

Evolution of death risk following initiation of dialysis in the United States

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Introduction

- Although initiation of dialysis is a period of great flux, the evolution of mortality risk early in the course of hemodialysis remains poorly studied. This lack of information is surprising, as it could help with clinical decision-making.
- Regarding mortality patterns from large national dialysis patient registries, there is concern that a survivor bias may be present at the initiation of RRT, with a retrospective decision being made to register patients in national registries after they have survived for indeterminate periods of time.

Objectives

- As few studies have systematically examined whether large national registry data are subject to this bias, we set out to address this question among adult patients in the United States Renal Data System (USRDS).

Methods

- USRDS standard analytical files were used to select patients who initiated dialysis between 2000 and 2009.
- As an indication of survival bias we hypothesized that mortality rates should be less than in the general population with GFR <20.
- As another indication of possible survival bias, we also compared mortality rates with follow-up beginning from the point when peak mortality rates were observed.
- Poisson regression was used to determine weekly mortality rate trajectories.
- For general population mortality rate calculations, we examined adult participants in the National Health and Nutrition Examination Survey (NHANES) from years 1999 to 2004 and selected those with GFR <20.

Results

- Mortality rates in the dialysis population began at 5.9 per 100 person-years in week 1 (Vs. 12.4 in the US general population with GFR <20), peaked (37.8) at week 6 and declined to intermediate levels (16.7) at week 52 (Figure 1).
- For mortality rates through 12 weeks, truncation of the first 6 weeks of follow-up caused a 12.3% increase in mortality rates, from 36.4 to 40.9 per 100 person-years. Between-subgroup mortality hazard ratios, however, were largely unchanged, suggesting that the relative survival effect of follow-up truncation was similar across subgroups (Table 2).
- Mortality rates and hazards ratios through 52 weeks were not meaningfully affected by truncation of initial follow-up (Table 3).

Table 1
 Characteristics at initiation of dialysis (N = 1,019,589)

	(%)
Age	
<40 yrs.	8.2
40-65 yrs.	41.5
≥65 yrs.	50.3
Female	44.8
Race	
African American	28.9
Hispanic/Latino	31.2
ESRD from diabetes	45.6
Ischemic heart disease	24.8
Hemodialysis	93.5
Peritoneal dialysis	6.5

Table 2
 Mortality up to 12 weeks; rates and adjusted hazards ratios (AHR) with (follow-up from week 6) and without (from week 1) truncation of initial follow-up.

	Week 1-12		Week 6-12	
	Rate	AHR	Rate	AHR
All	36.4	-	40.9	-
Age				
<40 yrs.	8.4	1 (R)	9.8	1 (R)
40-65 yrs.	19.6	2.25	21.9	2.16
≥65 yrs.	55.7	5.99	63.1	5.83
Female	36.7	1.00	41.9	1.03
Race				
African American	26.4	1 (R)	30.1	1 (R)
White	42.2	1.36	47.3	32.1
Hispanic/Latino	24.8	0.69	27.8	0.69
ESRD from diabetes	30.5	1 (R)	34.3	1 (R)
ESRD from hypertension	41.2	1.16	45.9	1.15
Ischemic heart disease	51.0	1.21	57.3	1.21
Hemodialysis	38.2	1 (R)	42.9	1.08
Peritoneal dialysis	12.5	0.37	14.1	0.37
GFR				
0-14	27.9	1 (R)	31.8	1 (R)
≥15	46.3	1.42	51.6	1.39

Mortality hazards ratios were adjusted for age, gender, race and ethnicity.

Figure 1
 Weekly trajectory of mortality rates following initiation of dialysis.

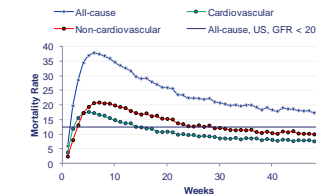


Table 3
 Mortality up to 52 weeks; rates and adjusted hazards ratios (AHR) with (follow-up from week 6) and without (from week 1) truncation of initial follow-up.

	Week 1-52		Week 6-52	
	Rate	AHR	Rate	AHR
All	28.1	-	27.0	-
Age				
<40 yrs.	7.9	1 (R)	8.1	1 (R)
40-65 yrs.	16.6	2.03	16.7	1.99
≥65 yrs.	42.9	4.93	42.6	4.80
Female	28.7	1.02	28.7	1.03
Race				
African American	21.5	1 (R)	21.6	1 (R)
White	32.1	1.30	31.8	1.29
Hispanic/Latino	19.4	0.70	19.3	0.70
ESRD from diabetes	25.6	1 (R)	25.7	1 (R)
ESRD from hypertension	30.9	1.05	30.5	1.04
Ischemic heart disease	40.0	1.25	39.7	1.25
Hemodialysis	29.2	1 (R)	29.0	1 (R)
Peritoneal dialysis	13.3	0.51	13.7	0.53
GFR				
0-14	22.0	1 (R)	22.0	1 (R)
≥15	35.6	1.40	35.3	1.39

Mortality hazards ratios were adjusted for age, gender, race and ethnicity.

Conclusions

- Within dialysis patients in the USRDS dataset, a survivor bias may be present in the initial weeks of follow-up.
- Mortality analyses of incident populations should take this possibility into account by varying the starting point for follow-up.