Treatment Status

Prior to the development of successful treatment for kidney failure, the deterioration of kidney function was almost always fatal. During the 1960s and early 1970s, the artificial kidney machine, peritoneal dialysis, and kidney transplantation became viable and practical treatment options for ESRD patients. All of these treatments are widely available today, allowing ESRD patients effective, long-term treatment choices.

Advances in the field of renal replacement therapy have continued, including the use of living and cadaveric organs for transplantation, effective immunosuppressive drug therapies, peritoneal dialysis methods, and more efficient and practical techniques for improving the life expectancy and quality of life for ESRD patients. This section provides an overview of the treatment modalities available to ESRD patients and reports on modality information for the KHC population.

Treatment Choices

It was not until the early 1940s that Dr. Willem Kolff invented the first dialysis machine. Although this led to lifesaving treatment, the first dialyzer operated slowly and unsanitarily. Since then, nephrologists have made great strides in the treatment of kidney disease. Today, there are two types of dialysis available for the treatment of ESRD, hemodialysis and peritoneal dialysis.

Hemodialysis

Hemodialysis cleans and filters the blood through the use of an artificial kidney machine, or dialyzer. It removes toxins, harmful wastes, and excess salts and fluids from the blood. It also controls blood pressure and helps the body keep the proper balance of electrolytes. Hemodialysis is a process in which the patient's blood travels through tubes into a dialyzer through a vascular access site to clean the blood. After the dialyzer filters the wastes and excess fluids, the newly cleansed blood is returned to the patient's body through another set of tubes.

Although hemodialysis is performed mainly in dialysis centers, it can also be done at home with the assistance of a trained person. Hemodialysis (in-center and home) is usually performed three times a week and each treatment lasts between three to five hours.

Peritoneal Dialysis

Peritoneal dialysis (PD) is another procedure that replaces the work of the kidneys. Peritoneal dialysis uses the lining of the abdomen (peritoneum) to filter toxins from the bloodstream. Using a surgically implanted catheter, the abdominal cavity is filled with dialysate fluid. The peritoneum acts as a membrane, drawing out toxins from the blood and into the dialysate-filled abdominal cavity. The dialysate fluid is then removed from the abdominal cavity after a certain period of time, which varies by patient and the method of peritoneal dialysis used.

Two peritoneal dialysis methods are currently used. The most common type is ***Continuous Ambulatory Peritoneal Dialysis*** (CAPD). With CAPD, the blood is constantly being cleansed. The patient manually inserts the dialysate fluid into the abdomen through a catheter and replaces it with a fresh supply once the cleansing process has completed. The process is performed several times during the day, typically four to six hours per exchange. CAPD does not require the use of a machine.

Continuous Cycling Peritoneal Dialysis (CCPD) is much like CAPD except that it uses a programmed machine (cycler) to fill the abdomen with dialysate, and then it drains the fluid after the exchange, or cycle, has occurred. Each cycle takes about 45 minutes and is done multiple times throughout the night while the patient is sleeping.

Kidney Transplantation

Kidney transplantation is another treatment modality available for the treatment of ESRD. Transplantation is the surgical placement of a donor's healthy kidney into the body of the recipient.

Kidney donors are classified as either living-related or living-unrelated to the recipient, or deceased donors. A living donor is a person who has two functioning kidneys, and voluntarily donates one of them to a recipient. Deceased donors are individuals who have suffered the irreversible loss of all functions of the brain, but whose major organ functions are being artificially sustained by mechanical support until transplantation into the recipient is accomplished.

After transplantation the immune system will try to fight off, or reject, the new kidney. To counteract organ rejection, transplant recipients must take immunosuppressive, or anti-rejection drugs for life. These drugs suppress the body's immune system by decreasing the natural defenses to foreign bodies so that the body will not try to destroy the new kidney.

Great scientific advances over the past forty years in the area of immunosuppressive drug therapy have improved the success rate of kidney transplantation, and kidney transplantation continues to evolve as an effective treatment for ESRD patients. Additionally, the success of solid-organ transplantation has increased the need for an expanded supply of organ donors. However, a number of factors continue to exist which limit access to transplantation, such as the shortage of donor organs, medical compatability, co-morbidity, variation in selection criteria, geographical factors, and socioeconomic barriers.

Historically, it has been important for the donor and recipient's tissues to very closely match. Recently, scientific analysis has shown that tissue matching could be somewhat reduced while maintaining long-term graft survival. Due to improvements in immunosuppressive drug therapy, improved graft outcomes have been achieved, despite a lack of stringent tissue matching. Transplantation policy has therefore evolved to allow kidney sharing between individuals with less emphasis on matching requirements.

During the past five years, great emphasis has been placed on increasing the number of living organ donors. Because a person only requires one healthy kidney to live, and because of the shortage of life saving organs for transplant, more patients are turning to living organ donation. In calendar years 2001-2003, the number of living organ donors in the United States surpassed the number of cadaveric donors (Organ Procurement and Transplantation Network, November 18, 2004 data). Calendar year 2004 data is not yet available.

The Anatomical Gift Educational Program of the DSHS was established in 1999 to educate Texans on the laws, benefits, and procedures governing organ donation. The AGEP provides education and outreach grants to organizations in Texas, and has been tasked with encouraging nursing and medical schools to include mandatory organ donor education in their curricula, as well as encouraging attorneys to provide organ donor information to clients seeking end-of-life decision making information.

Treatment Modality

There are various factors that influence the selection of treatment modality among ESRD patients, such as age, personal and physician preference, and co-morbid conditions.

In FY04, in-center hemodialysis was the predominant treatment modality among KHC recipients and comprised 72.6% of the KHC prevalent population. Of the remaining patients in FY04, 6.3% were receiving home dialysis and 21.1% were transplant patients.

Figures 17, 18, and 19 on pages 28 and 29 show the distribution of treatment modalities among KHC recipients by age, gender, and ethnicity.

Table 15: Treatment Status by Age, Gender, and Ethnic Group, FY04

	In-Center			Home Dialysis			Transplant		Totals	
Age	**FH**	**FP**	**SH**	**CA**	**CC**	**HH**	**LT**	**CT**	**Total**	**% of Total**
0-20	13	0	0	3	12	0	16	14	58	0.3
21-34	942	2	0	93	68	3	207	488	1,803	7.4
35-44	1,834	2	3	156	103	4	287	876	3,265	13.5
45-54	3,629	1	3	220	122	3	255	1,103	5,336	22.0
55-64	4,637	2	5	237	121	6	198	934	6,140	25.3
65-74	3,991	4	0	160	118	1	105	542	4,921	20.3
75 & Over	2,527	3	0	46	61	1	8	70	2,716	11.2
Gender	**FH**	**FP**	**SH**	**CA**	**CC**	**HH**	**LT**	**CT**	**Total**	**% of Total**
Female	8,390	10	3	458	323	8	467	1,676	11,335	46.8
Male	9,183	4	8	457	282	10	609	2,351	12,904	53.2
Ethnic Group	**FH**	**FP**	**SH**	**CA**	**CC**	**HH**	**LT**	**CT**	**Total**	**% of Total**
African American	5,642	3	5	204	116	4	112	901	6,987	28.8
Hispanic	7,856	7	2	370	246	1	503	1,544	10,529	43.4
White	3,706	3	4	325	222	13	426	1,428	6,127	25.3
Other	369	1	0	16	21	0	35	154	596	2.5
All Groups	**FH**	**FP**	**SH**	**CA**	**CC**	**HH**	**LT**	**CT**	**Total**	
Total	17,573	14	11	915	605	18	1,076	4,027	24,239	
% of Total	72.5	0.1	0.0	3.8	2.5	0.1	4.4	16.6	Total Currently Eligible	
Modality Total	17,598			1,538			5,103			
% of Total	72.6%			6.3%			21.1%		24,239	

As of 10/06/04, ASKIT.

FH: Facility Hemodialysis
FP: Facility Peritoneal Dialysis
SH: Self Hemodialysis
CA: Continuous Ambulatory Peritoneal Dialysis
CC: Continuous Cycling Peritoneal Dialysis
HH: Home Hemodialysis
LT: Living Transplant
CT: Cadaveric Transplant

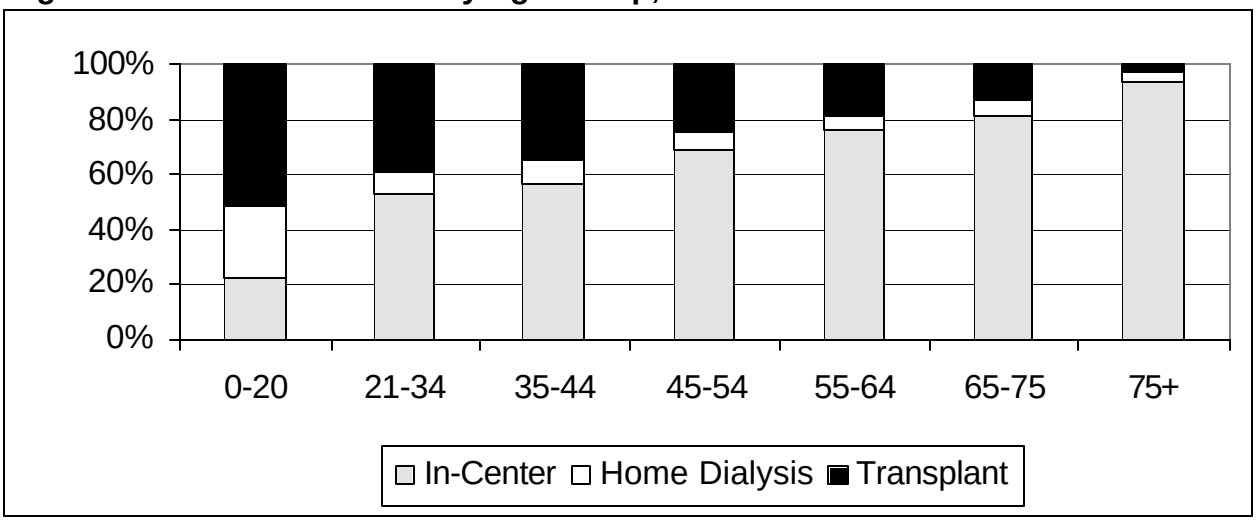
Treatment Status by Age and Gender

Figure 17 shows that in-center hemodialysis is the predominant treatment modality among all KHC age groups with the exception of those in the 0-20 group. More patients within this age group have kidney transplants, or are receiving home dialysis.

Recipients within the 55-64 age group comprise the largest proportion of the KHC prevalent population - 82% of whom are hemodialysis patients and 18% of whom are transplant patients. The highest percentage of hemodialysis treatment occurs within the 75+ age group.

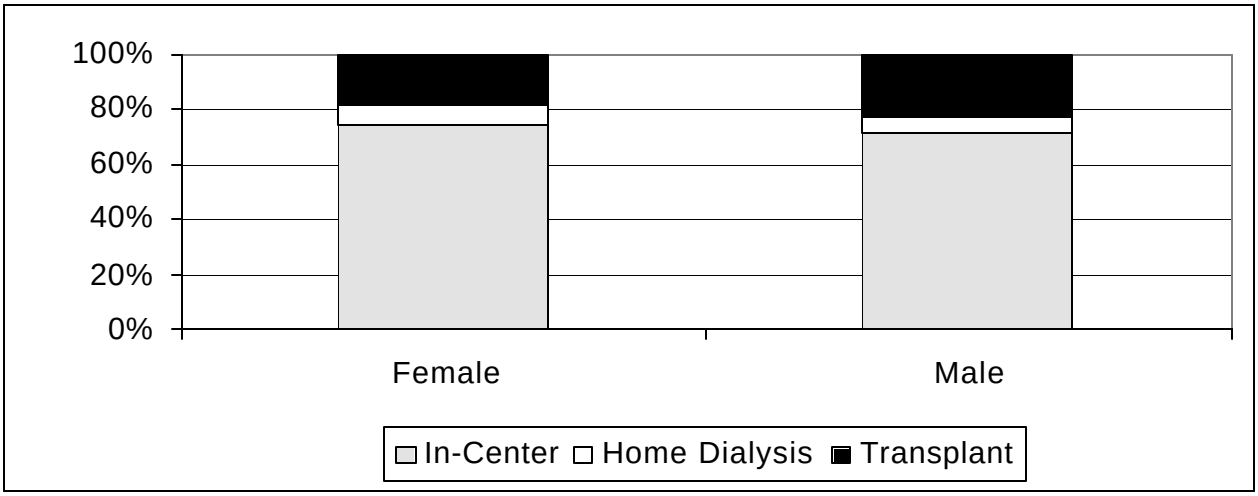
While the number of male and female recipients are fairly comparable with regard to in-center modality status, gender differences are evident in regard to transplant status, with male transplant recipients outnumbering their female counterparts by 38%.

Figure 17: Treatment Status by Age Group, FY04



As of 10/06/04, ASKIT.

Figure 18: Treatment Status by Gender, FY04



As of 10/06/04, ASKIT.

Treatment Status by Ethnic Group

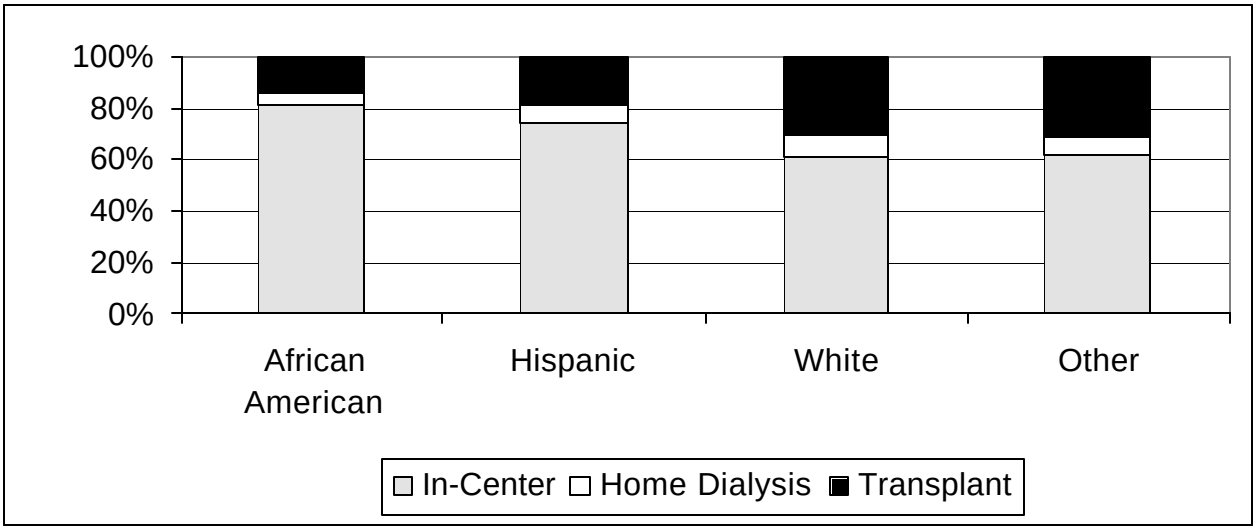
When looking at treatment status by ethnic group, differences exist within treatment modalities between these groups. While in-center dialysis is the predominant treatment modality for all ethnic groups, the distribution of kidney transplants between ethnic groups is evident.

In FY04, Hispanic recipients comprised 39.5% of KHC transplant patients, Whites comprised 36.3%, while African Americans comprised only 19.8% of the KHC transplant population. Eighty-one percent of African American recipients are treated with in-center dialysis.

The need for African American organ donors continues to be a critical issue. African Americans represent 13% of the U.S. population but make up 35% of those waiting for a kidney transplant on the national waiting list. Lower donation rates are one possible explanation for the longer wait times seen within this group. As a result of this disparity, numerous strategies and educational initiatives are directed at increasing the number of organ donors within this ethnic group, including the requirement of targeting minority groups through AGEP grant awards.

When looking at the KHC population, Hispanic recipients received transplants from 503 living donors and 1,544 cadaveric donors. White recipients received transplants from 426 living donors and 1,428 cadaveric donors. However, African American recipients only received transplants from 112 living donors and 901cadaveric donors in FY04.

Figure 19: Treatment Status by Ethnic Group, FY04



As of 10/06/04, ASKIT.

Table 16: ESRD Treatment Modality Trends - US[1] Compared with KHC

	Modality	1999		2000		2001		2002		2003	
		US	KHC	US	KHC	US	KHC	US	KHC	US	KHC
IN-CENTER	**Hemo**	230,684	15,639	244,987	16,558	257,900	16,942	270,561	17,853	281,757	17,584
	% Change	6.8	15.7	6.2	5.9	5.3	2.3	4.9	5.4	4.0	-1.5
	PD	300	6	220	17	295	21	159	26	104	14
	% Change	-14.3	600	-26.7	183	34.1	19.0	-46.1	23.8	-52.9	-85.7
HOME	**Hemo**	1,521	36	1,480	41	1,277	27	1,343	21	1,417	18
	% Change	-5.4	100	-2.7	13.9	-13.7	-51.9	5.2	-22.2	5.2	-16.7
	CAPD	13,320	1,022	12,548	1,132	11,642	917	11,249	945	10,662	915
	% Change	-10.6	41.7	-5.8	10.8	-7.2	-23.4	-3.4	3.1	-5.5	-3.3
	CCPD	13,620	573	14,098	673	14,868	551	15,711	596	16,604	605
	% Change	5.6	60.0	3.5	17.5	5.5	-22.1	5.7	8.2	5.4	1.5
TRANSPLANT	**Living**	4,644	874	5,427	962	5,804	887	6,141	1,006	6,208	1,076
	% Change	2.7	62.5	16.9	10.1	6.9	-8.5	5.8	13.4	1.1	6.5
	Cad.	8,839	3,588	8,884	3,872	8,824	3,475	9,453	3,868	9,521	4,027
	% Change	1.0	61.2	.51	7.9	-.7	-11.4	7.1	11.3	0.7	3.9

Notes: In-Center Hemodialysis includes assisted in-center hemodialysis and peritoneal dialysis. Home Dialysis includes CAPD, CCPD, and hemodialysis. Living transplant includes related and non-related donors.

ESRD Treatment Modality Trends

This table reports the trends in the treatment of ESRD from 1999-2003 and compares the percentage rate of change from each year to the next for each modality between KHC recipients and patients throughout the United States.

The largest growth occurred within the national and KHC transplant populations, which experienced increases in both the number of living and deceased donor transplants. Particular attention should be paid to the increase in living transplants, as more people are turning to living organ donors as a solution to the shortage of deceased donor kidneys available for transplantation.

In the 2003 year column, the most current data available for the U.S. is *Calendar* Year 2003 - the KHC data reported is *Fiscal* Year 2004.

[1] Source US Data: FORUM of ESRD Network Annual Report 2003