I am not resigned to
the shutting away
of loving
hearts in the hard
ground.
So it is, and so it will
be, for so it has
been, time
out of mind;
Into the darkness they
go, the wise and the
lovely.
Crowned
With lilies and with
laurel they go; but
I am not
resigned.

Eight

Survival, Mortality, & Causes of Death

The method used to compute first- and second-year death rates was changed from the 2000 to the 2001 Annual Data Report. Previously, first- and second-year death rates were estimated from a Cox proportional hazards model using average covariates, but a review of this method revealed significant biasing of the predicted rates. With our newer method the predicted and raw rates utilizing the weighted average of the output of the model were within 0.4%, whereas using average coefficients on the input of the model led to numbers that were off some 21%. Trends within the years are therefore more accurately represented by the newer adjustment method. Appendix A provides more detail on these changes.
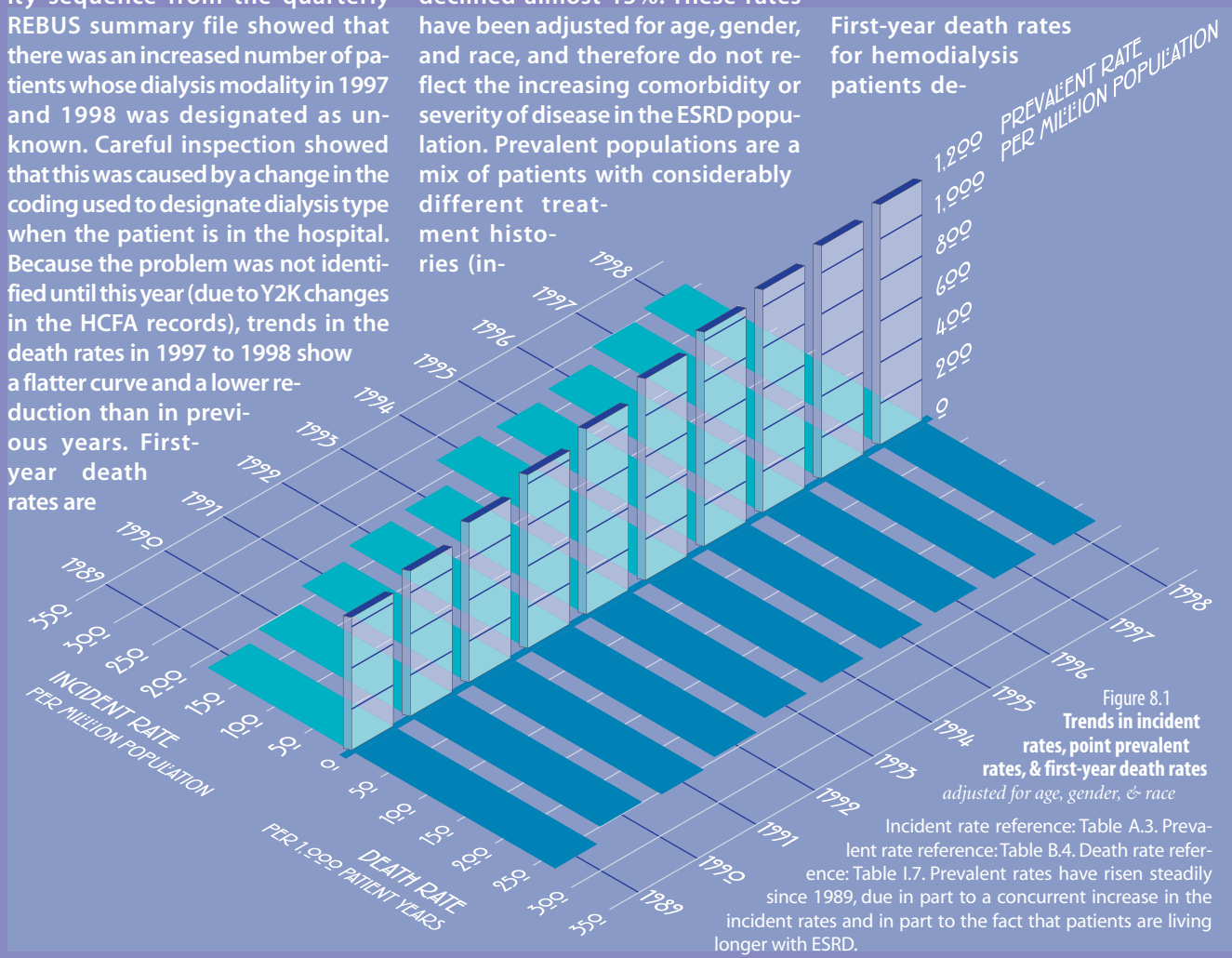
In addition, an analysis of the modality sequence from the quarterly REBUS summary file showed that there was an increased number of patients whose dialysis modality in 1997 and 1998 was designated as unknown. Careful inspection showed that this was caused by a change in the coding used to designate dialysis type when the patient is in the hospital. Because the problem was not identified until this year (due to Y2K changes in the HCFA records), trends in the death rates in 1997 to 1998 show a flatter curve and a lower reduction than in previous years. First-year death rates are

more vulnerable to these modality errors since changes occur most frequently in the first 90 days of treatment, a time when there is limited data for patients younger than 65—particularly for employer group health plan patients, patients in Medicare risk HMOs, and patients for whom there are no claims in the first 90 days. Second-year death rates are less vulnerable to these problems since they are calculated primarily for patients who have Medicare as their primary payor.

Relationships between incidence, prevalence, and death rates are shown in Figure 8.1. The steady increases in both incident and prevalent rates over the last decade are associated with the advancing age of the ESRD population and with increased comorbidity, particularly diabetes. First-year death rates have declined almost 15%. These rates have been adjusted for age, gender, and race, and therefore do not reflect the increasing comorbidity or severity of disease in the ESRD population. Prevalent populations are a mix of patients with considerably different treatment histories (in-

cluding prior transplant or different lengths of time on dialysis), and this mix can also mask improvements in the death rates.

Mean death rates vary up to 38% by state (fig 8.2), a difference which does not reflect comorbidity, disease severity, the degree of anemia treatment, or dialysis adequacy. The survival of patients who return to dialysis within a year after first transplant also varies considerably by state (fig 8.3). These patients have comparable comorbidity and disease severity, since they are screened for renal transplant. Some geographic differences may be due to the criteria used to re-initiate dialysis, the degree of anemia that develops as transplants fail, or the number of acute rejections which predispose these patients to increased risks of infections and surgical complications.

First-year death rates for hemodialysis patients de-

Figure 8.1
Trends in incident rates, point prevalent rates, & first-year death rates
adjusted for age, gender, & race

Incident rate reference: Table A.3. Prevalent rate reference: Table B.4. Death rate reference: Table I.7. Prevalent rates have risen steadily since 1989, due in part to a concurrent increase in the incident rates and in part to the fact that patients are living longer with ESRD.

creased 11% between 1989 and 1998, but remained relatively flat in 1996–1998 (fig 8.4). First-year rates for patients on peritoneal dialysis, in contrast, decreased 27% over the ten-year period. (Because Medicare starts payment for these patients without a 90-day waiting period, patients on peritoneal dialysis are less vulnerable to the 90-day modality uncertainty than hemodialysis patients. Since the treatment history can be tracked from day one there is more information on the treatment sequence.) The decrease in second-year death rates for dialysis patients was more consistent at 15–20%.

We examined incident patient survival as a function of urea reduction ratio. Based on a six-month entry period for incident patients from 1998, URR was determined from the claims and analyzed in a Cox regression model. Covariates included age, gender, race, renal diagnosis, comorbidity, severity of disease, and hematocrit level. Results show that only those patients with URRs less than 60% had a higher risk of death compared to those with a URR of 65–<70%. This pattern was the same for blacks and whites as well for diabetic and non-diabetic patients.

Since this is the first time a large-scale explanation of the association between URR and hematocrit has been performed on the national level, more work is needed to assess the long-term implications of these results. These studies should be repeated for years after 1999 when the general treatment of anemia is more stable and the target ranges for clinical treat-

ment of anemia and dialysis adequacy approach the NKF-DOQI recommendations. These trends are monitored through HCFA direct data collection and incorporated in the Clinical Performance Measures

project. Merging these data with the clinical event data may provide a more direct way to assess the impact of clinical practice and validate the reported URRs and hematocrit levels.
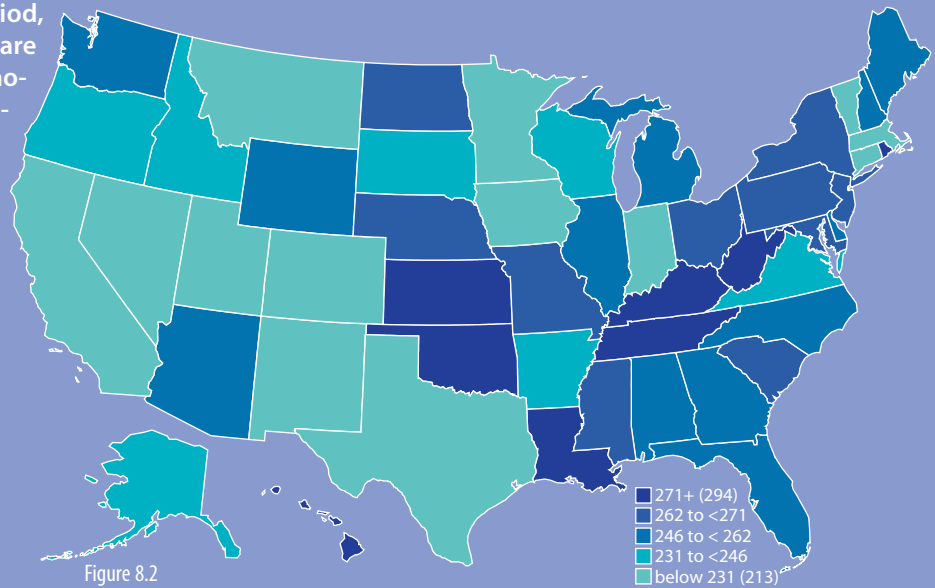
Figure 8.2
First-year death rates
incident dialysis patients, 1998, adjusted for age, gender, race, & primary diagnosis of diabetes

- 271+ (294)
- 262 to <271
- 246 to < 262
- 231 to <246
- below 231 (213)

There is a 38% difference in mean first-year death rates between the lowest and highest quintiles,.
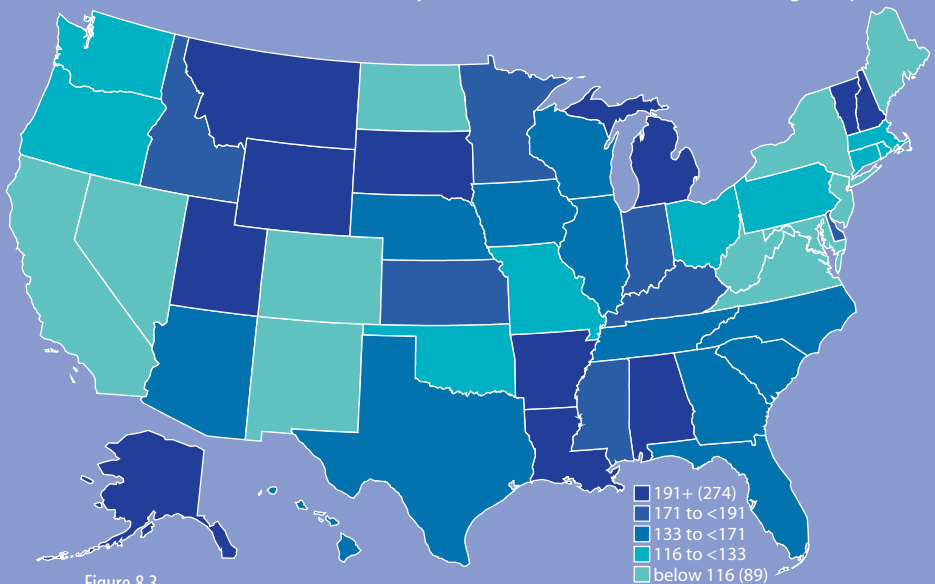
Figure 8.3
First-year death rates of patients whose first transplants fail & who return to dialysis within a year
1995–1998, adjusted for age, gender, race, diabetic status, & prior ESRD time

- 191+ (274)
- 171 to <191
- 133 to <171
- 116 to <133
- below 116 (89)

The highest first-year death rates for patients who return to dialysis after a transplant failure occur in scattered pockets throughout the country, and mean rates are three times greater in the highest quintile than in the lowest.

Figure 8.4
First- & second-year death rates, by modality: overall
incident patients, adjusted for age, gender, race, & primary diagnosis of diabetes

The number of deaths per 1,000 patient years in the first year shown, and the percent change in values over the ten-year period, are indicated next to the lines.

Overall first-year death rates have decreased since 1989 for all modalities. Rates are highest in the first year for hemodialysis patients, and in the second year for patients on peritoneal dialysis.
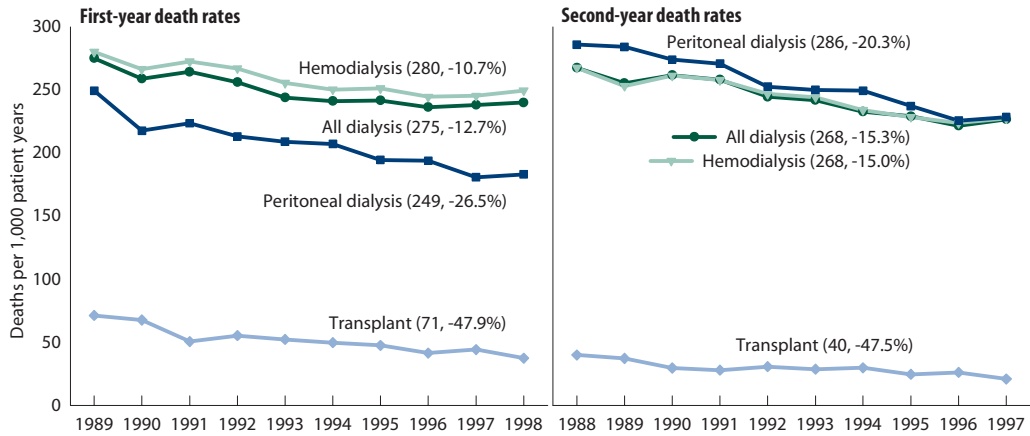
Reference: Tables H.14 & H.15.

First-year death rates

Hemodialysis (280, -10.7%)
All dialysis (275, -12.7%)
Peritoneal dialysis (249, -26.5%)
Transplant (71, -47.9%)

Second-year death rates

Peritoneal dialysis (286, -20.3%)
All dialysis (268, -15.3%)
Hemodialysis (268, -15.0%)
Transplant (40, -47.5%)

Figure 8.5
First- & second-year death rates, by age: hemodialysis
incident patients, adjusted for gender, race, & primary diagnosis of diabetes

The number of deaths per 1,000 patient years in the first year shown, and the percent change in values over the ten-year period, are indicated next to the lines.

Mortality rates in the first and second years increase with the age of the hemodialysis patient population, with first-year death rates for patients 75 and older being more than nine times those for pediatric patients in 1999. Rates have declined for patients in all age groups except those aged 0–19, in whom they have increased slightly.
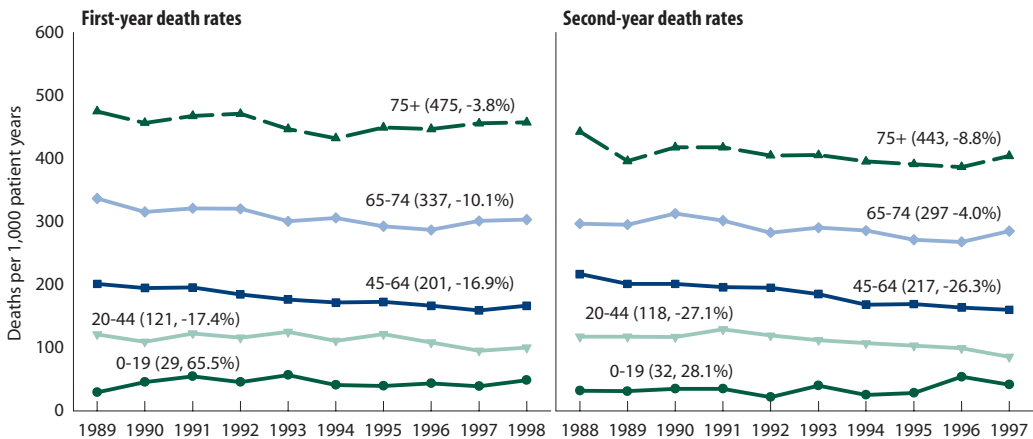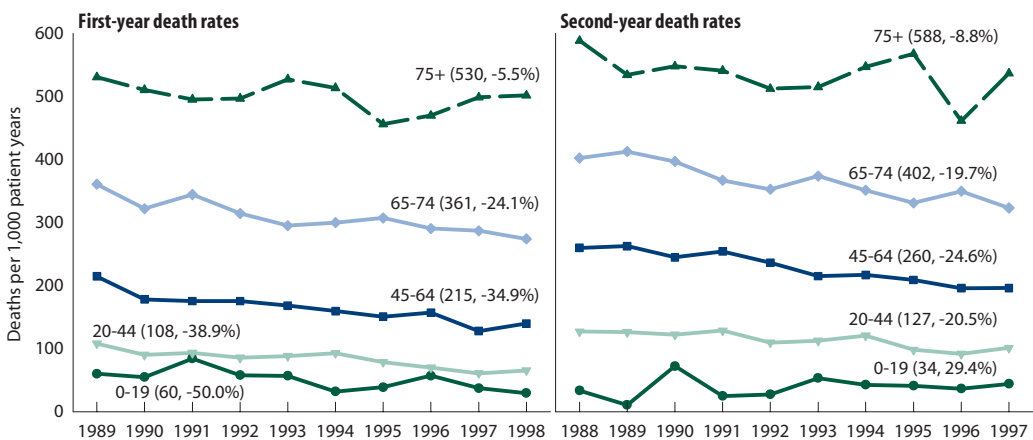
Reference: Tables H.14 & H.15.

First-year death rates

75+ (475, -3.8%)
65-74 (337, -10.1%)
45-64 (201, -16.9%)
20-44 (121, -17.4%)
0-19 (29, 65.5%)

Second-year death rates

75+ (443, -8.8%)
65-74 (297 -4.0%)
45-64 (217, -26.3%)
20-44 (118, -27.1%)
0-19 (32, 28.1%)

Figure 8.6
First- & second-year death rates, by age: peritoneal dialysis
incident patients, adjusted for gender, race, & primary diagnosis of diabetes

The number of deaths per 1,000 patient years in the first year shown, and the percent change in values over the ten-year period, are indicated next to the lines.

Death rates for patients on peritoneal dialysis decreased in all groups except for patients aged 0–19, for whom second-year rates increased 29.4% between 1988 and 1997. Second-year death rates are higher than first-year rates for all age categories.
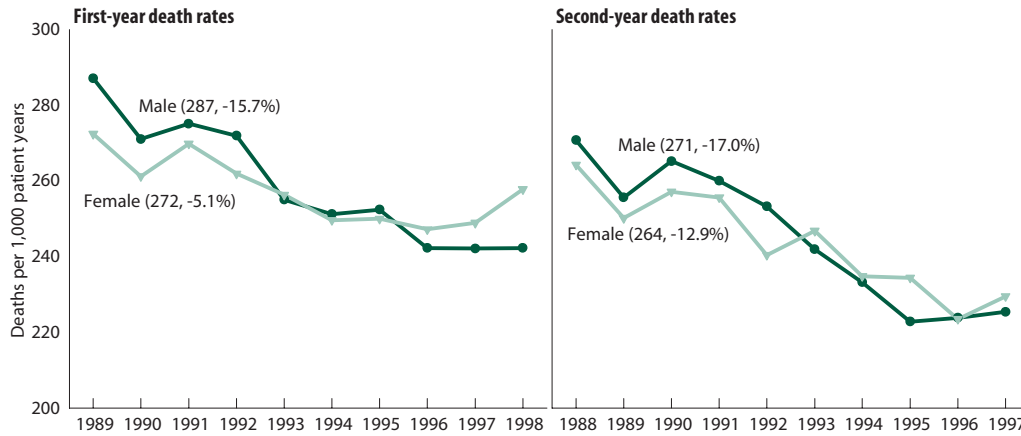
Reference: Tables H.14 & H.15.

First-year death rates

75+ (530, -5.5%)
65-74 (361, -24.1%)
45-64 (215, -34.9%)
20-44 (108, -38.9%)
0-19 (60, -50.0%)

Second-year death rates

75+ (588, -8.8%)
65-74 (402, -19.7%)
45-64 (260, -24.6%)
20-44 (127, -20.5%)
0-19 (34, 29.4%)

First-year death rates

Second-year death rates

First-year death rates

Second-year death rates

First-year death rates
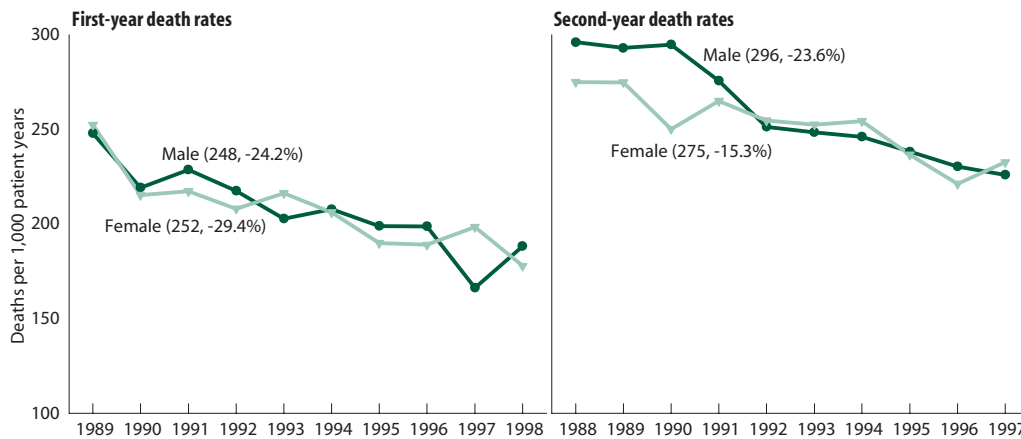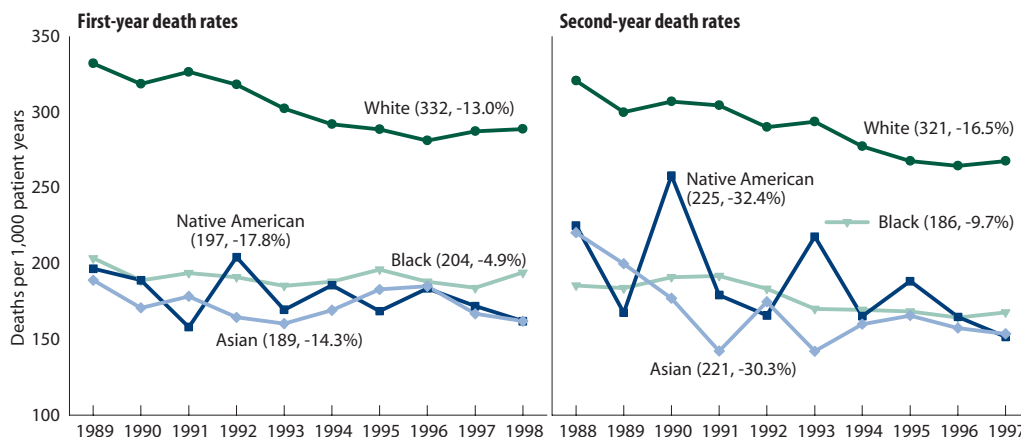
Second-year death rates

Figure 8.10
First- & second-year death rates, by race: peritoneal dialysis
incident patients, adjusted for age, gender, & primary diagnosis of diabetes

The number of deaths per 1,000 patient years in the first year shown, and the percent change in values over the ten-year period, are indicated in the legend.
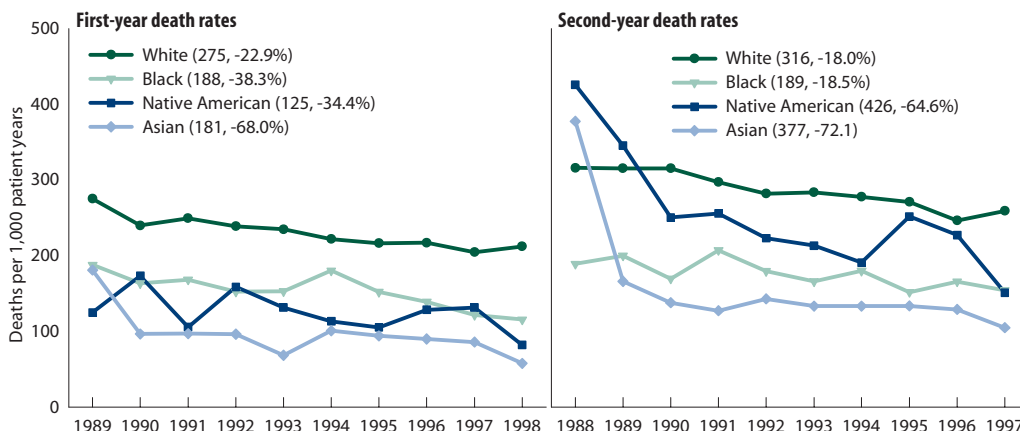
Reference: Tables H.14 & H.15.

First-year death rates

- White (275, -22.9%)
- Black (188, -38.3%)
- Native American (125, -34.4%)
- Asian (181, -68.0%)

Deaths per 1,000 patient years

Second-year death rates

- White (316, -18.0%)
- Black (189, -18.5%)
- Native American (426, -64.6%)
- Asian (377, -72.1)

Figure 8.11
First- & second-year death rates, by primary diagnosis: hemodialysis
incident patients, adjusted for age, gender, & race

The number of deaths per 1,000 patient years in the first year shown, and the percent change in values over the ten-year period, are indicated next to the lines.

Hemodialysis patients with diabetes as a primary diagnosis for renal failure continue to have the highest second-year death rates, followed by those with hypertension.

Reference Tables H.14 & H.15.

First-year death rates

Hypertension (296, -9.1 %)
Other (267, 3.8%)
Diabetes (296, -12.8%)
Glomerulonephritis (180, -22.2%)

Deaths per 1,000 patient years

Second-year death rates

Diabetes (332, -23.2%)
Hypertension (269, -9.3%)
Other (223, -10.3%)
Glomerulonephritis (152, -5.9%)
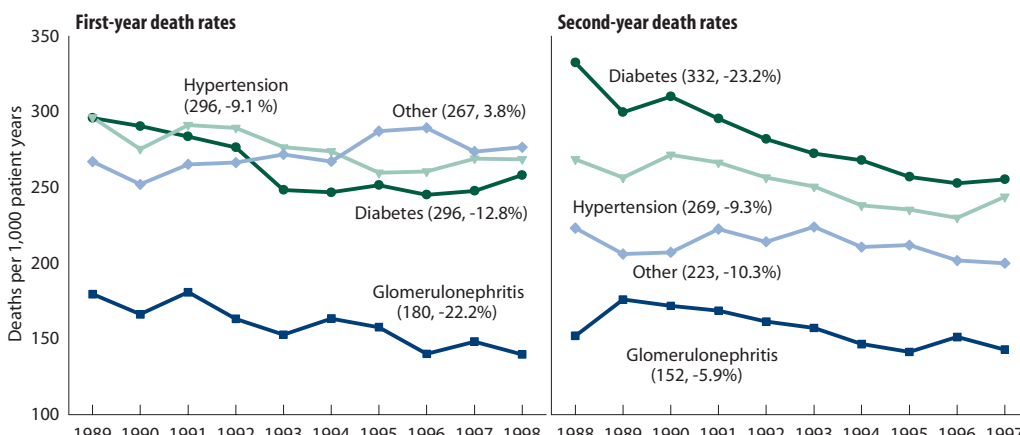
Figure 8.12
First- & second-year death rates, by primary diagnosis: peritoneal dialysis
incident patients, adjusted for age, gender, & race

The number of deaths per 1,000 patient years in the first year shown, and the percent change in values over the ten-year period, are indicated next to the lines.

Diabetes and hypertension account for the highest second-year death rates in peritoneal dialysis patients.

Reference: Tables H.14 & H.15.

First-year death rates

Diabetes (301, -26.6%)
Hypertension (289, -22.5%)
Other (200, -15.0%)
Glomerulonephritis (109, -40.4%)

Deaths per 1,000 patient years

Second-year death rates

Diabetes (396, -19.9%)
Hypertension (279, -16.5%)
Other (189, -20.5%)
Glomerulonephritis (176, -38.6%)

Hemodialysis

Third-to-fifth year (287, -8.4%)

First-year (280, -10.7%)

Second-year (253, -10.3%)

Peritoneal dialysis

Third-to-fifth year (306, -5.6%)

Second-year (284, -19.7%)

First-year (249, -26.5%)

Figure 8.13
First-, second-, & third-to-fifth year annual death rates
incident patients, adjusted for age, gender, race, & primary diagnosis of diabetes

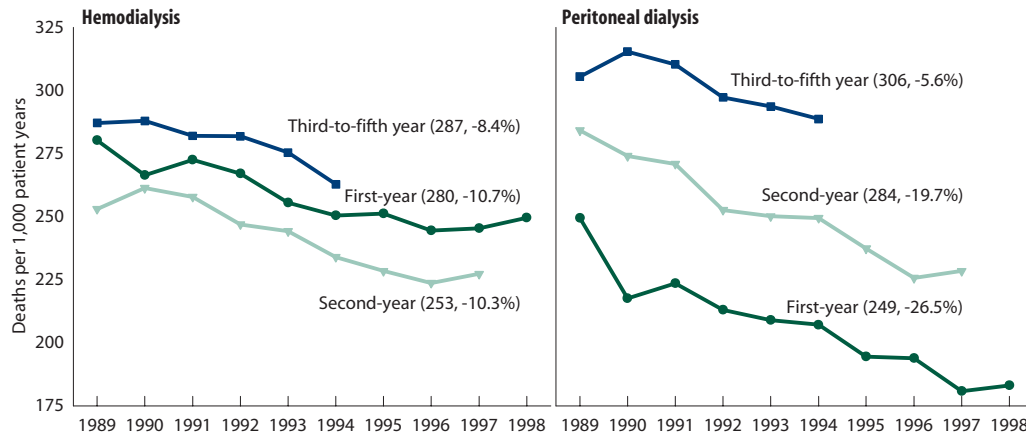The number of deaths per 1,000 patient years in 1989, and the percent change in values over the period, are shown next to the lines.

When compared to hemodialysis patients, peritoneal patients had 9.9% higher third-to-fifth year death rates in 1994.

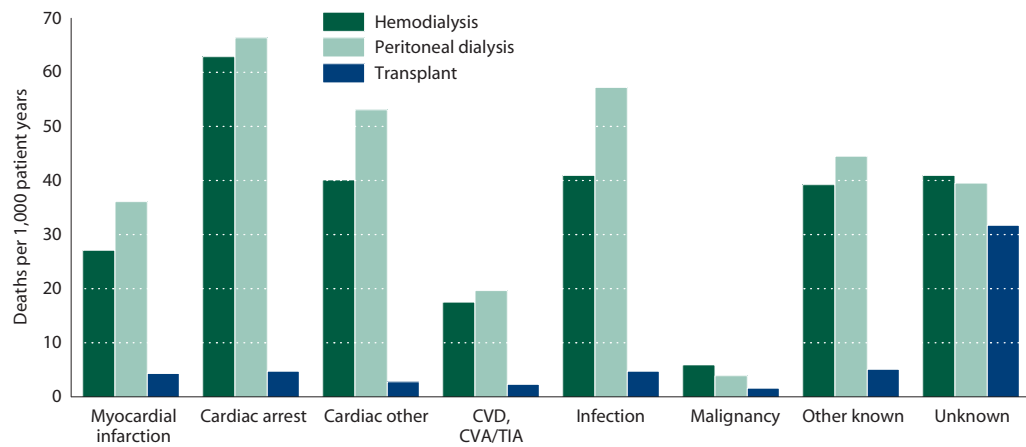Reference: Tables H.14 & H.15, and special study.

Hemodialysis
Peritoneal dialysis
Transplant

Myocardial infarction — Cardiac arrest — Cardiac other — CVD, CVA/TIA — Infection — Malignancy — Other known — Unknown

Figure 8.14
Cause-specific death rates, by modality: diabetics
period prevalent patients aged 20 & older, 1997–1999 combined, unadjusted

Comparisons of prevalent death rates across modalities should be made with caution, as the rates may be influenced by patient time on ESRD, transplant rates, comorbidity, disease severity, dialysis therapy, and hematocrit level.

Peritoneal dialysis patients have higher rates of death from myocardial infarction, cardiac arrest, cardiac (other), CVA/TIA, infection, and other known causes than their hemodialysis counterparts. Prevalent transplant patients have the lowest mortality rates in all categories.

Hemodialysis
Peritoneal dialysis
Transplant

Myocardial infarction — Cardiac arrest — Cardiac other — CVD, CVA/TIA — Infection — Malignancy — Other known — Unknown
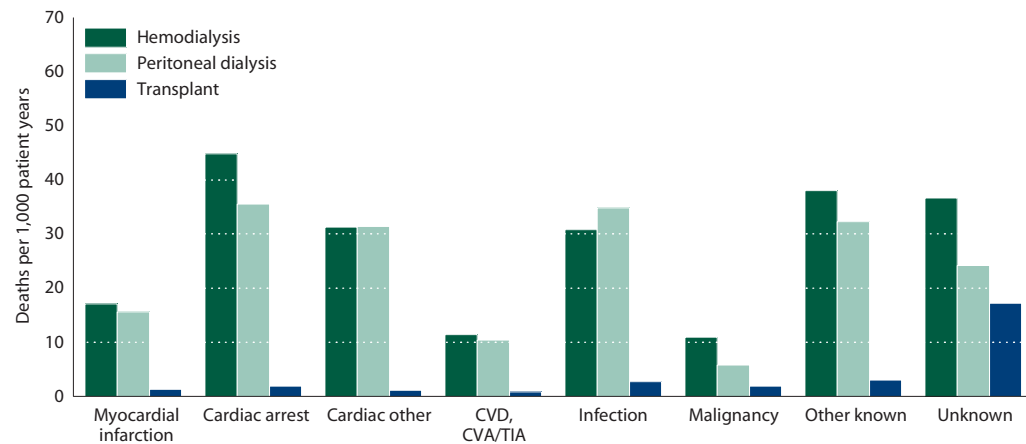
Figure 8.15
Cause-specific death rates, by modality: non-diabetics
period prevalent patients aged 20 & older, 1997–1999 combined, unadjusted

In non-diabetics, death rates in most categories are either comparable or slightly higher in hemodialysis patients compared to patients on peritoneal dialysis. Rates of death due to infection, however, are slightly higher in peritoneal dialysis patients. Mortality rates for non-diabetic transplant patients are lower than those of their diabetic counterparts.

Table 8.1
Expected remaining lifetimes (years), by age, gender, & race
period prevalent patients, 1999

The average expected remaining lifetime for dialysis and transplant patients is highly dependent on age. White male dialysis and transplant patients aged 60–64, for example, are expected to live 3.6 and 4.3 years, respectively. White males aged 50–54, in contrast, are expected to live 5.0 and 10.8 additional years, and for those aged 30–34 the numbers are 9.2 and 24.3. Comparable differences are seen in female white patients. Such discrepancies are less in black patients, since they have better overall survival on dialysis.

| | Dialysis White | | Black | | Nat. American | | Asian | | Transplant White | | Black | | Nat. American | | Asian | |
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
Age																
0-14	17.9	15.9	19.3	16.8	21.6	22.1	29.3	27.0	47.3	46.9	40.6	40.3	50.4	50.8	51.8	54.5
15-19	16.3	14.8	19.0	16.6	18.9	19.1	24.3	23.3	36.3	36.2	33.1	33.0	38.6	39.0	39.5	42.0
20-24	13.6	12.3	16.4	14.3	16.3	16.2	20.8	20.1	32.2	32.3	29.8	29.8	34.4	34.8	35.2	37.6
25-29	11.3	10.2	14.2	12.5	13.8	13.5	17.9	17.5	28.3	28.4	26.5	26.5	30.2	30.6	31.0	33.3
30-34	9.2	8.6	12.1	10.7	11.1	11.4	14.9	14.9	24.3	24.4	23.0	23.2	26.0	26.3	26.7	28.9
35-39	7.9	7.5	10.3	9.4	9.4	9.8	12.6	12.6	20.6	20.9	19.6	19.9	21.9	22.4	22.6	24.6
40-44	6.9	6.6	9.1	8.3	8.1	8.3	10.5	10.9	17.1	17.6	16.4	16.8	18.1	18.5	18.6	20.5
45-49	5.9	5.7	7.7	7.2	6.8	7.2	8.6	9.0	13.9	14.4	13.3	13.7	14.4	14.9	14.9	16.4
50-54	5.0	4.9	6.6	6.2	5.8	6.2	7.1	7.3	10.8	11.3	10.2	10.6	10.8	11.2	11.3	12.5
55-59	4.3	4.3	5.6	5.4	4.9	5.3	5.9	6.1	7.7	8.0	7.4	7.8	7.7	8.1	7.9	8.6
60-64	3.6	3.6	4.6	4.7	4.1	4.6	4.9	5.1	4.3	4.4	4.2	4.3	4.3	4.4	4.3	4.5
65-69	3.1	3.1	3.9	3.9	3.4	3.9	4.1	4.3								
70-74	2.7	2.7	3.3	3.3	2.9	3.4	3.4	3.7								
75-79	2.3	2.3	2.8	2.8	2.4	2.8	2.8	3.0								
80-84	1.9	2.0	2.3	2.3	1.9	2.3	2.3	2.5								
85+	1.6	1.6	1.8	1.9	1.5	1.8	1.8	2.1								

Figure 8.16
Associations between mortality & hematocrit level, by years of follow-up: hemodialysis

incident patients who survived the six-month entry period following day 90 of ESRD & who had at least four hematocrit/ EPO claims, 1994–1997 combined, adjusted for patient characteristics, comorbidity, & severity of disease in the entry period

For both diabetic and non-diabetic hemodialysis patients, third-year death rates are highest for those with hematocrit levels below 30%. The predictive value of a six-month hematocrit appears to be different for diabetic and non-diabetic patients, particularly in the third year of follow-up.
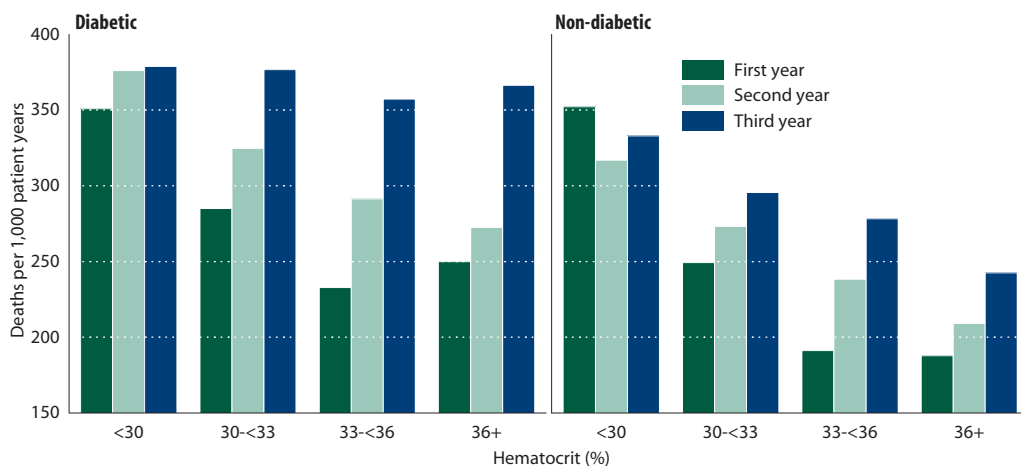

Figure 8.17
Associations between mortality & hematocrit level, by years of follow-up: peritoneal dialysis

incident patients who survived the six-month entry period following day 90 of ESRD & who had at least four hematocrit/ EPO claims, 1994–1997 combined, adjusted for patient characteristics, comorbidity, & severity of disease in the entry period

Third-year death rates for diabetic peritoneal dialysis patients are highest for those with hematocrit levels below 33%, while third-year death rates for non-diabetic peritoneal dialysis patients are highest for those with hematocrit levels below 30%.
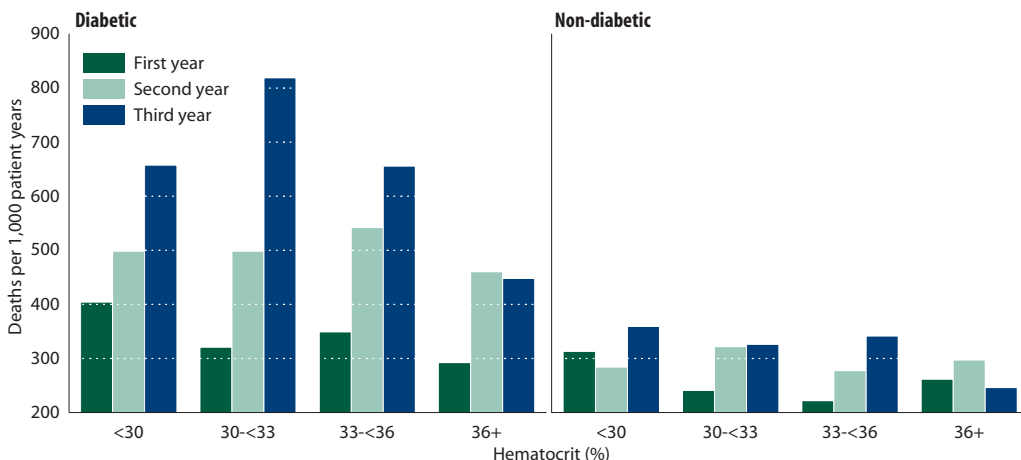
	White RR (CI)	Black RR (CI)
45-64	1.86 (1.50, 2.30)*	1.22 (0.99, 1.50)*
65-74	2.09 (1.69, 2.58)*	1.62 (1.31, 2.00)*
75 +	3.05 (2.47, 3.78)*	2.46 (1.98, 3.06)*
Male	1.06 (0.99, 1.14)	1.02 (0.92, 1.14)
Diabetic	1.20 (1.12, 1.28)*	1.01 (0.91, 1.12)*
ASHD	1.12 (1.02, 1.21)~	1.01 (0.90, 1.14)~
CHF	1.45 (1.32, 1.60)*	1.21 (1.06, 1.39)*
PVD	1.08 (1.00, 1.16)~	1.07 (0.95, 1.20)~
CVA/TIA	1.08 (1.01, 1.15)~	1.30 (1.17, 1.45)~
Cancer	1.08 (1.00, 1.15)~	1.20 (1.06, 1.35)~
Cardiac other	1.17 (1.06, 1.30)^	1.28 (1.10, 1.48)^
Gallbladder	0.98 (0.89, 1.08)	1.08 (0.92, 1.27)
COPD	1.09 (1.02, 1.17)^	1.23 (1.11, 1.38)^
GI	1.14 (1.06, 1.22)*	1.22 (1.09, 1.36)*
Liver	1.04 (0.97, 1.11)	1.04 (0.94, 1.16)
Transfusions		
1-2	1.12 (0.99, 1.28)	1.15 (0.93, 1.41)
3+	1.19 (0.79, 1.81)	2.18 (1.27, 3.74)

	White RR (CI)	Black RR (CI)
Hospitalization days		
1-10	1.42 (1.31, 1.53)*	1.23 (1.08, 1.40)*
11-20	2.12 (1.92, 2.35)*	1.49 (1.25, 1.77)*
20+	2.54 (2.29, 2.82)*	2.50 (2.13, 2.94)*
Vascular access procedures		
1-3	1.00 (0.93, 1.08)	1.03 (0.91, 1.17)
4+	0.96 (0.89, 1.04)	0.85 (0.75, 0.96)
Hematocrit		
<30	1.54 (1.38, 1.71)*	1.77 (1.53, 2.05)*
30-<33	1.15 (1.07, 1.24)*	1.26 (1.11, 1.43)*
36+	1.00 (0.91, 1.10)	0.98 (0.82, 1.16)
URR		
<60	1.32 (1.17, 1.50)*	1.34 (1.13, 1.59)*
60-<65	1.09 (0.98, 1.22)	0.94 (0.79, 1.12)
70-<75	0.96 (0.88, 1.04)	0.95 (0.82, 1.09)
75+	0.99 (0.91, 1.09)	0.90 (0.78, 1.05)

* p<0.001, ^ p<0.01, ~ p<0.05

Table 8.2
Relative risk of all-cause death, by race
incident hemodialysis patients, 1998

Reference: 20–44 years old, female, primary diagnosis not diabetes, no comorbidity, no blood transfusions, no hospitalization days, no vascular access procedures, hematocrit 33–<36, URR 65–<70% .

Separate Cox proportional hazards regression models are run for white and black patients, adjusting for the above covariates. Analyses include a six-month entry period following day 90 of ESRD, and patients are followed for a maximum of 18 months.
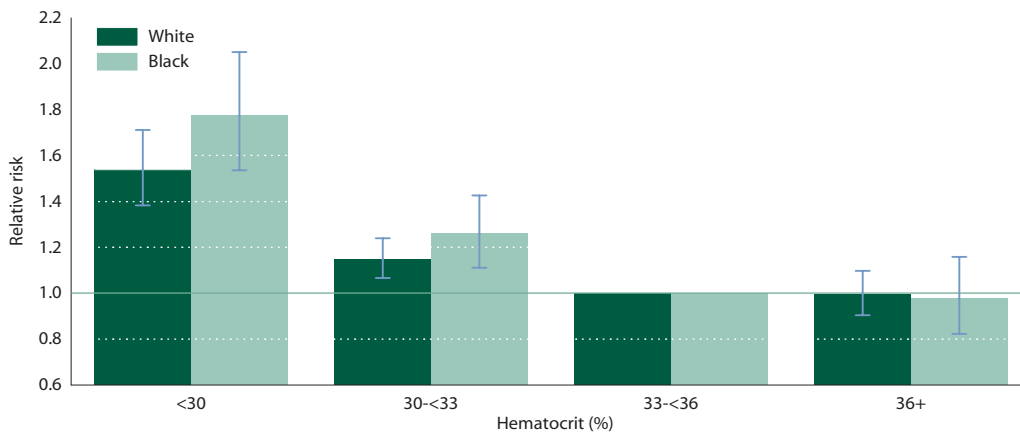

Figure 8.18
Relative risk of all-cause death, by hematocrit & race
incident hemodialysis patients, 1998, adjusted for age, gender, comorbidity, disease severity, & URR, stratified on diabetic status

The relative risk of all-cause death is highest in both black and white hemodialysis patients with hematocrit levels below 30%.
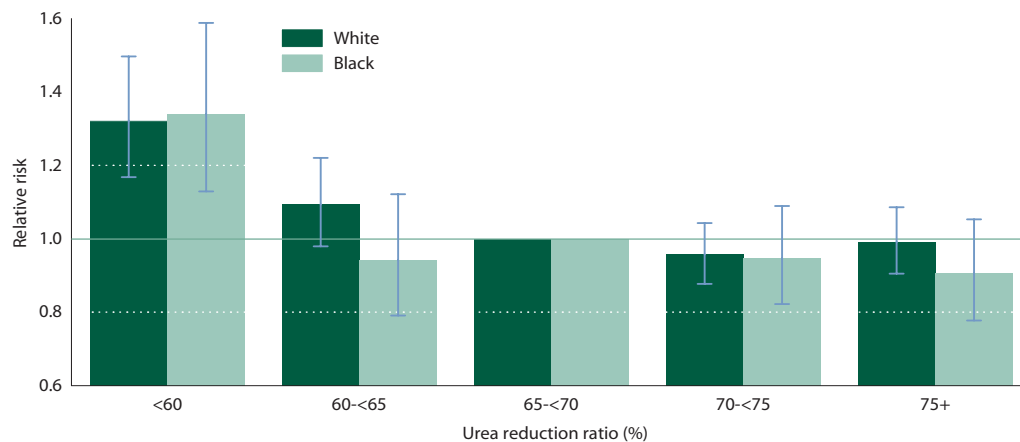

Figure 8.19
Relative risk of all-cause death, by urea reduction ratio & race
incident hemodialysis patients, 1998, adjusted for age, gender, comorbidity, disease severity, & hematocrit, stratified on diabetic status

The relative risk of all-cause death is highest in both white and black hemodialysis patients with urea reduction ratios below 60%.

Table 8.3
Relative risk of all-cause death, by diabetic status
incident hemodialysis patients, 1998

Reference: 20–44 years old, female, white, no comorbidity, no blood transfusions, no hospitalization days, no vascular access procedures, hematocrit 33–<36, URR 65–<70.

Separate Cox proportional hazards regression models are run for diabetic and non-diabetic patients, adjusting for the above covariates. Analyses include a six-month entry period following day 90 of ESRD, and patients are followed for a maximum of 18 months.

	Diabetic RR (CI)	Non-diabetic RR (CI)		Diabetic RR (CI)	Non-diabetic RR (CI)
45-64	1.39 (1.13, 1.70)^	1.58 (1.29, 1.94)*	Hospitalization days		
65-74	1.68 (1.37, 2.06)*	2.02 (1.66, 2.46)*	1-10	1.23 (1.12, 1.35)*	1.48 (1.35, 1.62)*
75+	2.27 (1.84, 2.80)*	3.16 (2.60, 3.85)*	11-20	1.81 (1.60, 2.04)*	1.96 (1.73, 2.22)*
			20+	2.41 (2.15, 2.72)*	2.63 (2.33, 2.98)*
Male	1.09 (1.01, 1.18)~	0.99 (0.92, 1.08)			
			Vascular access procedures		
Black	0.71 (0.65, 0.77)*	0.91 (0.83, 0.99)~	1-3	1.11 (1.02, 1.22)~	0.92 (0.84, 1.01)
Other race	0.83 (0.71, 0.97)~	0.93 (0.75, 1.15)	4+	0.97 (0.89, 1.07)	0.89 (0.81, 0.97)~
ASHD	1.13 (1.02, 1.24)~	1.05 (0.96, 1.15)	Hematocrit		
CHF	1.24 (1.11, 1.39)*	1.51 (1.36, 1.67)*	<30	1.56 (1.38, 1.76)*	1.73 (1.55, 1.94)*
PVD	1.14 (1.04, 1.25)^	1.04 (0.95, 1.13)	30-<33	1.14 (1.04, 1.24)^	1.23 (1.13, 1.35)*
CVATIA	1.18 (1.09, 1.28)*	1.10 (1.01, 1.19)~	36+	1.04 (0.92, 1.16)	0.94 (0.84, 1.05)
Cancer	0.98 (0.90, 1.08)	1.21 (1.12, 1.31)*			
Cardiac other	1.29 (1.12, 1.45)*	1.12 (1.00, 1.26)	URR		
Gallbladder	0.99 (0.88, 1.11)	1.04 (0.93, 1.17)	<60	1.39 (1.22, 1.58)*	1.35 (1.17, 1.57)*
COPD	1.14 (1.06, 1.24)*	1.13 (1.04, 1.22)^	60-<65	1.04 (0.92, 1.18)	1.09 (0.95, 1.24)
GI	1.15 (1.06, 1.24)^	1.15 (1.07, 1.25)*	70-<75	0.98 (0.89, 1.09)	0.95 (0.85, 1.05)
Liver	1.08 (1.00, 1.17)~	1.03 (0.95, 1.11)	75+	0.99 (0.88, 1.10)	0.97 (0.87, 1.08)
Transfusions					
1-2	1.06 (0.91, 1.24)	1.26 (1.09, 1.45)^			
3+	1.26 (0.77, 2.07)	1.52 (0.99, 2.33)			* p<0.001, ^ p<0.01, ~ p<0.05

Figure 8.20
Relative risk of all-cause death, by hematocrit & diabetic status
incident hemodialysis patients, 1998, adjusted for age, gender, comorbidity, disease severity, & URR, stratified on race

The relative risk of all-cause death in diabetic and non-diabetic hemodialysis patients is highest in those with hematocrit levels below 30%.
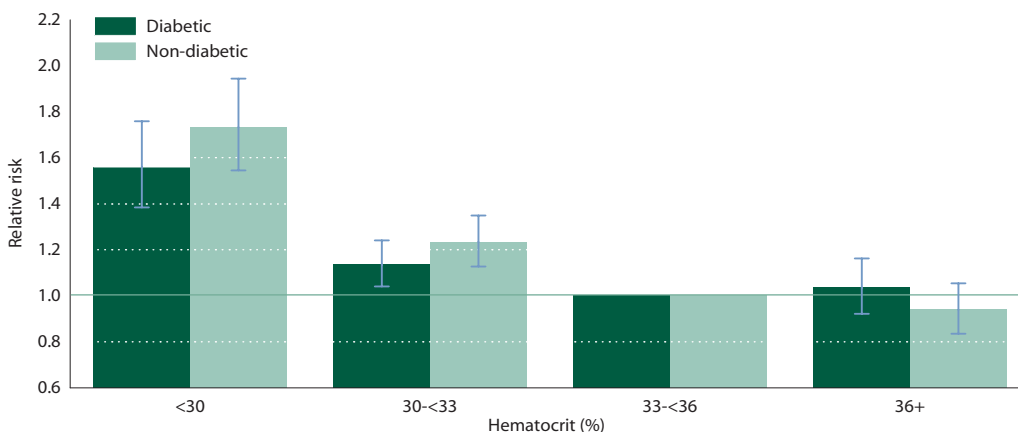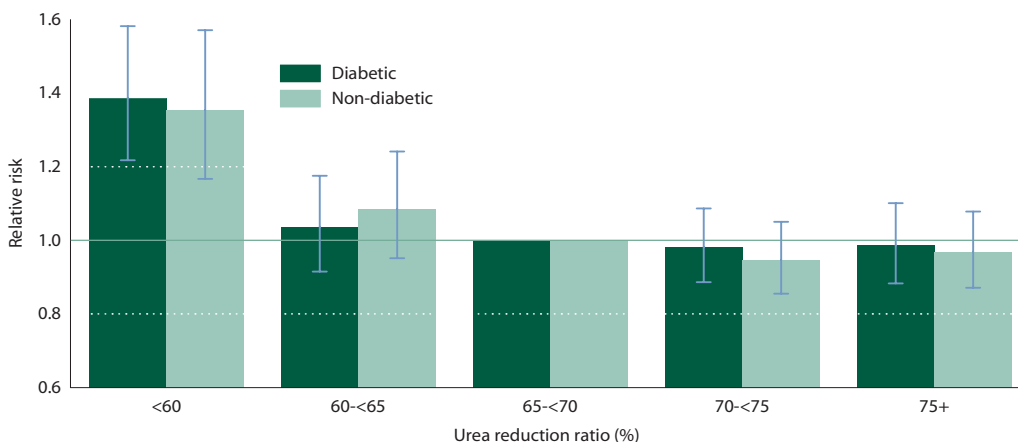

Figure 8.21
Relative risk of all-cause death, by urea reduction ratio & diabetic status
incident hemodialysis patients, 1998, adjusted for age, gender, comorbidity, disease severity, & hematocrit, stratified on race

Both diabetic and non-diabetic hemodialysis patients with a urea reduction ratio of less than 60% have a significantly higher risk of all-cause death compared to patients with urea reduction ratios of 65 to less than 70%.
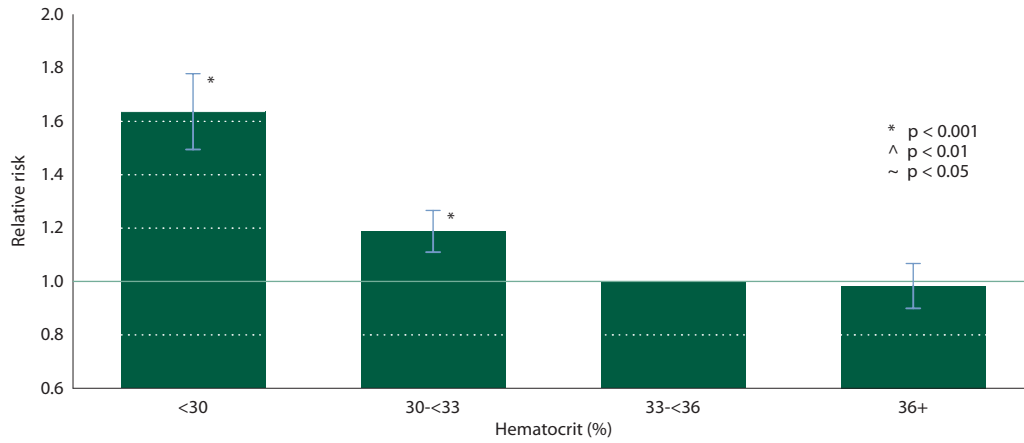
Figure 8.22
Relative risk of all-cause death, by hematocrit
incident hemodialysis patients, 1998, adjusted for age, gender, race, comorbidity, disease severity, & URR, stratified on diabetic status

The relative risk of all-cause death is highest in hemodialysis patients with hematocrit levels below 30%.
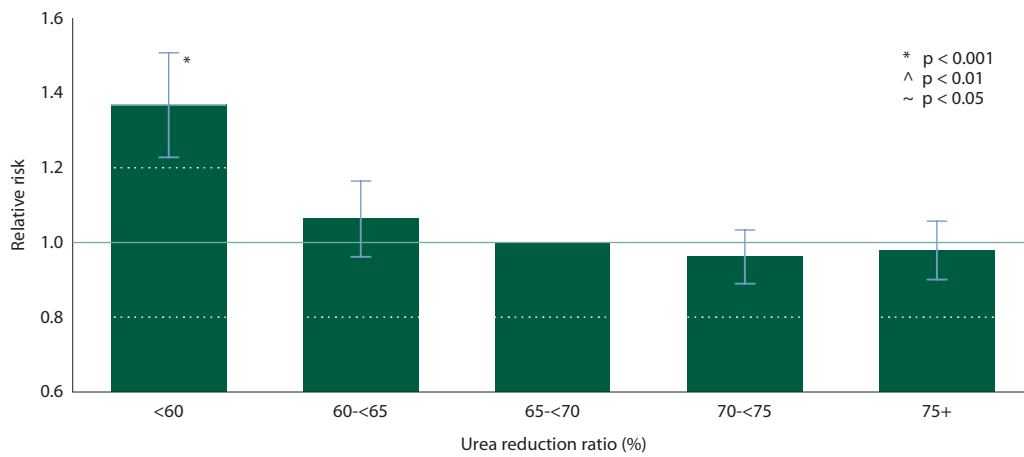
* p < 0.001
^ p < 0.01
~ p < 0.05

Figure 8.23
Relative risk of all-cause death, by urea reduction ratio
incident hemodialysis patients, 1998, adjusted for age, gender, race, comorbidity, disease severity, & hematocrit, stratified on diabetic status

The relative risk of all-cause death is highest in hemodialysis patients with urea reduction ratios below 60%.
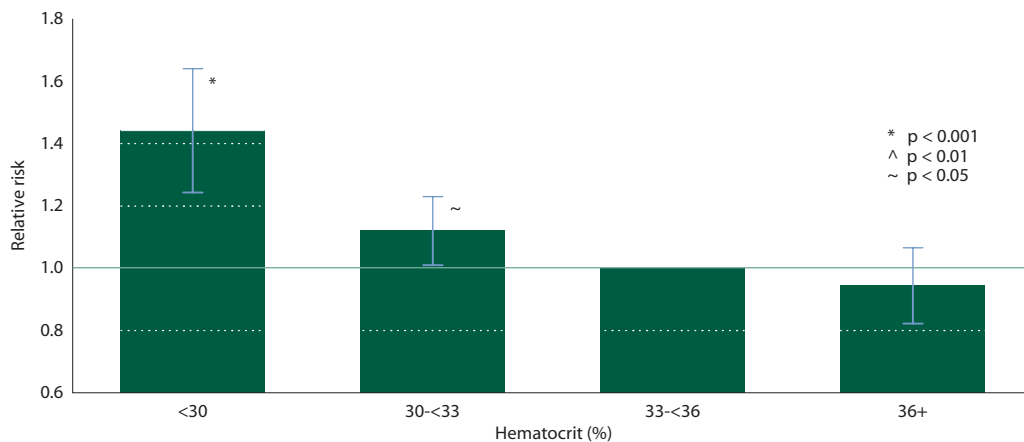
* p < 0.001
^ p < 0.01
~ p < 0.05

Figure 8.24
Relative risk of cardiac death, by hematocrit
incident hemodialysis patients, 1998, adjusted for age, gender, race, comorbidity, disease severity, & URR, stratified on diabetic status

The relative risk of cardiac death is highest in hemodialysis patients with hematocrit levels below 30%.

* p < 0.001
^ p < 0.01
~ p < 0.05

Figure 8.25
**Relative risk of cardiac death,
by urea reduction ratio**
*incident hemodialysis patients,
1998, adjusted for age, gender,
race, comorbidity, disease
severity, & hematocrit, stratified
on diabetic status*

The relative risk of cardiac death
is highest in hemodialysis
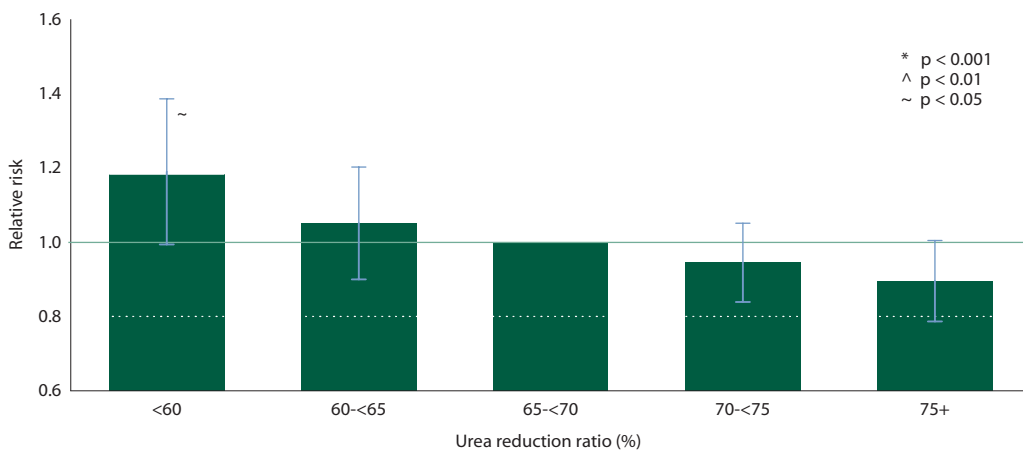patients with urea reduction
ratios below 60%.

* p < 0.001
^ p < 0.01
~ p < 0.05

Relative risk

Urea reduction ratio (%)

Figure 8.26
**Relative risk of infectious
death, by hematocrit**
*incident hemodialysis patients,
1998, adjusted for age, gender,
race, comorbidity, disease
severity, & URR, stratified on
diabetic status*

As is the case for all-cause death
and cardiac death, the relative
risk of infectious death in
hemodialysis patients is highest
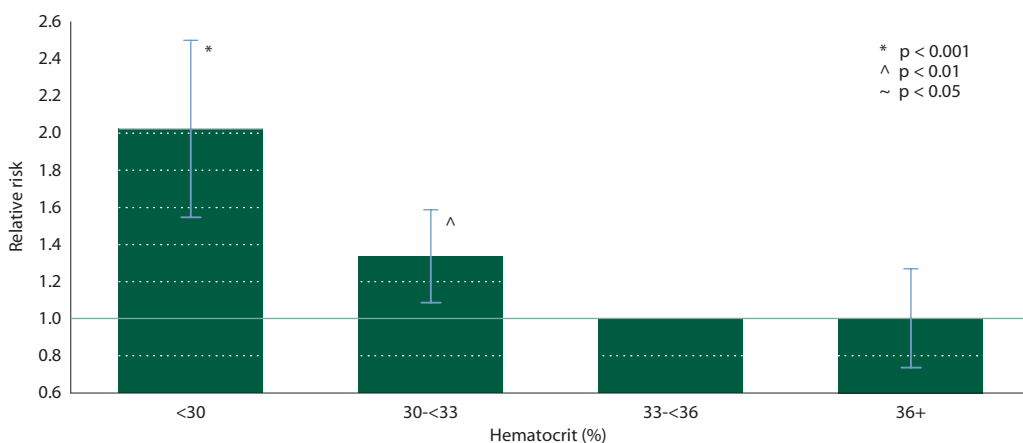for those with hematocrit levels
below 30%.

* p < 0.001
^ p < 0.01
~ p < 0.05

Relative risk

Hematocrit (%)

Figure 8.27
**Relative risk of infectious
death, by urea reduction ratio**
*incident hemodialysis patients,
1998, adjusted for age, gender,
race, comorbidity, disease
severity, & hematocrit, stratified
on diabetic status*

The relative risk of infectious
death is highest in hemodialysis
patients with urea reduction ra-
tios below 60%.

* p < 0.001
^ p < 0.01
~ p < 0.05

Relative risk

Urea reduction ratio (%)