAs). Of the total, 348 were Connecticut residents; 3 lived in Massachusetts, 1 in Maine, and 1, a native of Ecuador, came to Connecticut specifically to receive 6 months of training in home dialysis. The largest number of patients resided in the Capitol HSA (greater Hartford), followed by those living in the South Central HSA (greater New Haven) and the greater Bridgeport area. As one might expect, these HSAs are among the highly industrialized and densely populated areas of the State. It should be emphasized that the patient's health service area of residence, not the location where he received end-stage kidney disease services, is shown in table 2.

The 212 patients active as of November 30, 1972, represent a caseload for the State of 69 per million population. The "active" patient population is actually a composite of two types of patients. Some have participated in hemodialysis programs since the early years of the study. A larger number entered treatment programs during 1972 and, therefore, had a slightly higher probability of dying during their initial year on hemodialysis. Lewis and co-workers (11) reported that

the survival rate for patients undergoing hemodialysis approximated a "constant geometric function" over time. They reported survival rates of 87 percent, after 1 year of hemodialysis, 77.3 percent after 2 years, and 67.4 percent after 3 years. Unfortunately, similar data are unavailable for the hemodialysis patients in Connecticut.

Treatment units and patient origins. Only 6 of the 10 HSAs have end-stage uremia services (see chart). Table 3 shows the distribution of treatment units, the units per million population, residence of patients, and where they obtained uremia services. A treatment unit is the hospital bed the patient occupies during dialysis, but it may also include other devices such as a hospital stretcher or reclining lounge chair. As of November 1972, the State's 64 treatment units were located in 12 dialysis programs. The patient capacity of each program was dependent upon such unique operating characteristics as number of available units, staffing levels, and the hours per week that hemodialysis treatments were provided.

Table 3. Distribution of treatment units and patients and treatment units per million population, by health service area, Connecticut, 1972

Health service area	Treatment units			Patients			
	Number	Percent	Per million population ¹	Residing in HSA		Received care in HSA	
				Number	Percent	Number	Percent
All areas	64	100.0	21	² 209	100.0	³ 212	100.0
Greater Bridgeport	12	18.7	38	32	15.3	49	23.1
Housatonic Valley	5	7.8	35	13	6.2	13	6.1
South Central	21	32.8	36	49	23.4	58	27.4
Central Naugatuck Valley	6	9.4	27	15	7.2	15	7.1
Capitol	16	25.0	18	60	28.7	69	32.5
Southwestern	4	6.2	12	16	7.7	8	3.8
Southeastern				14	6.7		
Mid-State				5	2.4		
Northeastern				4	1.9		
Northwestern				1	.5		

¹Based on 1970 U.S. Census data. ²Connecticut residents only. ³Includes 3 nonresidents.
NOTE: Percents may not total 100 because of rounding.

As expected, the HSAs containing large medical centers and teaching hospitals have the greatest percentage of units. Almost one-third of all units are in the South Central HSA, which contains the Yale-New Haven Medical Center/Veterans Administration end-stage kidney disease program; the largest number of individual treatment units, 14, are at the West Haven Veterans Administration Hospital. One-fourth of the units are in the Capitol HSA, the site of another major teaching medical center and of Hartford Hospital's end-stage renal disease program.

For the most part, the HSAs with the greatest percentage of active patients also have the greatest percentage of treatment units. The Capitol HSA had the greatest percentage of active patients (26.9), but it ranked second in the percentage of units; these rankings were reversed for the South Central HSA.

The rate for the State was 21 treatment units per million population. The range for individual health service areas was from 12 to 38; four of the six HSAs with chronic hemodialysis capability exceeded the rate for the State.

Table 3 also provides some insight into the patients' travel patterns for dialysis services. Although 15 percent of the patients resided in the greater Bridgeport HSA, dialysis programs in that area provided care to more than 23 percent of all Connecticut patients. Similarly, the number of patients treated in the South Central and Capitol health service areas, traditional referral centers in the State, was greater than the number of patients residing in those HSAs.

About 85 percent of the patients residing in the Southwestern and greater Bridgeport HSAs received treatment at two hospitals in the Bridgeport HSA and at the sole hospital in the Southwestern HSA. Of 58 patients living in the South Central HSA, about 70 percent obtained service within the HSA. The remaining 30 percent traveled out of the service area to the two hospitals with chronic hemodialysis programs in the

greater Bridgeport HSA. Sixty percent of patients residing in the mid-State HSA were dialyzed at facilities in the South Central HSA, and the remaining 40 percent obtained treatment in the Capitol HSA.

The Yale-New Haven/Veterans Administration program provided therapy to about 57 percent of patients from the Southeastern HSA, and the remainder went to facilities in the Capitol health service area. Over 90 percent of dialysis patients who reside in the Housatonic Valley HSA obtained care there; similarly, nearly 94 percent of patients in the Central Naugatuck Valley HSA received dialysis in that area. Among the patients living in the Capitol

Table 4. Summary of chronic hemodialysis programs, Connecticut, as of November 30, 1972

Health service area and program	Number of treatment units	Full-time equivalent staffing ¹	Average hours per week program operated
Greater Bridgeport:			
Bridgeport Hospital	7	6.4	88
St. Vincent's Hospital	5	4.7	80
Housatonic Valley:			
Danbury Hospital	5	5.1	42-48
South Central:			
Yale-New Haven Hospital .	4	8.6	64-80
St. Raphael's Hospital	3	3.1	² 40
VA Hospital-West Haven ..	14	18.8	66
Central Naugatuck Valley:			
Waterbury Hospital	3	2.9	69
St. Mary's Hospital	3	3.3	54
Capitol:			
Hartford Hospital	10	0	112
St. Francis Hospital	4	4.2	70
McLean Home	2	1.4	42-48
Southwestern:			
Norwalk Hospital	4	1.7	40

¹Includes physicians, nurses, and technicians. Excludes private duty personnel.
²Hours are understated because home training is carried out as a second shift.
NOTE: No programs were actively operating in the Southeastern, Mid-State, Northeastern, and Northwestern Health Service Areas on Nov. 30, 1972.

health service area, 76 percent received therapy from programs in that area, and 15 percent traveled to the South Central HSA to receive dialysis at the Veterans Administration Hospital. Operational characteristics of the State's 12 dialysis programs are summarized in table 4.

Age. The age distribution and mean age for all patients and for the 212 active patients are shown in table 5. The mean age for all patients approximated 43 years, compared with a mean of 43.6 years for active patients. The modal age group was 40-44 years for all patients compared with the 50-54 year modal age group for active patients.

No infants or preschool children were identified as receiving services from chronic hemodialysis programs. Although 12 persons of high school age (15-19 years) received dialysis during the study period, only half were active patients in late 1972. In the aggregate, just over 5 percent of the total patients were of school age compared with 4.7 percent of the active patients. Persons between 20 and 64 years (college and working age population) numbered 326 during the entire study compared with 195 of the active patients. About 5 percent of all patients were under age 20, more than a fourth were under age 35, about one-half were under age 45, and about two-thirds were under 50. About 3 percent of the patients were 65 or older.

The mean age for the 103 patients who died was 44.5 years; the mean age of the active patients, 43.6 years, was about 1 year less. The modal age group of deceased patients was 40-44 years. Deaths in this age group represented slightly less than one-fourth of all patients who died during the 7 years. Of all deceased patients almost 25 percent died before age 35, slightly more than half before age 45, and more than two-thirds before age 50 (table 6).

Sex. Data on the sex of all patients and the group of 212 active patients follow:

Sex	Number	Percent
Total patients	353	100
Males	211	60
Females	142	40
Active patients	212	100
Males	120	57
Females	92	43
National Dialysis Registry ¹	7,437	100
Males	4,741	64
Females	2,696	36

¹Jan. 1, 1973.

The mean ages for the total group were 44 years for males compared with 41 years for females. For the active patients, the mean age of the males was 45 years and the females, 41 years. A comparison of the Connecticut dialysis patients with those on the National Dialysis Registry shows that the State has a smaller percentage of males in chronic dialysis programs (12).

Sixty-five (31 percent) of the 211 males in dialysis programs died between 1966 and 1972. The corres-

Table 6. Age distribution of 103 deceased patients, Connecticut, 1966-72

Age group (years)	Number	Percent	Cumulative	
			Number	Percent
10-14	1	1.0	1	1.0
15-19	2	1.9	3	2.9
20-24	5	4.9	8	7.8
25-29	6	5.8	14	13.6
30-34	11	10.7	25	24.3
35-39	6	5.8	31	30.1
40-44	25	24.3	56	54.4
45-49	13	12.6	69	67.0
50-54	16	15.5	85	82.5
55-59	7	6.8	92	89.3
60-64	9	8.7	101	98.1
65-69	2	1.9	103	100.0

NOTE: mean=44.5; variance=152.7; standard deviation = 12.4.

Table 5. Distribution of patients by age, Connecticut, 1966-72

Age (years)	Total patients ¹				Active patients as of Nov. 30, 1972 ²			
			Cumulative				Cumulative	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
5-9	2	0.6	2	0.6	1	0.5	1	0.5
10-14	4	1.1	6	1.7	3	1.4	4	1.9
15-19	12	3.4	18	5.1	6	2.8	10	4.7
20-24	24	6.8	42	11.9	15	7.1	25	11.8
25-29	27	7.6	69	19.5	15	7.1	40	18.9
30-34	32	9.1	101	28.6	16	7.5	56	26.4
35-39	32	9.1	133	37.7	23	10.8	79	37.3
40-44	62	17.6	195	55.2	32	15.1	111	52.4
45-49	47	13.3	242	68.6	26	12.3	137	64.6
50-54	56	15.9	298	84.4	38	17.9	175	82.5
55-59	27	7.6	325	92.1	20	9.4	195	92.0
60-64	19	5.4	344	97.5	10	4.7	205	96.7
65-69	7	2.0	351	99.4	5	2.4	210	99.1
70-74	1	.3	352	99.7	1	.5	211	99.5
75-79	1	.3	353	100.0	1	.5	212	100.0

¹N = 353; mean = 42.9; variance = 175.3; standard deviation = 13.2. ²N = 212; mean = 43.6; variance = 180.1; standard deviation = 13.4

Table 7. Distribution of patients by ethnicity, Connecticut, 1966-72

Ethnicity	Total patients		Active patients		Deceased patients	
	Number	Percent	Number	Percent	Number	Percent
Total	353	100.0	212	100.0	103	100.0
White	286	81.0	166	78.0	86	83.0
Puerto Rican	7	2.0	3	1.0	2	2.0
Nonwhite	67	19.0	46	22.0	17	17.0
Black	65	18.4	44	21.0		
Oriental	1	.3	1	.5		
American Indian	1	.3	1	.5		

NOTE: Percents may not total because of rounding.

ponding figures for females are 38 persons (27 percent) of a population of 142.

Race and ethnicity. Nineteen percent of the total patient population and 22 percent of the active patients were nonwhite. This nonwhite caseload of both total and active patients appears high compared with Connecticut's 1970 nonwhite population of only 6 percent (table 7). The average age for all white patients was 43 years, compared with 41 years for the nonwhite group.

Treatment modality. Table 8 provides information about types of treatment modality. Most frequently used was in-center dialysis; more than 83 percent of all patients and 78 percent of the active patients received such care. More than a fifth of all active patients received home dialysis, compared with 16 percent of the total patients. The number of patients on home dialysis increased over the 7 years as more facilities instituted training programs. The literature contains many references to the potential for limited care dialysis, particularly in reducing patient cost and providing flexibility of scheduling. During the period under study, however, only one patient was obtaining dialysis from a limited-care program.

Among both total and active patient populations, more males than females used home dialysis. Similarly, more whites than nonwhites used home dialysis.

Length of time in dialysis. The number of months the active patients were receiving dialysis follows:

Months in dialysis ¹	Number	Percent
Total	212	100.0
Under 7	60	28.3
7-12	51	24.1
13-18	17	8.0
19-24	28	13.2
25-30	18	8.5
31-36	12	5.7
37-42	9	4.2
43-48	2	.9
49-54	5	2.4
55-60	7	3.3
61-66	2	.9
67-72	1	.5

¹ As of Nov. 30, 1972.

The greatest percentage of patients (28.3 percent) had been in dialysis less than 7 months; 24.1 percent had been dialyzing between 7 and 12 months; and 13 percent were in dialysis between 19 and 24 months. The average dialysis time for the 212 active patients was 17 months. One person had been receiving dialysis treatments for almost 6 years.

More than half of the active patients had been in dialysis a year or less, and 73.6 percent had been dialyzing for 2 years or less.

Transplant patients. Among the 353 patients treated in the chronic hemodialysis programs in Connecticut, 20 percent received kidney transplants. Slightly more than one-half (53 percent) of these 70 transplant patients survived surgery and had successfully functioning transplants at the conclusion of the study period. Of the 33 unsuccessful transplants, 45 percent of the patients

Table 8. Distribution of patients by type of treatment modality, Connecticut, 1966-72

Treatment modality	Total patients		Active patients		Deceased patients	
	Number	Percent	Number	Percent	Number	Percent
All modalities	353	100.0	212	100.0	103	100.0
In-center ¹	294	83.3	165	77.8	98	95.1
Home-dialysis ²	58	16.4	46	21.7	5	4.9
Limited care dialysis ³	1	.3	1	.5		

¹Treatment in a center where therapy is provided by trained staff who are completely responsible for administering and monitoring the patient's dialysis.

²Performed by the patient usually assisted by a family member, after appropriate

training. During the training period, patients receive in-center dialysis treatment. ³See description in Definitions section.

had died and 55 percent returned to dialysis. Eighty-seven percent of the patients receiving transplants had previously used in-center hemodialysis programs, and 12 percent had dialyzed at home. One patient had had no dialysis to treat chronic uremia but subsequently entered a hemodialysis program because of kidney rejection.

The age distribution of those who received kidney transplants follows:

Age group (years)	Number	Percent
All ages	70	100.0
Under 11	1	1.4
11-20	6	8.6
21-30	17	24.3
31-40	15	21.4
41-50	25	35.7
51-60	6	8.6

About 36 percent were in the 41–50 age group, about a fourth were in the 21–30 group, and more than a fifth were 31–40 years old. Ninety-one percent of the transplant patients were 50 or younger. Thirty-eight males received transplants compared with 32 females; 58 of the group were white and 12, nonwhite.

Information on the number of months their transplanted kidneys had continued to function was available for 31 patients; the average period was 17 months, as of November 30, 1972. This period is similar to the length of time patients who had not received transplants had been in dialysis. The median for them was about 1 year, and the longest period was 53 months. The distribution of patients, by months their transplants had continued to function, follows:

Months transplant had functioned	Number	Percent
Total	31	100.0
Under 7	7	22.6
7-12	6	19.3
13-18	4	12.9
19-24	6	19.3
25-30	3	9.7
31-36	3	9.7
37-42	0
43-48	1	3.2
49-54	1	3.2

¹Information not available on 6 patients.

NOTE: Percents may not total because of rounding.

Discussion

A basic element in planning and developing treatment programs is knowledge of the population to be served. This study has attempted to provide some insight into the demographic and program characteristics of chronic hemodialysis patients by characterizing those who entered programs in Connecticut during the first 7 years that such services were available. Although this patient population is not truly representative of current or future populations because of modifications in selection criteria and Federal financing, the findings provide baseline data on which policy directives can be based.

Since the inception of the first Connecticut program in 1966, more than 350 patients were treated for chronic renal disease; 212 patients were active as of November 1972. Although the absolute number of kidney transplants increased each year, the percentage of patients removed from dialysis through renal transplantation declined, suggesting that the rate of new dialysis patients entering programs in the State increased at a higher rate than transplantation. These findings typify the problems encountered in attempting to treat chronic renal disease. By the end of the study in 1972, slightly less than two-thirds of the patients continued to be dependent on dialysis. Renal transplants depend upon the availability and suitability of donor kidneys, and the supply has not been able to keep pace with the increasing patient load. The majority of end-stage uremia patients, therefore, are relying on dialysis treatment.

The greatest number of renal disease patients resided in the three most densely populated health service areas. Similarly, the largest number of treatment units are found in these same service areas. Hemodialysis services appear to be concentrated in the urban regions of the State. Fewer patients reside in rural locales and have fewer treatment units available. Although it may be more economical to have in-center dialysis programs concentrated in the more densely populated areas, the distribution creates hardships for patients who must travel long distances for dialysis. Similarly, the focus of individual programs varies, causing some patients to obtain services from programs outside their health service area.

Only 16 percent of the hemodialysis patients received ongoing care at home. Although this percentage was slightly higher among active patients (22 percent), the majority of patients traveled to institutional settings for dialysis treatment.

In terms of long-range planning, these findings suggest a need to increase home dialysis services. Federal reimbursement for hemodialysis, modifications in the criteria for the selection of suitable dialysis patients, and increased physician awareness will undoubtedly increase the number of patients seeking dialysis treatment in future years. Without provisions to enlarge the capabilities for home dialysis treatment, the accumulation of in-center patients will inevitably overburden existing programs.

To increase the number of home dialysis patients, more facilities for training patients are needed. Not all dialysis patients are physically or psychologically suited for home-care dialysis; however, it is impossible to expect an increase in the number of patients in home treatment without setting up training centers for such persons and their families.

Federal reimbursement for hemodialysis, via P.L. 92–603, places an emphasis on regional centers not only as the place where patients receive hemodialysis treatment but, more important, where patients can be trained in home dialysis care.

In addition to increased emphasis on home care, planners should consider the particular needs of special groups of patients. Although there were fewer nonwhites than whites in the patient population, the caseload for nonwhites appeared high in relation to the size of the State's nonwhite population, and women seemed to develop end-stage renal disease at an earlier age than men. It is the impression of those staffing chronic hemodialysis centers that women and nonwhite patients had poorer rehabilitation experiences, perhaps as a result of the emphasis on in-center treatment, which was more inconvenient for these two groups. Financial limitations and lack of opportunity to continue scheduled rehabilitation activities might have been additional contributing factors.

Renal transplantation is not an unusual procedure today. The results of this procedure in the population studied were somewhat mixed. Of the 353 patients, 70 received kidney transplants, and 53 percent of the transplants were successful, but less than 11 percent of the total group had successful transplants. It is generally held that transplantation is the optimal treatment of choice; however, until more kidneys become available for transplantation and the operation is more successful, greater emphasis should be placed on home and limited care dialysis. Such modalities are both less costly and more convenient for the patient than in-center dialysis.

Medically and economically, the best solution to chronic renal disease would be the prevention of uremia. Until this goal is attainable, a coordinated and comprehensive chronic kidney disease program is dependent on an accurate assessment of demand for chronic kidney disease services and the analysis of the nature and needs of this demand. It is hoped that our

report provides some insights upon which to base planning and decision making.

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SYNOPSIS

PEARSON, DAVID A. (Yale University School of Medicine), **STRANOVA, THOMAS J.**, and **THOMPSON, JOHN D.**: *Characteristics of Connecticut patients receiving services for end-stage uremia. Public Health Reports. Vol. 90, September-October 1975, pp. 440-448.*

Data are presented on the characteristics of all patients with end-stage uremia who were treated in Connecticut hemodialysis programs over a 7-year period. Of the total of 353 patients, 103 patients died, 37 had successful transplants and discontinued dialysis, no information was

available for one patient, and the remaining 212 patients continued to receive treatment in 1 of the 12 hemodialysis programs.

The mean age of active chronic hemodialysis patients was 43.6 years; about 83 percent of all active patients were under age 55. Twenty-two percent were nonwhite; the nonwhite caseload appeared high in relation to the percent of nonwhite population.

Of the 212 active patients, 78 percent were dialyzed at in-center programs and 22 percent at home; one patient obtained dialysis from a new limited-care program.

The largest group (28 percent) of active patients had been in dialysis less

than 7 months, about one-fourth had been dialyzing for 7-12 months, and about 13 percent of the total active population had been in dialysis between 19 and 24 months. The average period for active patients to be in dialysis was 17 months.

The advent of Federal reimbursement for hemodialysis, as well as changes in the criteria for the selection of patients and increased physician awareness, can result in significant increases in the future population of patients receiving dialysis. To prevent overburdening of existing in-center programs, expansion of training facilities statewide for home-care dialysis is suggested.