Preliminary Market and Cost Analysis

of a Five-station Hemodialysis Facility

in Marengo, Iowa

By

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Introduction

This report was commissioned by the Marengo Memorial Hospital to evaluate the market potential for a new kidney dialysis facility. Marengo Memorial Hospital is a rural hospital located in Marengo, a town of 2,535 people in north central Iowa County, Iowa (see the star in Map 1). In 2001, the hospital reported a capacity of 25 acute-care beds, 228 admissions, 8,485 inpatient admission days, and 8,750 outpatient visits.

Marengo Memorial Hospital intends to add space in order to expand its wellness, health maintenance, and community programs. One of the options for use of this added space is a five-station hemodialysis facility. Our primary goal is to determine whether there is enough current and anticipated demand for in-center hemodialysis services within the immediate area and surrounding region to support such a facility. Our secondary aim is to determine the utilization levels at which a five-station hemodialysis facility's operations can be self-financed.

For the purposes of this report, it is assumed that suitable facility space will be included in hospital expansion, regardless of whether the space is utilized for dialysis operations. This report focuses on the potential market for and operational costs and revenues associated with the proposed dialysis facility.

Area Geography

Wherever possible, in this study, data has been identified for the City of Marengo, Iowa County, the immediate area, the surrounding region, and the State of Iowa. The immediate area includes:

Iowa County	Benton County	Johnson County
Keokuk County	Linn County	Poweshiek County
Tama County	Washington County	

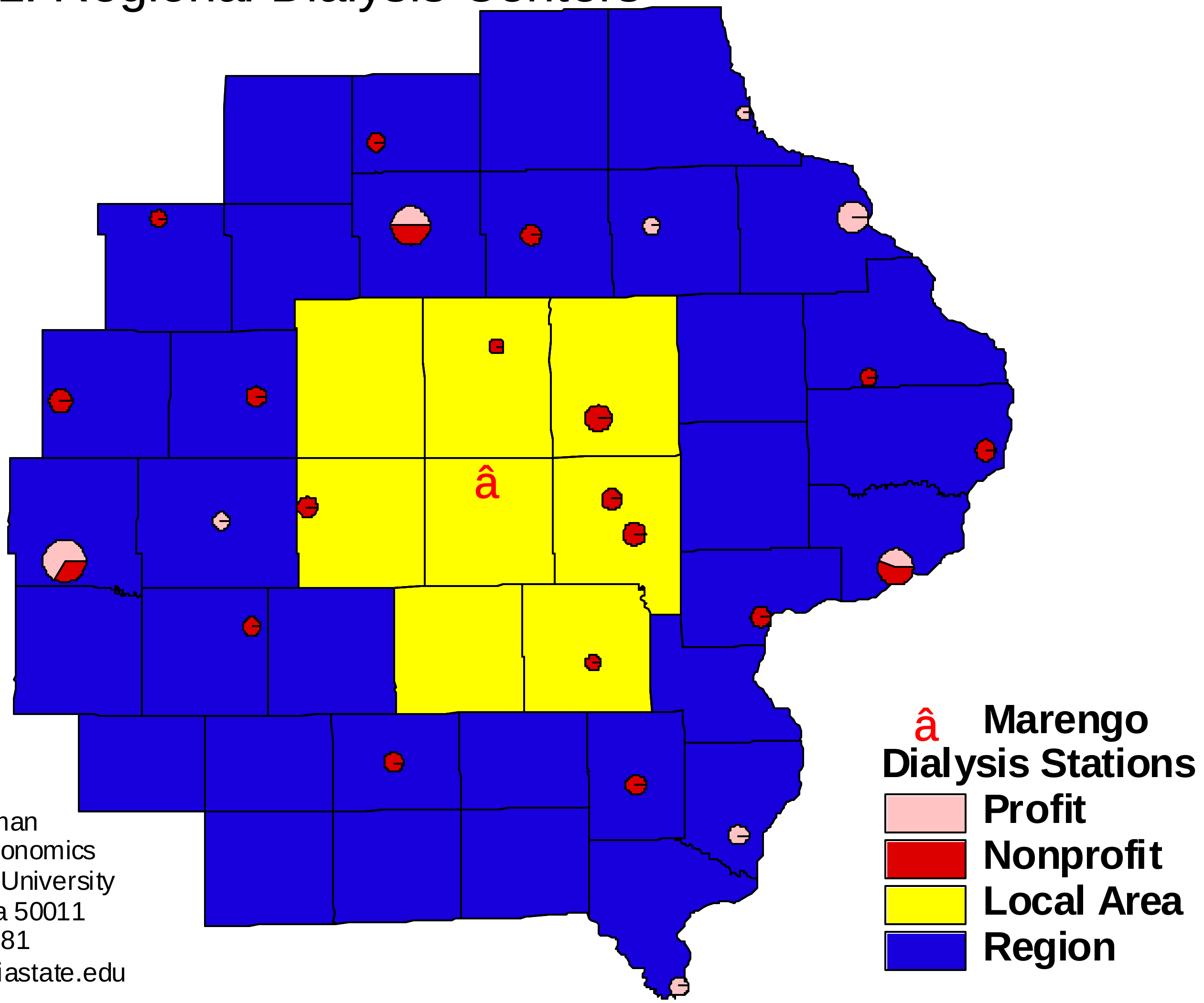
The immediate area includes Iowa County and all of its contiguous counties. It encompasses virtually all of the area within 30 miles of Marengo. At the northern and southeastern corners it extends about 50 miles from Marengo.

The surrounding region includes the immediate area plus:

Appanoose County	Bremer County	Buchanan County
Butler County	Cedar County	Clayton County
Clinton County	Davis County	Delaware County
Des Moines County	Dubuque County	Fayette County
Grundy County	Hardin County	Henry County
Jackson County	Jasper County	Jefferson County
Jones County	Lee County	Louisa County
Lucas County	Mahaska County	Marion County
Marshall County	Monroe County	Muscatine County
Polk County	Scott County	Story County
Van Buren County	Wapello County	Warren County

The surrounding region includes nearly all of the area that is both within the State of Iowa and within 90 miles of Marengo.

Map 1. Regional Dialysis Centers



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Regional Dialysis Capacity

Map 1 shows the locations and relative capacities (number of dialysis chairs) of dialysis centers in the immediate area and the larger region surrounding Marengo. In larger communities containing multiple dialysis centers, only one spot is used to show the sum of chairs available from all of the centers in the community. Red spots indicate publicly owned dialysis facilities. Pink spots represent privately owned facilities. Split spots represent the proportion of public to private capacity (chairs) in the community. Spot size represents capacity size relative to all of the dialysis facilities in the region. Table 1 provides the data supporting Map 1, including community names and the number of publicly owned and privately owned dialysis chairs available in these communities.

Table 1 shows that there are 74 dialysis chairs, all publicly owned, in Marengo's immediate area. Of these chairs, all but 28 (22 in Cedar Rapids and 6 in Vinton) are owned by or affiliated with the University of Iowa Hospitals and Clinics. Directly to the north and east, 56 of the area's chairs sit within 25-to-30 miles of Marengo. Fifty of these 56 are located within the Iowa City and Cedar Rapids urban areas. There are 427 dialysis chairs within the region. Of these, 353 are outside of the immediate area.

Regional Dialysis Patients

Table 2 shows the number of dialysis patients resident in regional counties in June 2001 and June 2003 reported by the End-Stage Renal Disease (ESRD) Network. These reports included 4 dialysis patients resident in Iowa County, 200 total patients in the immediate area, and 1288 total patients within the region in 2003. Looking back to the dialysis capacity data from Table 1, we estimate that the 74 dialysis chairs in the immediate area support an average of 2.7 dialysis patients, each. The 427 total dialysis chairs in the region support an estimated of 3.0 patients, each.

Assuming no increase in the number of dialysis patients in the immediate area, the addition of five dialysis chairs in Marengo would dilute the average patient per chair ratio in the immediate area to 2.5. The addition of chairs would not significantly change the average patient per chair ratio for the entire region.

Map 2 adds the number of reported dialysis patients by zip code area (June 2003) to the dialysis facilities included in Map 1. Areas in Map 2 where the blue or yellow background colors of the immediate area and surrounding region can be seen indicate zip codes for which no dialysis patients were reported.

Incidence and Prevalence of Dialysis and Kidney Disease

"Incidence" and "Prevalence" are two important terms when looking at the demand for treatment of ESRD or any disease. "Incidence" refers to the number of new cases of the disease that are reported in a given time period (usually a year). "Incidence rates" refer to the rate at which incidence strikes the population. In the case of ESRD statistics, incidence rates refer to the number of incident cases per million people.

"Prevalence" refers to the number of living patients reporting cases of the disease at a particular time. For ESRD statistics, prevalence refers to counts of living patients on December 31 of any year. As with incidence, ESRD prevalence rates are reported in terms of patients per million people in the population.

Table 1. Regional Dialysis Chairs

City	For Profit	Nonprofit	Total
Cedar Rapids		22	22
Grinnell		12	12
Iowa City		16	16
North Liberty		12	12
Vinton		6	6
Washington		6	6
Immediate Area		74	74
Ames		17	17
Clinton		13	13
Davenport	19	24	43
Des Moines	41	20	61
Dubuque	32		32
Guttenberg	5		5
Independence		12	12
Iowa Falls		8	8
Keokuk	10		10
Manchester	9		9
Maquoketa		8	8
Marshalltown		12	12
Mount Pleasant		12	12
Muscatine		12	12
Newton	8		8
Ottumwa		12	12
Pella		9	9
Waterloo	24	25	49
Waverly		9	9
West Burlington	12		12
Regional Total	160	267	427

ESRD Network 12. www.esrdnetworks.org, January 2004.

Map 2. Regional Dialysis Patients

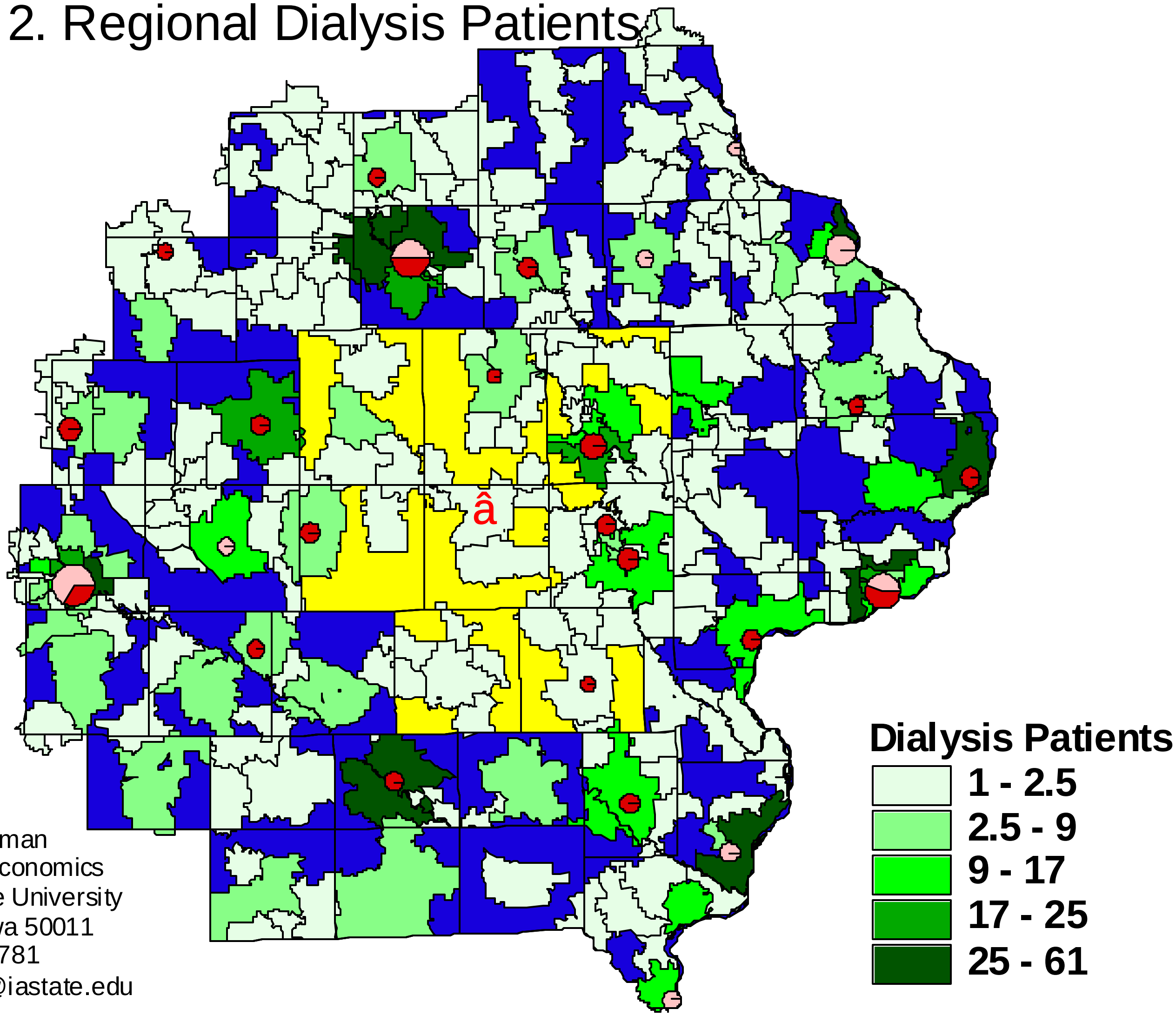

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Table 2. Regional Dialysis Patients as of June 30, 2001 And June 30, 2003

	2001	2003		2001	2003
State of Iowa	**1946**	**1911**	**Regional Total**	**1322**	**1288**
			Appanoose	**11**	**14**
Iowa County	**4**	**4**	**Black Hawk**	**124**	**120**
			Bremer	**19**	**20**
Immediate Area	**219**	**200**	**Buchanan**	**20**	**17**
Benton	14	17	Butler	16	17
Johnson	49	41	Cedar	10	10
Keokuk	8	7	Clayton	15	17
Linn	114	107	Clinton	38	46
Poweshiek	11	7	Davis	6	6
Tama	10	10	Delaware	12	11
Washington	9	7	Des Moines	39	38
			Dubuque	86	97
			Fayette	14	8
			Grundy	8	10
			Hardin	11	15
			Henry	15	18
			Jackson	19	15
			Jasper	22	18
			Jefferson	7	7
			Jones	13	19
			Lee	43	29
			Louisa	6	7
			Lucas	5	7
			Mahaska	9	10
			Marion	21	20
			Marshall	27	31
			Monroe	7	5
			Muscatine	23	20
			Polk	247	225
			Scott	127	122
			Story	19	27
			Van Buren	4	4
			Wapello	35	36
			Warren	25	22

ESRD Network 12. www.esrdnetworks.org, January 2004.

The relationship between incidence and prevalence depends upon the rate at which the disease is successfully cured and patient life expectancy. Unfortunately, in the case of ESRD, the rate of successful cure is too low to be a factor in the analysis, so incidence and prevalence are linked by life expectancy. In a case where the life expectancy of new patients of a disease is less than one year, incidence would exceed prevalence. In the case of ESRD, patient life expectancy is greater than one year, so prevalence, the measure of living patients, is greater than incidence, the measure of new patients. Life expectancy (or, more specifically, the probability of surviving a given number of years after diagnosis) is steadily increasing for ESRD patients. This means that prevalence is not only greater than incidence, but that prevalence, the number of living patients, is growing faster than incidence, the number of newly diagnosed patients. This is true of both Iowa and the United States, and can be seen in Graph 1 and Graph 2.

Between 97 percent and 98 percent of all new (incident) cases of ESRD, nationwide, are treated through some form of dialysis. This has been steadily true since 1978, with the exception of a brief dip between 1987 and 1993, which was accompanied by an increased kidney transplantation rate for new ESRD patients. Of incident cases on dialysis, the percentage utilizing in-center hemodialysis has grown from 80.2 percent in 1985 to 91.6 percent in 2001.

Graph 1. ESRD Incidence Rates Per Million Population

Data derived from United States Renal Data System, www.usrds.org

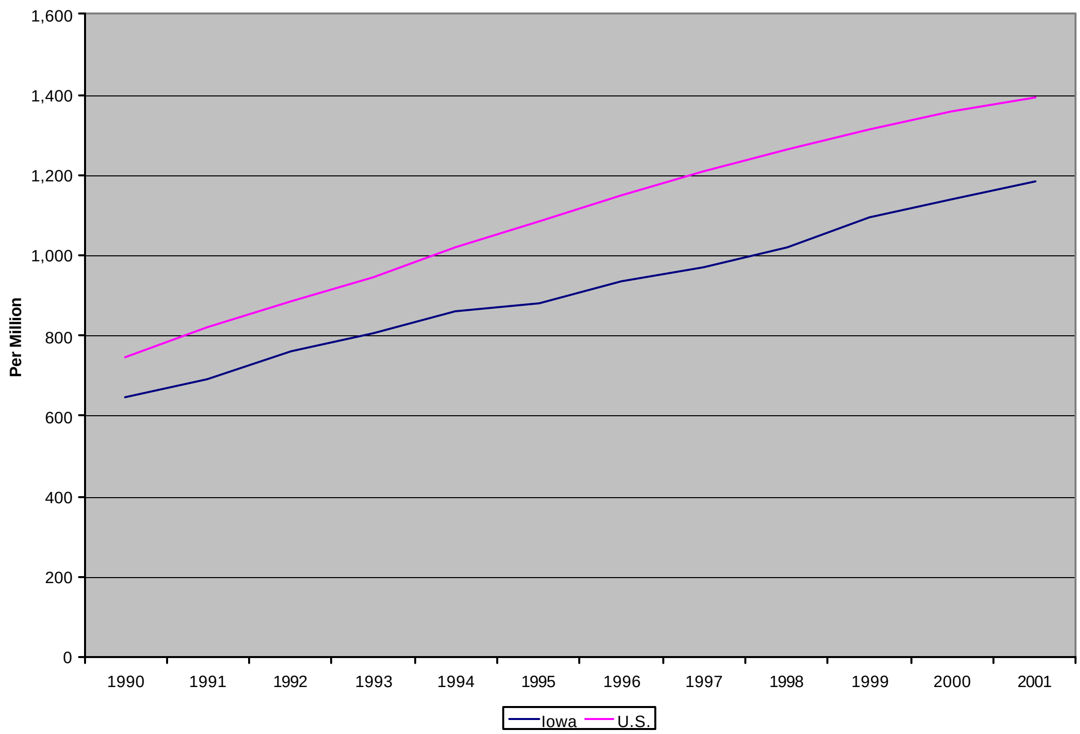
The importance of this is apparent from the trend shown in Graph 1. Graph 1 shows that incidence rates for ESRD are steadily rising for the United States. The graph also shows that Iowa ESRD Incidence rates are growing, although not so steadily (the variation seen in the Iowa trendline is at least partially due to the smaller population for which the trend is measured). Given that a growing proportion of new ESRD patients are treated with in-center hemodialysis, a growing ESRD incidence rate results in a magnified growth in incident in-center hemodialysis demand that results from newly diagnosed ESRD cases.

The trend in dialysis use is different when the focus is on prevalent ESRD cases. From 1978 to 2001, the percentage of prevalent ESRD patients utilizing dialysis dropped from 86.5 percent to 72 percent, nationwide. This primarily reflects the increased availability of kidney transplantation as a successful treatment option. The proportion of dialysis patients among the prevalent population that utilizes in-center hemodialysis has grown, however, from 75.6 percent in 1985 to 90.1 percent in 2001. The result is that, in 1985, 58 percent of prevalent ESRD patients utilized in-center hemodialysis. This share has grown to 64.9 percent in 2001. The increasing prevalent patient share of in-center hemodialysis among all dialysis users continues to outweigh the declining share of prevalent ESRD patients utilizing dialysis of any type.

Just as the importance of increasing utilization of in-center hemodialysis by incident ESRD patients magnifies the in-center hemodialysis demand pressure exerted by increasing ESRD incidence rates, so does the increasing share of prevalent ESRD patients utilizing in-center hemodialysis. Graph 2 shows the increasing ESRD prevalence rates for the United States and Iowa. While the rate of prevalence in Iowa remains below that of the United States, both are consistently growing. This points to an expectation of continued increases in demand for in-center hemodialysis in the foreseeable future.

Graph 2. ESRD Prevalence Rates Per Million Population

Data derived from United States Renal Data System, www.usrds.org



Regional Population Trends and Projection

Marengo is a town of 2,535 people in north central Iowa County, Iowa. From 1990 to 2000, Marengo's population grew by 265 people, or over 11.5 percent. Iowa County, of which Marengo is the county seat, had a population of 15,671 in 2000, according to the U.S. Census. This reflected an increase of 1,041, or over seven percent, from 1990.

This section looks at historical and projected population growth for Iowa County, the immediate area, and the surrounding region. In addition to total population, the section looks at historical white and nonwhite populations and both historical and projected age distributions. An understanding of these subpopulations is important to understanding the demand for in-center dialysis services, because both the incidence and prevalence of ESRD vary substantially by age and race.

Table 3 shows total population for Marengo, the immediate area, and the region reported by the 1990 and 2000 Census, as well as projections for the county-based areas for 2010. The projections are based upon an economic model that takes into account recent trends in population, employment, economic activity, and relative proximity to urban areas. The model and projections are part of an ongoing regional research effort at Iowa State University. Data for Iowa County is shown in red on the table. Yellow highlighted entries in the "Percent Change" columns show growth for the corresponding areas and ten-year periods. Unhighlighted columns represent declining area-period combinations. With the exception of Iowa County data, which is red, projected data or calculations that depend upon projected data are shown in blue.

Table 3 shows growth in all of the listed areas except Keokuk and Poweshiek counties (part of the immediate area) between 1990 and 2000. The primary growth areas within Marengo's immediate area during this period were Benton, Johnson, and Linn counties. These three counties are the only counties in the immediate area that are projected to grow between 2000 and 2010. Iowa County is projected to lose 567 people over the current decade.

It is expected, however, that much of the projected growth in Benton, Johnson, and Linn counties will take place on the western edge of the Iowa City-Cedar Rapids corridor. This would result in substantial population growth in an area 15-to-25 miles east of Marengo, immediately between Marengo and the closest existing dialysis facilities.

Table 3. Regional Population Growth: Historical and Projected

				Percent Change	
	1990	**2000**	**2010**	**90-00**	**00-10**
Marengo	2,270	2,535		11.67	
Immediate Area	369,633	412,674	444,321	11.64	7.67
Iowa County	14,630	15,671	15,104	7.12	-3.62
Benton	22,429	25,308	26,523	12.84	4.80
Johnson	96,119	111,006	126,778	15.49	14.21
Keokuk	11,624	11,400	10,856	-1.93	-4.77
Linn	168,767	191,701	208,615	13.59	8.82
Poweshiek	19,033	18,815	18,335	-1.15	-2.55
Tama	17,419	18,103	17,659	3.93	-2.45
Washington	19,612	20,670	20,451	5.39	-1.06
Regional Total	1,801,028	1,927,893	2,006,467	7.04	4.08
State of Iowa	2,776,755	2,926,324	2,994,094	5.39	2.32

U.S. Census Data
Jintanakul, Kanlaya, Dan Otto, and Mark Imerman. Work in progress.
Iowa State University Department of Economics. 2004.

Table 4 shows total, white, and nonwhite populations for Iowa County, the entire immediate area, and the entire region for 1990 and 2000. No projections based on race are available. The table also shows white and nonwhite populations as a percent of total for each year and the percentage growth in each population category over the decade. While the table shows that populations in all categories rose over the decade, nonwhite populations clearly grew at a faster rate than white populations, throughout. As a result, nonwhite populations held a larger population share in 2000 than they did in 1990. All indications are that this trend will continue, and may accelerate.

Table 4. Regional White and Nonwhite Populations

	Population		Percent of Total		% Change
	1990	2000	1990	2000	90-00
Iowa County					
Total	14,630	15,671			7.12
White	14,566	15,467	99.56	98.70	6.19
Nonwhite	64	204	0.44	1.30	218.75
Immediate Area					
Total	369,633	412,674			11.64
White	355,834	386,441	96.27	93.64	8.60
Nonwhite	13,799	26,233	3.73	6.36	90.11
Regional Total					
Total	1,801,028	1,927,893			7.04
White	1,722,534	1,789,452	95.64	92.82	3.88
Nonwhite	78,494	138,441	4.36	7.18	76.37
State of Iowa					
Total	2,776,755	2,926,324			5.39
White	2,683,090	2,748,640	96.63	93.93	2.44
Nonwhite	93,665	177,684	3.37	6.07	89.70

U.S. Census

This is important because of the substantial differences that exist in incidence and prevalence rates between racial categories. Table 5 shows that both the incident and prevalent rates for ESRD in the U.S. are much lower for the white population than for the total. The table also shows that white incident rates grew faster between 1980 and 2001 than all other groups except Asians. Long-term, this opens the possibility of more equivalent prevalence rates. At the moment, however, a growing nonwhite population can be expected to accelerate the growth in area ESRD prevalence and the demand for in-center hemodialysis.

Table 6 shows historical population by age for the area and region for 1990 and 2000 and projected population by age for 2010. Table 7 shows the actual change in populations by age from 1990 through 2000 and the projected changes in populations by age from 2000 to 2010. The projected population changes in Table 7 show an expectation that populations are going to become older, both in counties and with overall population growth and in counties where overall population declines. In all cases, the population aged 50-and-over is expected to increase between 2000 and 2010. In all but two of the immediate area counties (Keokuk and Poweshiek), the population aged 40-and-over is expected to increase (Keokuk and Poweshiek counties are also the only two immediate-area counties to have lost population between 1990 and 2000).

Table 5. U.S. ESRD Incidence Rates and Prevalence Rates
By Race (per million population)

	1980	1985	1990	1995	2000	2001	%Chg 80-01
Prevalence							
Tot. Pop.	242	445	698	1,044	1,360	1,403	480%
White	180	339	529	772	1,013	1,050	483%
Black	706	1,181	1,824	2,762	3,499	3,579	407%
Nat. Am.	328	670	1,150	1,992	2,565	2,579	686%
Asian	126	415	659	1,053	1,341	1,380	995%
Incidence							
Tot. Pop.	74	122	191	267	332	336	354%
White	54	96	150	202	266	269	398%
Black	215	299	470	680	761	771	259%
Nat. Am.	122	179	332	547	524	494	305%
Asian	41	151	160	261	286	288	602%

Data derived from United States Renal Data System, www.usrds.org

Increasing populations in the upper age groups are important because of the substantial differences that exist in both incidence and prevalence rates among the age groups. Table 8 shows both incidence and prevalence rates by age for the U.S. at five-year intervals from 1980. Both incidence and prevalence rates increase substantially with age until age 75 for all of the years shown. Equally as important for forecasting in-center hemodialysis demand, the rates of growth for both incidence and prevalence from 1980 to 2001 increase as age increases. Expected population change in Marengo's immediate area lead to an expectation of increased ESRD patients and increased demand for hemodialysis services.

Table 6. Population by Age for 1990, 2000, and 2010 (Projected)

1990	Tot. Pop.	0 to 9	10 to 16	17 to 24	25 to 29	30 to 39	40 to 49	50 to 59	60 to 69	70 & over
Immediate Area	369,633	51,256	33,412	55,435	32,100	60,678	44,113	31,436	28,140	33,063
Iowa County	14,630	2,152	1,398	1,176	1,055	2,263	1,641	1,444	1,490	2,011
Benton	22,429	3,463	2,445	1,974	1,626	3,456	2,619	2,082	2,070	2,694
Johnson	96,119	11,964	6,506	24,744	10,610	16,683	10,245	5,754	4,624	4,989
Keokuk	11,624	1,718	1,154	914	782	1,660	1,222	1,153	1,247	1,774
Linn	168,767	24,054	16,135	20,773	14,337	28,410	21,988	15,712	13,284	14,074
Poweshiek	19,033	2,538	1,859	2,652	1,197	2,780	2,173	1,762	1,764	2,308
Tama	17,419	2,433	1,867	1,513	1,089	2,441	1,972	1,785	1,807	2,512
Washington	19,612	2,934	2,048	1,689	1,404	2,985	2,253	1,744	1,854	2,701
Regional Total	1,801,028	258,955	176,521	229,378	142,083	288,539	219,694	159,106	150,805	175,947
State of Iowa	2,776,755	402,541	279,013	321,039	206,616	434,123	329,253	250,711	249,807	303,652

2000	Tot. Pop.	0 to 9	10 to 16	17 to 24	25 to 29	30 to 39	40 to 49	50 to 59	60 to 69	70 & over
Immediate Area	412,674	55,113	38,508	59,586	29,173	60,401	61,097	42,829	28,042	37,925
Iowa County	15,671	2,198	1,698	1,227	780	2,248	2,508	1,597	1,376	2,039
Benton	25,308	3,641	2,899	2,098	1,267	4,038	3,850	2,622	1,988	2,905
Johnson	111,006	12,659	8,406	27,260	10,249	16,065	15,347	9,976	5,079	5,965
Keokuk	11,400	1,513	1,247	973	561	1,407	1,735	1,168	1,049	1,747
Linn	191,701	27,430	18,341	22,037	13,491	29,224	29,243	21,086	13,608	17,241
Poweshiek	18,815	2,212	1,774	2,691	891	2,270	2,707	2,103	1,598	2,569
Tama	18,103	2,557	1,978	1,538	869	2,328	2,590	1,987	1,669	2,587
Washington	20,670	2,903	2,165	1,762	1,065	2,821	3,117	2,290	1,675	2,872
Regional Total	1,927,893	259,442	191,014	241,460	124,621	274,260	289,236	211,100	140,989	195,771
State of Iowa	2,926,324	391,016	297,923	342,707	177,259	403,698	439,965	319,183	225,733	328,840

2010 Proj.	Tot. Pop.	0 to 9	10 to 16	17 to 24	25 to 29	30 to 39	40 to 49	50 to 59	60 to 69	70 & over
Immediate Area	444,321	60,632	41,436	55,302	28,019	68,219	53,137	56,321	31,169	50,086
Iowa County	15,104	2,067	1,572	912	661	2,146	2,066	2,290	1,214	2,176
Benton	26,523	3,995	2,756	1,676	1,178	4,402	3,944	3,605	2,087	2,878
Johnson	126,778	15,303	9,835	28,275	10,373	18,548	12,772	14,438	6,823	10,410
Keokuk	10,856	1,390	1,121	834	454	1,435	1,354	1,587	933	1,748
Linn	208,615	30,449	20,437	18,572	12,818	33,823	26,176	26,590	15,218	24,531
Poweshiek	18,335	2,200	1,709	2,333	825	2,432	2,035	2,492	1,597	2,712
Tama	17,659	2,381	1,898	1,269	771	2,432	2,151	2,424	1,560	2,772
Washington	20,451	2,846	2,108	1,430	939	3,001	2,638	2,896	1,735	2,860
Regional Total	2,006,467	273,228	195,658	213,554	117,016	301,817	241,985	262,357	152,614	248,238
State of Iowa	2,994,094	401,955	297,059	299,930	163,866	439,129	363,213	400,961	235,639	392,343

Table 7. Population Change from 1990 to 2000 and projected from 2000 to 2010

1990-2000	Tot. Pop.	0 to 9	10 to 16	17 to 24	25 to 29	30 to 39	40 to 49	50 to 59	60 to 69	70 & over
Immediate Area	43,041	3,857	5,096	4,151	(2,927)	(277)	16,984	11,393	(98)	4,862
Iowa County	1,041	46	300	51	(275)	(15)	867	153	(114)	28
Benton	2,879	178	454	124	(359)	582	1,231	540	(82)	211
Johnson	14,887	695	1,900	2,516	(361)	(618)	5,102	4,222	455	976
Keokuk	(224)	(205)	93	59	(221)	(253)	513	15	(198)	(27)
Linn	22,934	3,376	2,206	1,264	(846)	814	7,255	5,374	324	3,167
Poweshiek	(218)	(326)	(85)	39	(306)	(510)	534	341	(166)	261
Tama	684	124	111	25	(220)	(113)	618	202	(138)	75
Washington	1,058	(31)	117	73	(339)	(164)	864	546	(179)	171
Regional Total	126,865	487	14,493	12,082	(17,462)	(14,279)	69,542	51,994	(9,816)	19,824
State of Iowa	149,569	(11,525)	18,910	21,668	(29,357)	(30,425)	110,712	68,472	(24,074)	25,188

2000-2010	Tot. Pop.	0 to 9	10 to 16	17 to 24	25 to 29	30 to 39	40 to 49	50 to 59	60 to 69	70 & over
Immediate Area	31,647	5,519	2,928	(4,284)	(1,154)	7,818	(7,960)	13,492	3,127	12,161
Iowa County	(567)	(131)	(126)	(315)	(119)	(102)	(442)	693	(162)	137
Benton	1,215	354	(143)	(422)	(89)	364	94	983	99	(27)
Johnson	15,772	2,644	1,429	1,015	124	2,483	(2,575)	4,462	1,744	4,445
Keokuk	(544)	(123)	(126)	(139)	(107)	28	(381)	419	(116)	1
Linn	16,914	3,019	2,096	(3,465)	(673)	4,599	(3,067)	5,504	1,610	7,290
Poweshiek	(480)	(12)	(65)	(358)	(66)	162	(672)	389	(1)	143
Tama	(444)	(176)	(80)	(269)	(98)	104	(439)	437	(109)	185
Washington	(219)	(57)	(57)	(332)	(126)	180	(479)	606	60	(12)
Regional Total	78,574	13,786	4,644	(27,906)	(7,605)	27,557	(47,251)	51,257	11,625	52,467
State of Iowa	67,770	10,939	(864)	(42,777)	(13,393)	35,431	(76,752)	81,778	9,906	63,503

U.S. Census
Jintanakul, Kanlaya, Dan Otto, and Mark Imerman. Work in progress.
Iowa State University Department of Economics. 2004.
(sources for Table 6 and Table 7)

Table 8. U.S. ESRD Incidence and Prevalence
By Age (per million population)

	1980	1985	1990	1995	2000	2001	%Chg 80-01
Prevalence							
Tot. Pop.	242	445	698	1,044	1,360	1,403	480%
0-19	30	46	58	71	79	80	167%
20-44	220	368	533	721	844	853	288%
45-64	508	914	1,370	1,963	2,457	2,529	398%
65-74	573	1,113	1,931	3,100	4,157	4,318	654%
75+	271	705	1,378	2,345	3,387	3,486	1186%
Incidence							
Tot. Pop.	74	122	191	267	332	336	354%
0-19	10	11	14	15	15	16	60%
20-44	53	70	96	123	128	126	138%
45-64	150	241	347	472	525	528	252%
65-74	228	429	727	1,003	1,268	1,292	467%
75+	128	311	596	893	1,340	1,346	952%

Data derived from United States Renal Data System, www.usrds.org

Estimate of Growth in Area and Regional Hemodialysis Demand

We have used the data on projected population growth in the local areas and prevalence rate trends by age and race for the U.S. to make a rough estimate of the rate of increase in state, area, and regional hemodialysis patients from numbers reported in June 2001 to 2010.

Table 9. Projected Growth in Area and Regional Dialysis Patient Population
From 2001 to 2010

AREA	**PERCENT GROWTH**	**2001 PATIENTS**	**PROJECTED PATIENTS**
State of Iowa	75	1946	3414
Marengo's Region	75	1322	2318
Marengo's Immediate Area	132	219	509

Assuming that no new in-center dialysis chairs (beyond the 5 proposed for Marengo Memorial Hospital) are installed, these estimates would generate average patient-per-chair numbers in 2010 of 5.4 for the entire region and 6.4 for the immediate area. In the cost information, below, we do not consider patient loads of more than 4 per chair. Under current practice, 6 patients per chair would require the facility to be staffed 16 hours per day, six days per week.

We obtained these estimates by

- extending the known prevalence trend in Iowa out to 2010
- applying the latest reported (1999-2001 average) national prevalence shares by age and race to the projected Iowa prevalence rate

- extending trends in racial (white and nonwhite) shares by age for each of the areas and applying them to projected population by age
- applying projected prevalence rates by age and race to projected populations by age and race for each area
- multiplying expected prevalence totals by the most recently observed proportion of ESRD patients, nationwide, receiving treatment through in-center hemodialysis

These estimates are for an expected growth in prevalence (total living patients), not for growth in incidence, or newly diagnosed ESRD cases. Increases in total patient numbers reflect both a medical problem (increasing numbers of new cases) and a medical success (increasing life expectancies for patients in treatment).

It should also be noted that as we move to smaller populations, these estimates would be less accurate, as they depend on trends identified at the national level. These estimates, however, are not out of line with the state and national experience from 1990 to 2000. During the past decade,

- Iowa ESRD prevalence counts have increased by 92 percent
- U.S. ESRD prevalence counts have increased by 115 percent
- Iowa ESRD prevalence rates have increased by 76 percent
- U.S. ESRD prevalence rates have increased by 95 percent
- U.S. dialysis patient counts have increased by 139 percent.

However, even in light of the compatibility of our estimates with the experience of the recent past, these estimates depend upon one big "If…"

> "If current trends continue…"

The current growth in ESRD incidence is undoubtedly due to a number of factors. Two factors, however, stand out for discussion. The first of these is lifestyle. The second is government policy.

There is little doubt that some of the increase in ESRD incidence is correlated with lifestyle factors related to diet, exercise, hypertension, etc. Given current societal trends with regard to these factors, we should expect ESRD incidence rates to continue rising into the foreseeable future. On the other hand, should society "get religion" on health issues and reform with respect to these factors, rates of increase in incidence and actual incident rates could drop.

It is also possible that some of the surge in ESRD incidence rates is related to government policy with regard to paying for ESRD treatments. Certainly, government payment policies affect the proportions of ESRD patients that are treated by in-center hemodialysis. The extension, in 1972, of federal Medicare coverage to all ESRD patients requiring dialysis or transplantation, regardless of age, undoubtedly provided incentives for earlier diagnoses of renal disease cases to ensure treatment of other conditions in otherwise noncovered populations. Federal policies that favor in-center dialysis over home dialysis also affect the distribution of treatment modalities. To the extent that federal policies have elicited a "surge" in incidence and in-center dialysis treatments, one might expect an eventual leveling off of this effect, slowing the increase in incidence rates. Changes in federal policies favoring in-center hemodialysis could cause a fall in the demand for in-center treatment even in an environment of increasing prevalence.

Finally, regardless of any "Ifs," kidney failure, in the absence of any complicating factors, is age related. As we continue to enjoy increasing life expectancies, and we continue to extend the lives of patients suffering from kidney-related or totally unrelated diseases, we will expect higher incident levels of kidney failure. We will also see increasing life expectancies among patients suffering from kidney failure. For these reasons, the questions regarding the big "If," above, are questions of scale. Absent a major breakthrough in prevention and cure, we will see increasing numbers of patients needing some form of kidney-function support. The questions relate only to how fast these numbers will grow and how these cases are treated.

Costs and Revenues

The cost analysis portion of this analysis will focus only on the direct costs that are specifically required in order to establish and operate the proposed dialysis center. It is assumed that suitable space for a 5-station hemodialysis center will be made available in the planned addition to the Marengo Memorial Hospital. It is also assumed that there are sufficient staff support, supply, and business office capabilities existing within the hospital organization and infrastructure to support or absorb the needs of the proposed dialysis center.

As a result, the cost analysis done here will not address facility construction or amortization costs, general business offic e costs, general supply organization and storage costs, or general staff support costs. These cost items are generally referred to as "Overhead." We are assuming that current overhead investments and expenses at Marengo Memorial Hospital are not fully exploited and, at least in the initial stages of dialysis-center operations, can be spread across the support of these additional services. Savings to the overall hospital budget would offset any overhead costs allocated to the dialysis facility. This becomes an accounting formality that is ignored, here, for the sake of simplicity.

In general, in-center hemodialysis patients receive treatments three times per week. Treatments last about 4 hours and require about an hour total for set-up and clean-up time, resulting in a per-treatment cycle of approximately 5 hours. Treating two patients per chair requires three ten-hour days per week (two patients times five hours times three treatments per week). Moving from two to three patients per chair requires either moving to three 15-hour days per week, or maintaining three 10-hour days and adding three five-hour days. Four patients per chair can be done with six 10-hour days. There is some facility maintenance that has to be performed outside of the treatment cycle. Regardless of the number of cycles run in a day, it is assumed that staff will be required at the facility for one additional hour to perform basic maintenance and preparations.

Because the required operating staff support for a five-chair dialysis facility is relatively constant whether one chair or five chairs are in use, the goal is to operate on a schedule that keeps all five chairs full or the entire facility shut down. As a result, optimal patient loads would come at levels of five patients (one per chair), ten patients (two per chair), 15 patients, or 20 patients. Obviously, fixed costs per patient decline as the number of patients increases. Operating labor costs remain relatively constant per patient as long as the facility is full when it operates. Administrative labor costs per patient decline as more patients are added.

Table 10. Definition of shift cycles

A.1-2	One cycle with one or two patients
A.3-5	One cycle with between three and five patients
B.6-7	Two cycles; one cycle full and one cycle with one or two patients
B.8-10	Two cycles; one cycle full and one cycle with between three and five patients
C.11-12	Three cycles; two cycles full and one cycle with one or two patients
C.13-15	Three cycles; two cycles full and one cycle with between three and five patients
D.16-17	Four cycles; three full cycles and one cycle with one or two patients
D.18-20	Four cycles; three full cycles and one cycle with between three and five patients

Cycles for any number of shifts, defined in Table 10, are split according to the utilization level of the last cycle added. It is assumed that a cycle with less than three patients can be operated with only a registered nurse and a chief technician. For cycles serving three or more patients, a patient care technician is added. As mentioned earlier, from an efficiency standpoint, it is optimal to operate fully-populated cycles. Direct staffing needs, hourly wages, and annual wages and benefits for each of the possible shift cycles are shown in Table 11. Wage rates were taken from statewide workforce statistics. Shift costs divided by patients served are included in the estimated annual costs per patient that drive Graph 3.

Table 11. Directly-employed staff requirements for dialysis center operating schedules

		A.1-2	A.3-5	B.6-7	B.8-10	C.11-12	C.13-15	D.16-17	D.18-20
HOURS/WEEK									
Registered nurse		25	25	40	40	58	58	73	73
Patient care technician			18	18	33	33	51	51	66
Chief technician		18	18	33	33	51	51	66	66
SALARY COST	$/Hour								
Registered nurse	18.6	24,264	24,264	38,822	38,822	56,292	56,292	70,850	70,850
Patient care technician	13.36	0	12,548	12,548	23,005	23,005	35,553	35,553	46,010
Chief technician	15.43	14,492	14,492	26,570	26,570	41,062	41,062	53,139	53,139
Benefits (30% X salary)		11,627	15,391	23,382	26,519	36,108	39,872	47,863	51,000
TOTAL COST		50,383	66,696	101,322	114,916	156,467	172,779	207,405	220,999

In addition to the direct operating staff, hemodialysis facilities are required to have three additional positions:

Medical Director/Nephrologist
Renal Social Worker
Hemodialysis Dietician

These three positions can be covered on a partial-time contract or retainer basis. Unlike the labor costs in Table 11, these costs are not shift-dependent. Once contracted, these costs are fixed costs. Ranges for these costs are included in Table 13, below. The actual negotiated value of these contracts will depend upon the ability to fit these duties into a workable annual employment options for either the hospital or the employee. The dietician contract might be attached to other dietician work at the hospital. The social work position might be shareable within the hospital or with other less-than-full-time social work positions in the local area. The medical director contract might be a method of augmenting the incentives for a local doctor to remain in the area, or it might be shared with other dialysis facilities in the area or region.

Table 12 provides estimates of completely variable costs. These are costs that should depend directly upon the number of treatments that the facility provides or the number of patients that are regularly served. Table 12 contains a separate subtotal for equipment maintenance and dialysis supplies, as these are direct costs of the dialysis process and will be billed as dialysis services. Medication costs are generally considered and reported as an addition to dialysis costs.

Table 12. Variable Dialysis and Medication Costs

Dialysis equip. maintenance	880
Biomedical dialysis supplies	
Dialysis supplies: dialysate, dialyzers, chemicals, supplies, disposable linens, etc.	5,874
Biomedical material disposal	463
Dialysis Total	**7,217**
Patient medications	
Medications: EPO, Vitamin D, etc.	9,839
Total Dialysis and Medication	**17,056**

Modified from Lawler, Mary K., et al.,
"A Systems Development Guide for a Kidney Dialysis Center"
Oklahoma State University

Table 13 provides a list of equipment, supplies, and contract staff that are needed to open a facility, regardless of the facility's utilization rate. These are establishment costs. They do not depend upon the number of cycles or the number of patients. They depend upon the size of the facility established. Low, high, and mid prices are included for most of the items in Table 13. For the categories of "Facility infrastructure," "Dialysis station equip.," and "Patient-care equip. pool," three prices were generally obtained. Staff at Marengo Memorial Hospital provided two of these. The third was included in "A Systems Development Guide for a Kidney Dialysis Center," a 2003 publication of the Oklahoma State University Dept. of Agricultural Economics. Low and high prices were identified from this set. Mid price is the midpoint between the low and high price (not the average of the three prices). For two of the remaining categories ("Water treatment" and "Biomedical equipment") only Oklahoma State University estimates were used. For the final category, "Fixed staff costs," ranges were developed around point estimates provided by Oklahoma State University.

For each of the categories, unit costs are multiplied by number of units to provide a range of total establishment costs. In the final series of columns, establishment costs for all categories except "Fixed staff costs," which are annual, are divided by an average life expectancy of seven years to provide an estimate of annualized establishment costs. These costs are then divided by numbers of possible patients (1 through 20) to provide input into the estimated annual costs per patient that drive Graph 3.

It should be noted that annual costs are calculated by simple division. They are not amortized with respect to an assumed interest rate. All cost and revenue estimates within this report assume that the value of money remains constant throughout the period of analysis (inflation is zero).

This allows users to easily make independent assumptions about rates of change in revenue values and individual costs.

Graph 3 provides a visual perspective of expected costs per patient for the facility. These costs assume that patients are regular recipients of dialysis in the proposed facility and that the facility consistently operates at one of the shift levels defined in Table 10. Graph 3 provides two sets of Low, High, and Mid trend lines. One includes Medications from Table 12, and one does not. Medications will be provided in the course of dialysis, in any event. Separating them out in Graph 3 assists interpreting the trend if medications are provided from outside the hospital or if they are billed under a separate system. Table 14 provides the cost per patient numbers for utilization levels above 3 patients.

Revenue estimates begin with Table 15. This table shows annual average Medicare payouts per patient for outpatient hemodialysis treatments at a state and national level. The table includes only payments to outpatient hemodialysis facilities for functions and medications directly related to the hemodialysis service. There area additional physician and hospital services (minor surgeries, laboratory work, emergency treatment, ambulance, etc.) that Medicare will pay for, but are not directly attached to the dialysis process.

Table 15 shows annual payouts per patient year at risk. This assumes that a patient comes in for regular dialysis three times a week and fifty-two weeks a year. The average hemodialysis patient spends approximately 14 days per year admitted to a hospital. During this time, Medicare does not make treatment payments to the outpatient hemodialysis facility (though it does make payments to the hospital for inpatient care). As a result, these payments should be discounted by about 4 percent to arrive at actual payments per patient.

Table 15 also assumes that the patient is beyond the 90 day waiting period prior to eligibility for Medicare. If we assume a 5-year life expectancy from the initiation of treatment and that waiting-period treatment billings are written off, then the Table 15 payments should be discounted by an additional 5 percent (a lower assumed life-expectancy would result in a greater discount). Combining these discounts would result in annual average Medicare payments of approximately $19,918 per patient for the U.S. as a whole and $22,940 per patient for Iowa. These numbers include medications and should be compared with the average total costs per patient lines in Table 14 and Graph 3.

Nonmedicare patients are billed at a significantly higher rate than are Medicare patients. Urban hospitals within the region experience nonmedicare patient rates of up to 25%, and bill these patients at up to 5 times the Medicare billing rate (actual insurance and private payments vary significantly from billed rates). Assuming a private-payer yield of 2.5 times the rate of Medicare payments per patient would result in nonmedicare revenue of $57,350 per patient, annually. If it was also assumed that nonmedicare patients are not discounted for the 90-day waiting period, their estimated yield per-patient would move up to $59,872, annually.

Clearly, the addition of nonmedicare patients has a substantial effect on expected revenue per hemodialysis patient. Given the revenue assumptions discussed above, a 10-percent rate of nonmedicare patients would increase the expected yield per patient for the operation from $22,940 to $26,633, annually.

It is unclear, however, what the rate of nonmedicare patients would be for a proposed hemodialysis facility in Marengo. Rural areas tend to have much lower proportions of nonmedicare patients. It is not unusual for rural facilities in the region to depend 100 percent upon Medicare patients. Marengo's location just west of an urban growth region may increase its probability of obtaining nonmedicare patients beyond that of a purely rural location.

Finally, all of the discussions regarding costs and revenues in this report are preliminary. While it is not certain, from these estimates, that a 5-station dialysis facility at Marengo Memorial Hospital would cash-flow, it is not beyond the very reasonable possibility that it could do so. The numbers here, derived largely from national averages and academic studies, provide an indication that in-depth exploration of this facility could be worthwhile. It is certain that the cost scenarios that can be obtained by an potential buyer in an active market will be different from those available to speculative academics.

Speculation on Industry Trends

The hemodialysis industry seems destined to decentralize, geographically, for a couple of reasons. First, there is continued dramatic growth in patient numbers in both rural and urban areas. Increasing patients make it possible to generate financially-critical patient numbers in rural areas. Second, dialysis equipment and facilities continue to become smaller and more cost-effective. This means that financially-critical patient numbers necessary to support facilities should continue to fall even as the number of available patients continues to rise. The combination of these factors, by themselves, should lead to increasing numbers of rural dialysis facilities.

Changing regulation may also add to the decentralization trend in dialysis. Dialysis treatments are tightly bound by Medicare participation rules. The four-hour per treatment, three-treatment per week regimen is mandated by Medicare reimbursement. Growing bodies of evidence indicate that treatment could be more effective in terms of both cost and patient welfare on a two-hour per treatment, six-treatment per week cycle. Dialysis is clearly more efficient for the first two hours of the process, and patients treated every day do not experience the extreme internal chemistry fluctuations that result from every-other-day treatment. Daily treatment would increase the number of visits required and provide an incentive for patients to further minimize distance traveled. Should Medicare change to reimburse treatment beyond three per patient per week, this will provide a further incentive to geographically disperse dialysis facilities.

Geographic dispersion of dialysis facilities, however, does not equate to decentralization of ownership, management, or control. It is quite likely that management of dialysis facilities will become more centralized as facilities become more decentralized. This is due to both labor and secondary treatment considerations.

Small dialysis facilities, whether free-standing or hospital based, will increasingly have a harder time maintaining sufficient staff on a continuous basis. This is partially because small facilities do not provide the number of patients required to fully employ some highly specialized staff. As facilities decentralize, more of these staff will be shared, and staff sharing lends itself to joint management. In addition, small facilities have trouble maintaining continuity in full-time staff. Nurses and technicians are highly mobile in the job market. Maintaining operating staff in the face of mobility requires some level of redundancy, and smaller facilities face difficulties in maintaining this redundancy. Jointly managed facilities will continue to find it easier to maintain the redundancy or staff sharing arrangements that make continued operations on a small scale workable.

Table 13. Establishment costs

	No.					Total Cost				Life:	Annual Cost		
		Low	High	Mid		Low	High	Mid		yrs.	Low	High	Mid
Facility infrastructure													
Lab refrigerator	1	150	6316	3233		150	6,316	3,233		7	21	902	462
Lab freezer	1	275	4,743	2,509		275	4,743	2,509		7	39	678	358
Meds refrigerator	1	150	1,200	675		150	1,200	675		7	21	171	96
EPO refrigerator	1	150	1,934	1,042		150	1,934	1,042		7	21	276	149
Ice machine	1	400	3,000	1,700		400	3,000	1,700		7	57	429	243
Chart rack	1	55	700	378		55	700	378		7	8	100	54
Computer system	1	1,500	5,000	3,250		1,500	5,000	3,250		7	214	714	464
Shelving	1	315	630	473		315	630	473		7	45	90	68
Facility infrastructure						**2,995**	**23,523**	**13,259**			**428**	**3,360**	**1,894**
Water treatment													
R/O system (cap. up to 30 tx/day)	1	25,000	25,000	25,000		25,000	25,000	25,000		7	3,571	3,571	3,571
Drum dolly	1	300	300	300		300	300	300		7	43	43	43
Central bi-carb system	1	2,000	2,000	2,000		2,000	2,000	2,000		7	286	286	286
Water treatment						**27,300**	**27,300**	**27,300**			**3,900**	**3,900**	**3,900**
Biomedical equipment													
Electrical analyzer/tester	1	2,195	2,195	2,195		2,195	2,195	2,195		7	314	314	314
Conductivity meter	1	233	233	233		233	233	233		7	33	33	33
dialysate meter	1	275	275	275		275	275	275		7	39	39	39
R/O tds water meter	1	61	61	61		61	61	61		7	9	9	9
Water analysis test kit	1	25	25	25		25	25	25		7	4	4	4
Heat block	1	462	462	462		462	462	462		7	66	66	66
portable tool chest and tools	1	30	30	30		30	30	30		7	4	4	4
Parts storage cart	1	238	268	253		238	268	253		7	34	38	36
Misc. tools, fittings, & tubing	1	3,000	3,000	3,000		3,000	3,000	3,000		7	429	429	429
Hardness test kit	1	30	30	30		30	30	30		7	4	4	4
Biomedical equipment						**6,549**	**6,579**	**6,564**			**936**	**940**	**938**

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Table 13. Establishment costs (cont'd.)

	No.					Total Cost				Life:	Annual Cost		
		Low	High	Mid		Low	High	Mid		yrs.	Low	High	Mid
Dialysis station equip.													
Dialysis machines	6	15,000	16,550	15,775		90,000	99,300	94,650		7	12,857	14,186	13,521
Dialysis chair	5	750	1,720	1,235		3,750	8,600	6,175		7	536	1,229	882
Privacy screen	5	148	200	174		740	1,000	870		7	106	143	124
Task stool	5	50	265	158		250	1,325	788		7	36	189	113
Stethoscope	3	10	50	30		30	150	90		7	4	21	13
Trash can	5	35	155	95		175	775	475		7	25	111	68
Infectious waste hampers	5	45	100	73		225	500	363		7	32	71	52
Television	5	200	1,001	601		1,000	5,005	3,003		7	143	715	429
Dialysis station equip.						**96,170**	**116,655**	**106,413**			**13,739**	**16,665**	**15,202**
Patient-care equip. pool													
Patient lift	1	800	4,000	2,400		800	4,000	2,400		7	114	571	343
Wheelchair	1	199	450	325		199	450	325		7	28	64	46
Wheelchair/standup scales	1	1,971	2,500	2,236		1,971	2,500	2,236		7	282	357	319
Subacute bed	1	1,592	1,592	1,592		1,592	1,592	1,592		7	227	227	227
Mobile blood-pressure modules	3	111	200	156		333	600	467		7	48	86	67
Ambu bag	1	18	250	134		18	250	134		7	3	36	19
Oxygen equipment	2	150	693	422		300	1,386	843		7	43	198	120
Infusion pump	2	950	2,500	1,725		1,900	5,000	3,450		7	271	714	493
IV pole	2	85	125	105		170	250	210		7	24	36	30
Glucometer	1	45	88	67		45	88	67		7	6	13	10
Thermometer	2	150	250	200		300	500	400		7	43	71	57
Ultrasonic mini doppler	1	500	712	606		500	712	606		7	71	102	87
Emergency evacuation kit	2	100	150	125		200	300	250		7	29	43	36
Miscellaneous clinical	1	50	1,000	525		50	1,000	525		7	7	143	75
Bed pan	3	3	75	39		9	225	117		7	1	32	17
Crash cart	1	1,219	1,219	1,219		1,219	1,219	1,219		7	174	174	174
Patient-care equip. pool						**9,606**	**20,072**	**14,839**			**1,372**	**2,867**	**2,120**

Continued on next page

Table 13. Establishment costs (cont'd.)

	No.					Total Cost				Life:	Annual Cost		
		Low	High	Mid		Low	High	Mid		yrs.	Low	High	Mid
Fixed staff costs													
Medical director/nephrologist	1	30,000	50,000	40,000		30,000	50,000	40,000		1	30,000	50,000	40,000
Renal social worker	1	5,000	10,000	7,500		5,000	10,000	7,500		1	5,000	10,000	7,500
Hemodialys dietician	1	5,000	10,000	7,500		5,000	10,000	7,500		1	5,000	10,000	7,500
Pagers for staff	1	2,400	4,800	3,600		2,400	4,800	3,600		1	2,400	4,800	3,600
Staff development	1	4,000	8,000	6,000		4,000	8,000	6,000		1	4,000	8,000	6,000
Fixed staff cost						**46,400**	**82,800**	**64,600**			**46,400**	**82,800**	**64,600**
TOTALS						**189,020**	**276,929**	**232,975**			**66,774**	**110,533**	**88,654**

Table 14. Estimated Costs Per Patient Per Year

	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Total Cost Est.																	
Low Estimate	50,423	43,750	45,072	41,070	39,767	37,244	35,225	37,351	35,659	35,483	34,167	33,026	34,192	33,184	33,043	32,202	31,445
High Estimate	61,363	52,502	52,365	47,321	45,237	42,106	39,601	41,329	39,306	38,849	37,292	35,943	36,927	35,758	35,474	34,505	33,633
Mid Range	55,893	48,126	48,718	44,195	42,502	39,675	37,413	39,340	37,483	37,166	35,730	34,485	35,560	34,471	34,259	33,353	32,539
With No Medication Costs																	
Low Estimate	40,584	33,911	35,233	31,231	29,928	27,405	25,386	27,512	25,820	25,644	24,328	23,187	24,353	23,345	23,204	22,363	21,606
High Estimate	51,524	42,663	42,526	37,482	35,398	32,267	29,762	31,490	29,467	29,010	27,453	26,104	27,088	25,919	25,635	24,666	23,794
Mid Range	46,054	38,287	38,879	34,356	32,663	29,836	27,574	29,501	27,644	27,327	25,891	24,646	25,721	24,632	24,420	23,514	22,700

Graph 3. Estimated Cost Ranges Per Dialysis Patient (Total and Without Medication Costs)

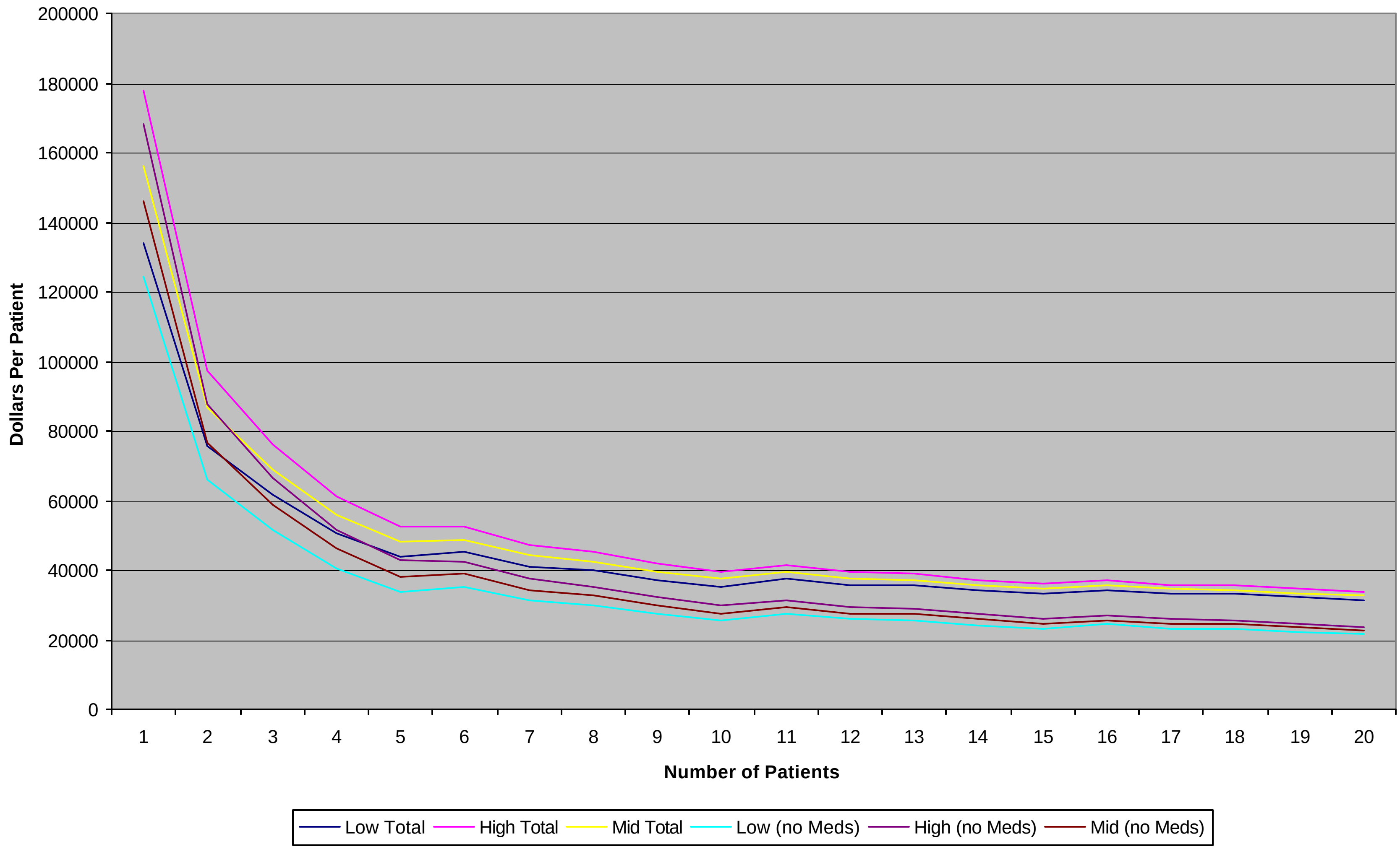

Table 15. Medicare Payments Per Patient Year At Risk
Outpatient Hemodialysis (1997-2001 average)

	U.S.	IOWA
Patient years at risk	861,423	1,355
Total outpatient	**21,887**	**25,209**
Outpatient hemodialysis	12,485	13,968
Outpatient EPO	4,941	5,259
Outpatient vitamin D hormones	1,029	2,068
Outpatient iron	760	700
Outpatient other injectables	284	547
Radiology	352	415
Pharmacy	350	261
Laboratory/pathology	355	480
Outpatient other	1,331	1,511

United States Renal Dialysis Data System
http://www.usrds.org/odr/xrender_home.asp.

Secondary treatment and emergency services are also an issue that leads towards joint management of small facilities. Hemodialysis facilities must maintain agreements with hospitals that are capable of taking care of emergency situations related to dialysis patients. In addition to emergency referral, there are complications in end-stage renal disease that many small facilities will be unable to effectively treat. For both of these reasons, affiliation with larger centralized hospitals will be inevitable for smaller rural dialysis facilities. These affiliations will often extend to staff management or staff sharing agreements either with the central hospital or among a group of the central hospital's affiliates.

Conclusions

This study was commissioned to look at the potential market for additional hemodialysis facilities in the Marengo area and to do a preliminary analysis of financial issues in the development of a five-station facility in Marengo. There are two basic conclusions to this work.

First, there is almost certainly going to be growth in demand for hemodialysis services in the Marengo area that outstrips current supply facilities. This is due to both expected increases in area populations and expected increases in ESRD prevalence within area populations. While Marengo's home county is not expected to grow over the next several years, a high proportion of area population growth is expected to occur in western Johnson and Linn Counties, directly between Marengo and the closest alternative dialysis facilities.

Second, cost and revenue estimates used in this study do not guarantee that a Marengo facility will cash-flow. This is not an indication that consideration of the facility should cease, but it does warrant

- More analysis of the interaction between the potential dialysis facility and the existing hospital
- A more locally-focused analysis of required equipment and minimum costs
- Exploration of more management and staffing/compensation options.

The existence of viable well-managed hemodialysis centers in the current demand environment should be an indication that additional well-managed hemodialysis facilities will be successful in the region as demand levels increase.

Resources

In putting together this study, the authors relied heavily on information from the following sources:

"2003 Annual Data Report" www.usrds.org/adr.htm. United States Renal Data System Coordinating Center, Minneapolis, Minnesota. Accessed December 2003 through January 2004.

"Reports and Data" www.network12.org/reports/reports.htm. End-Stage Renal Disease Network 12 Coordinating Council, Inc., Kansas City, Missouri. Accessed December 2003 through January 2004.

Lawler, Mary K., et al., "A Systems Development Guide for a Kidney Dialysis Center" Department of Agricultural Economics, Oklahoma State University. August 2003.

The staff at Marengo Memorial Hospital.