

Dialysis outcomes: can we do better?

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Disclosures

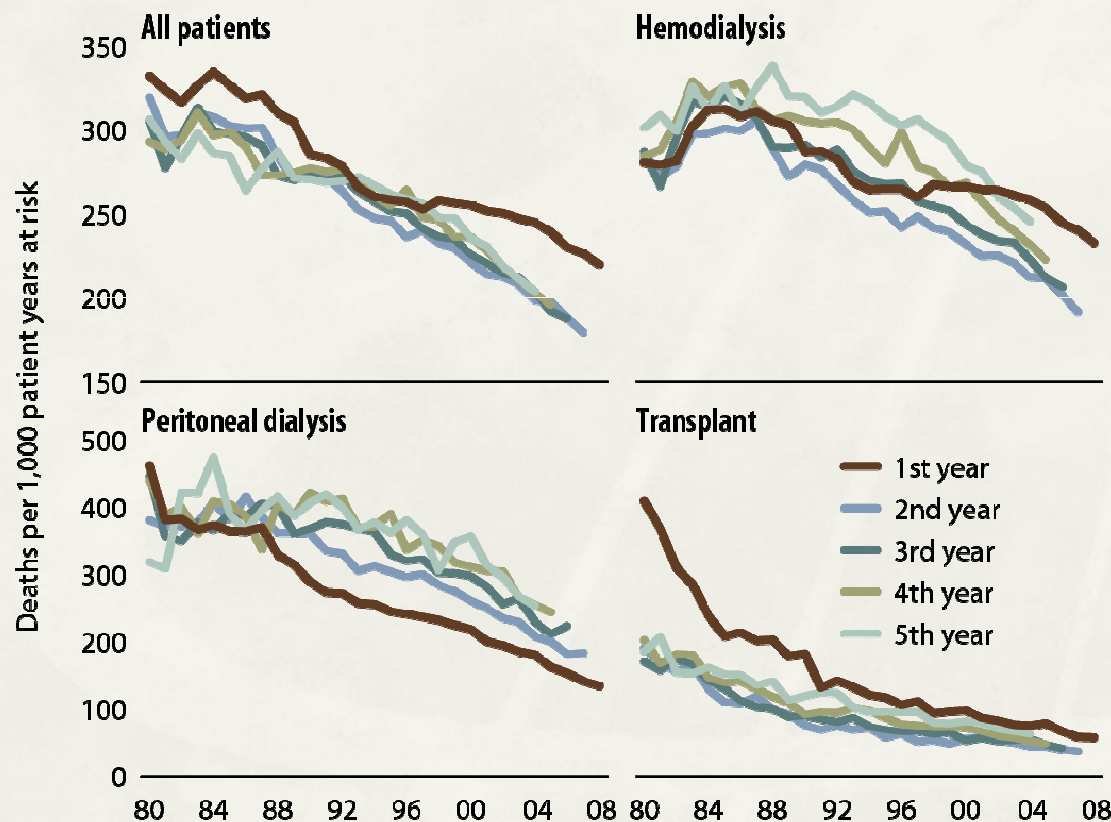
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- Advisory Boards: WHO NCD research panel, WHO field protocol for NCD Dx and Rx, KDIGO, Kidney Health Australia, CARI, IKEA-J, Kidney and Urologic Institute Karachi
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Current Status of dialysis outcomes in the United States

- Trends in both incident and prevalent based mortality
- The impact of three times per week hemodialysis on morbidity and mortality: impact of a long interdialytic interval
- Hospitalization and re-hospitalization
- Alternatives to three times per week HD in practice
 - Peritoneal dialysis
 - Frequent hemodialysis: 5+ days per week

Adjusted all-cause mortality rates (from day 90), by modality & year of treatment

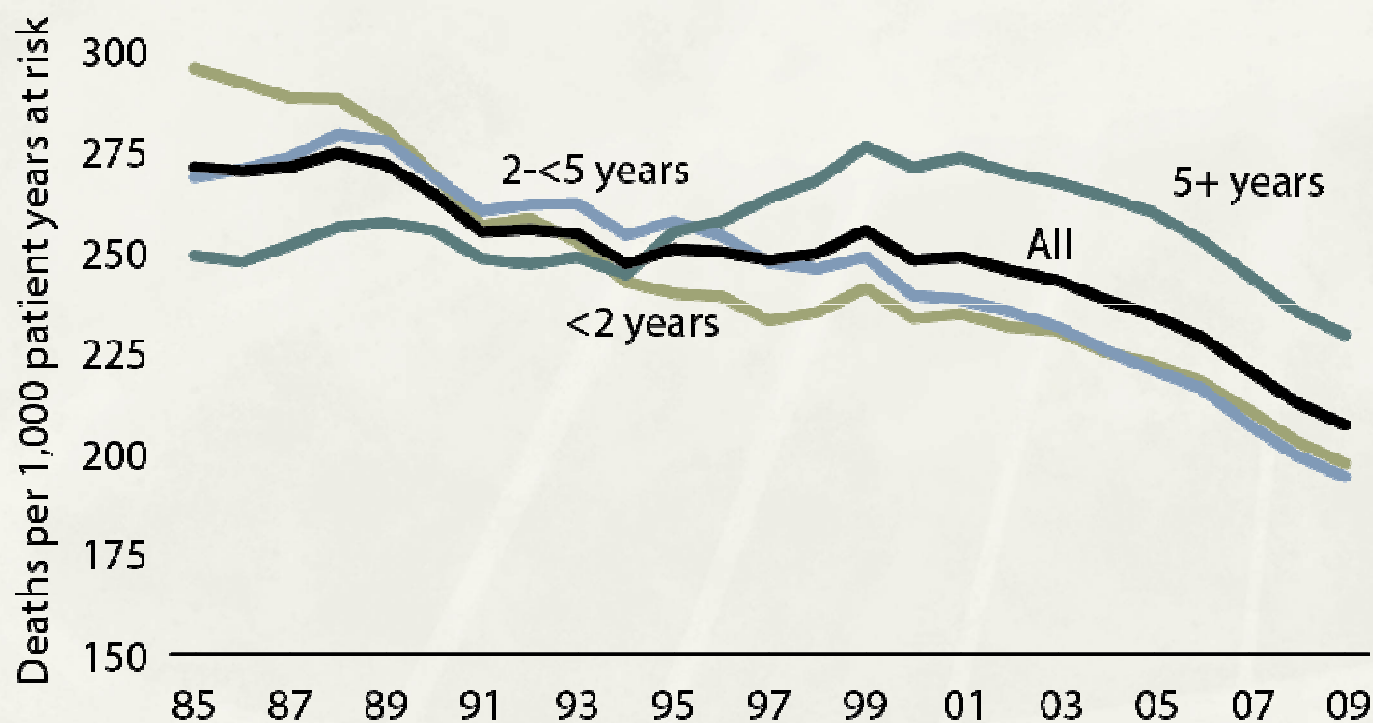
Figure 5.1 (Volume 2)



Incident ESRD patients.
Adj: age/gender/race
/primary diagnosis; ref:
incident ESRD patients,
2005.

Adjusted all-cause mortality rates in prevalent hemodialysis patients, by vintage

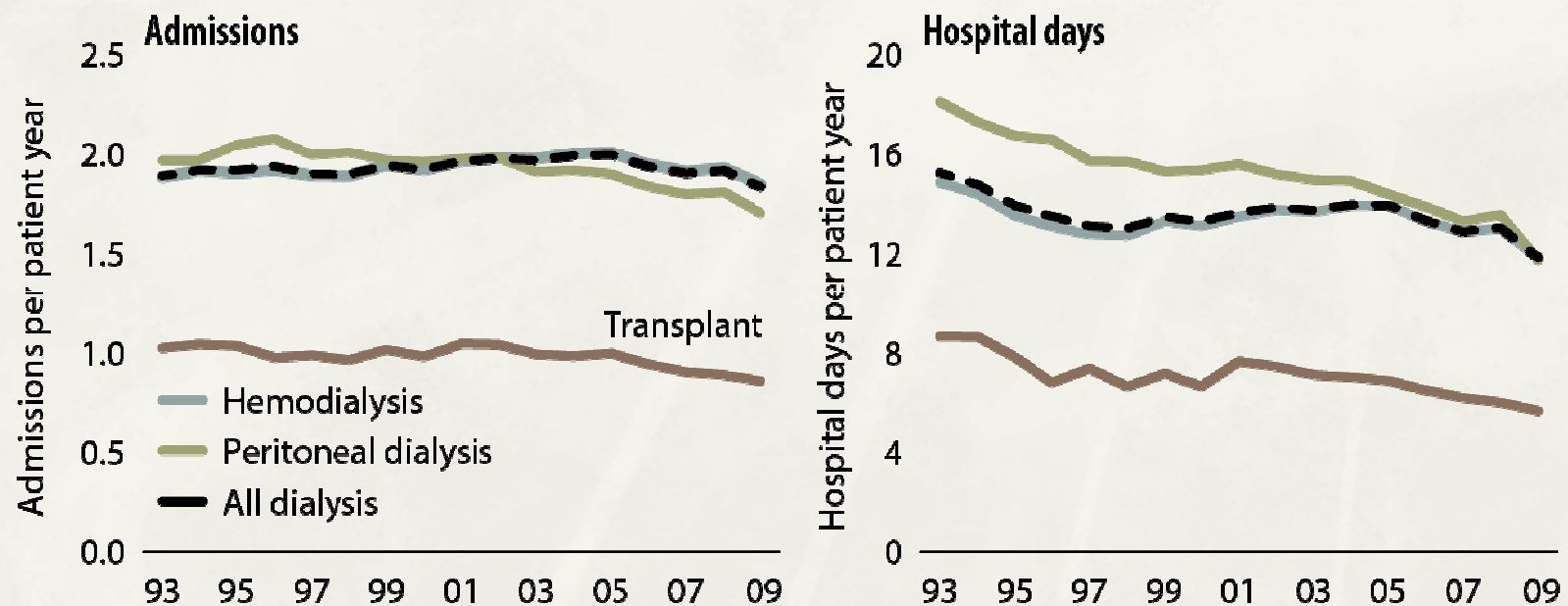
Figure 5.4 (Volume 2)



Incident hemodialysis patients. Adj: age/gender/race/primary diagnosis; ref: incident hemodialysis patients, 2005.

Adjusted hospital admission rates & days, by modality

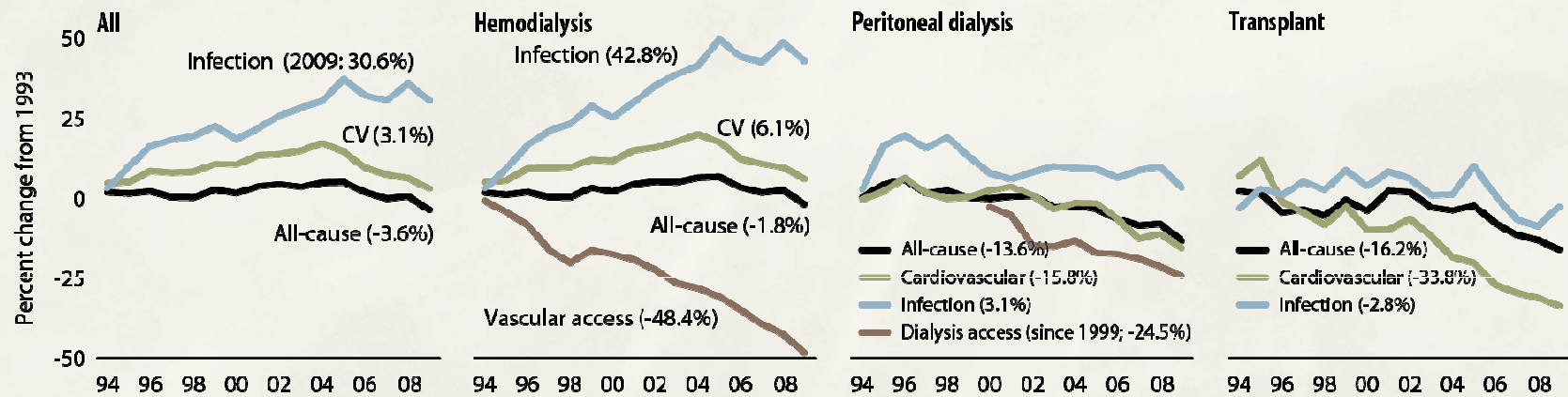
Figure 3.2 (Volume 2)



Period prevalent ESRD patients. Adj: age/gender/race/primary diagnosis; ref: ESRD patients, 2005.

Change in adjusted all-cause & cause-specific hospitalization rates, by modality

Figure 3.1 (Volume 2)



Period prevalent ESRD patients. Adj: age/gender/race/primary diagnosis; ref: ESRD patients, 2005.

State of Dialysis in the United States

- Slow progress in overall Prevalent mortality (10% decline over 20+ years)
- Slightly better improvement in incident based death rates over the last 20 years (20-30% decline)
- Hospitalization rates are still very high for CVD, Infections and other causes
- Hemodialysis is the dominant dialysis therapy based on 3 times per week

Original Article

Long Interdialytic Interval and Mortality among Patients Receiving Hemodialysis

Robert N. Foley, M.B., David
T. Gilbertson, Ph.D., Thomas
Murray, M.S., and Allan J.
Collins, M.D.

N Engl J Med
Volume 365(12):1099-1107
September 22, 2011

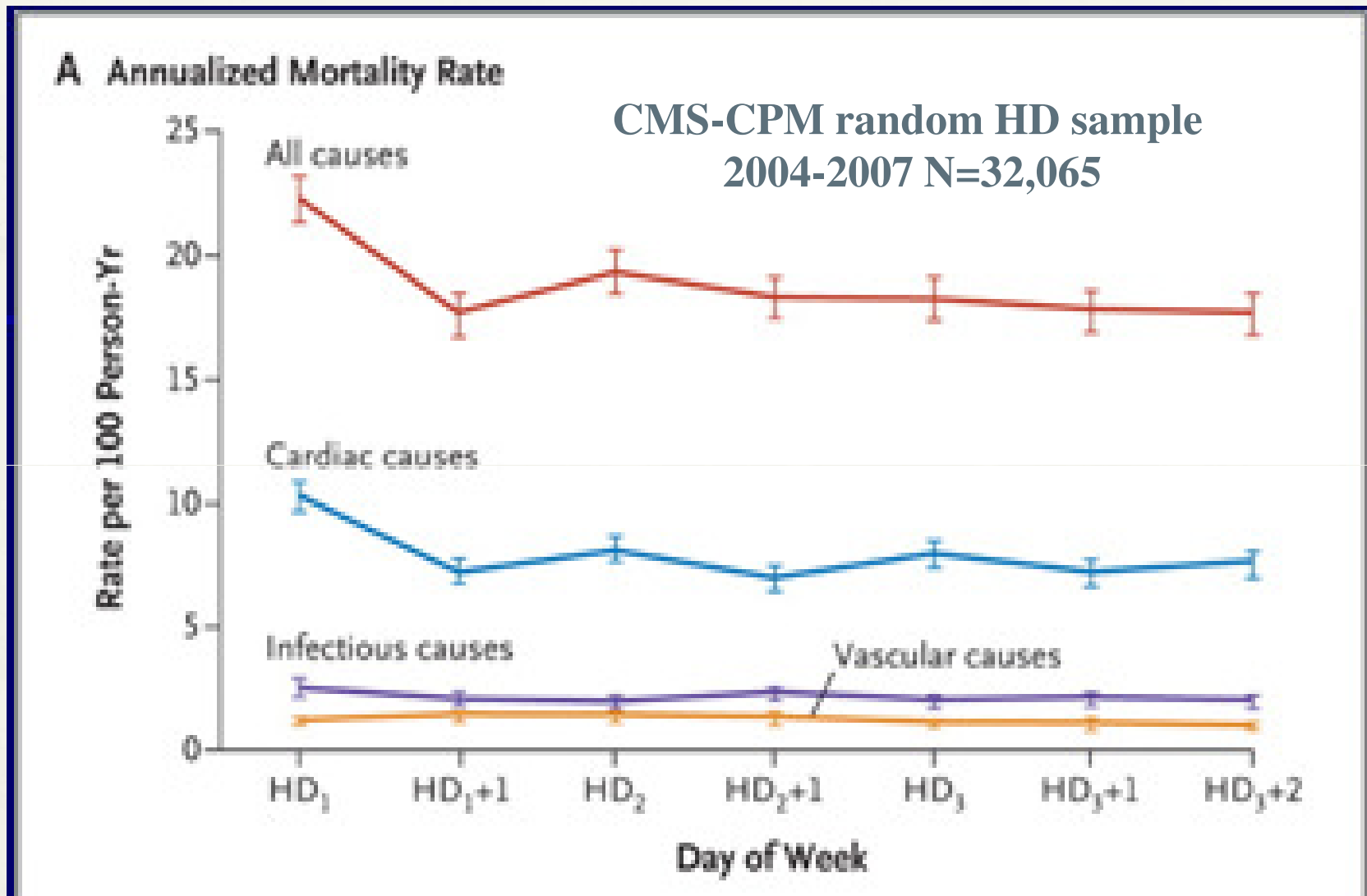
USRDS 2011 ADR



The NEW ENGLAND
JOURNAL of MEDICINE

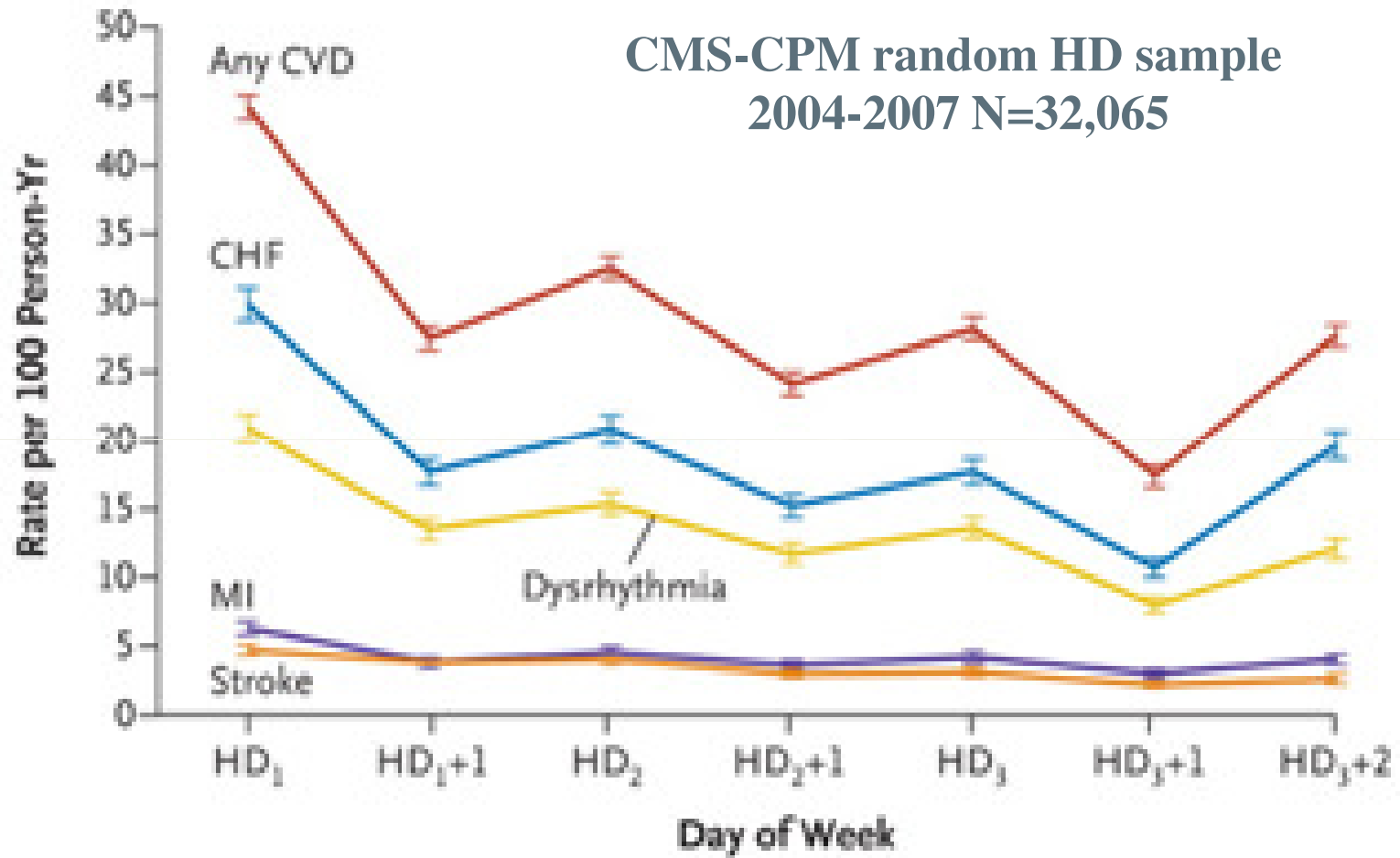
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Annualized Mortality Rates on Different Days of the Dialysis Week.



Annualized CVD Admission Rates on Different Days of the Dialysis Week.

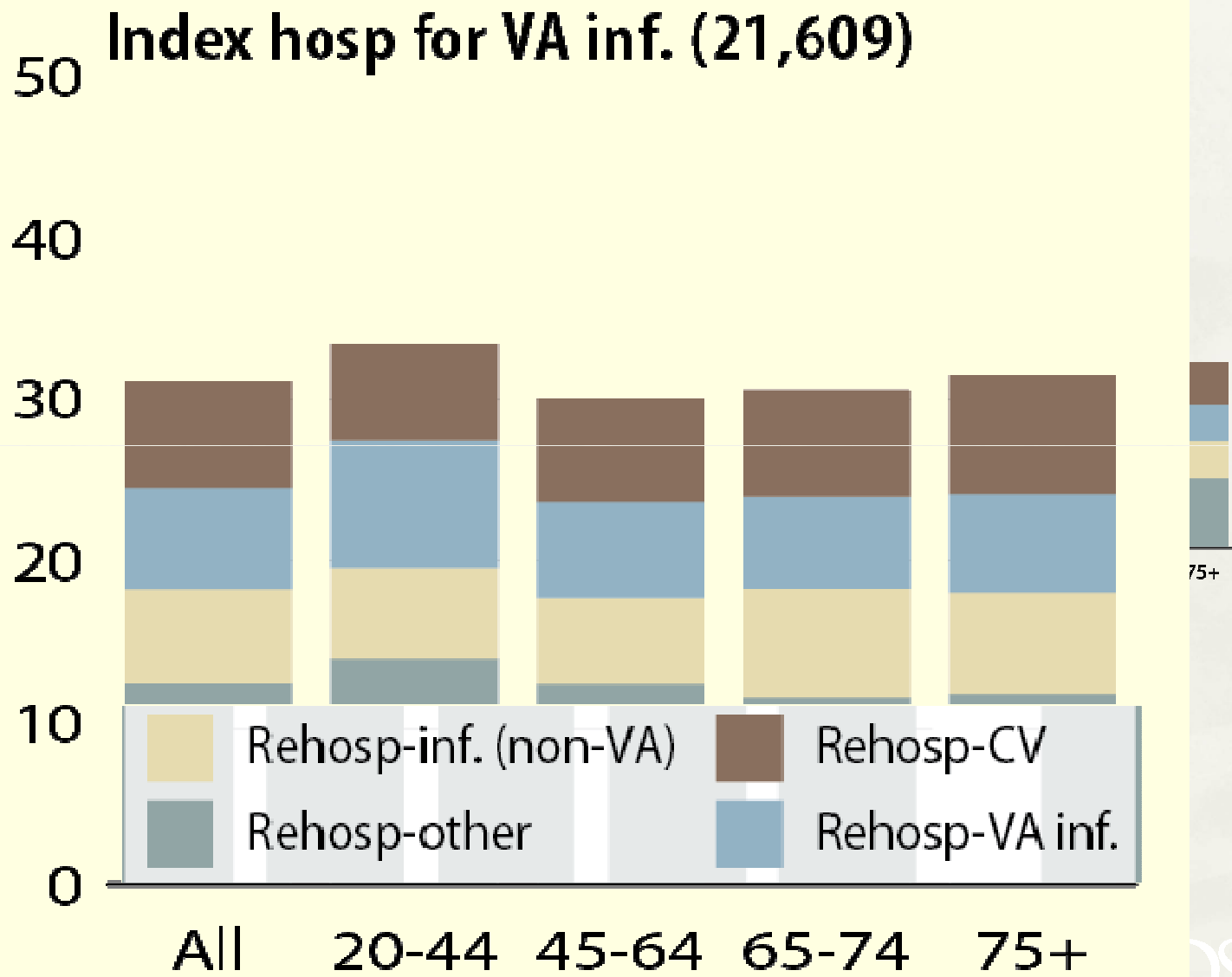
B Annualized CVD-Admission Rate



Mortality and Morbidity on three times per week hemodialysis

- The long interdialytic interval (two days off) is associated with substantial morbidity and mortality.
- Congestive Heart failure, Arrhythmias and Acute Myocardial Infarctions are the lead causes of hospitalization after the long interdialytic interval.
- This is only the tip of the iceberg!
 - Re-hospitalization within 30 days are substantial.

% live discharges with reshosp. w/i 30 days

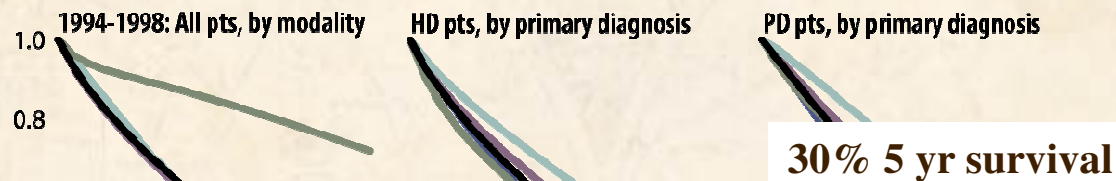


Re-hospitalizations are a major problem

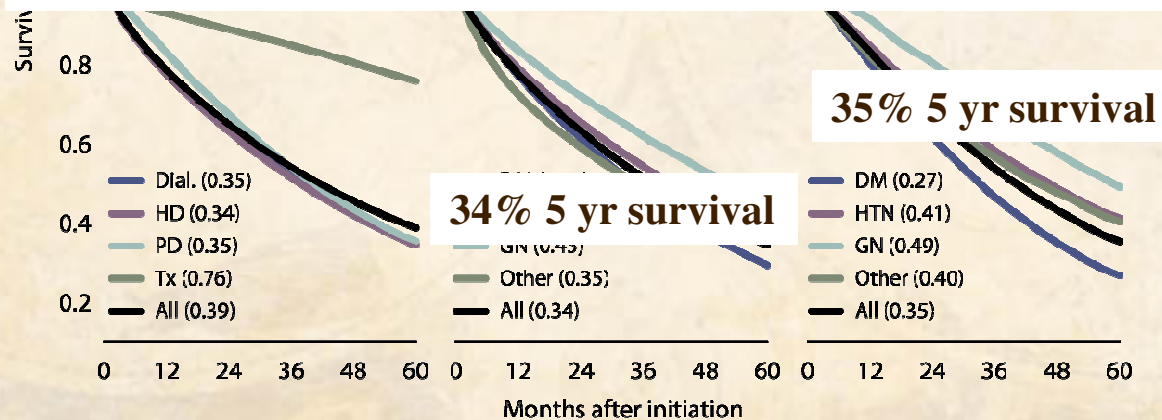
- Almost double the rate of the non-dialysis population in Medicare
- Cardiovascular disease and infections are the major source of re-hospitalization
- The rates have not changed over the last decade (data in 2011 ADR)
- How do the different therapies stackup on morbidity and mortality?

Adjusted five-year survival, by modality & primary diagnosis

Figure 6.7 (Volume 2)



Classic Cox outcome modeling does not address substantial selection bias between HD and PD



patients, 2005, used as reference cohort. Modality determined on first ESRD service date; excludes patients transplanted or dying during the first 90 days. Five-year survival probabilities noted in parentheses. Dialysis patients followed from day 90 after initiation; transplant patients followed from the transplant date.

Propensity-Matched Mortality Comparison of Incident Hemodialysis and Peritoneal Dialysis Patients

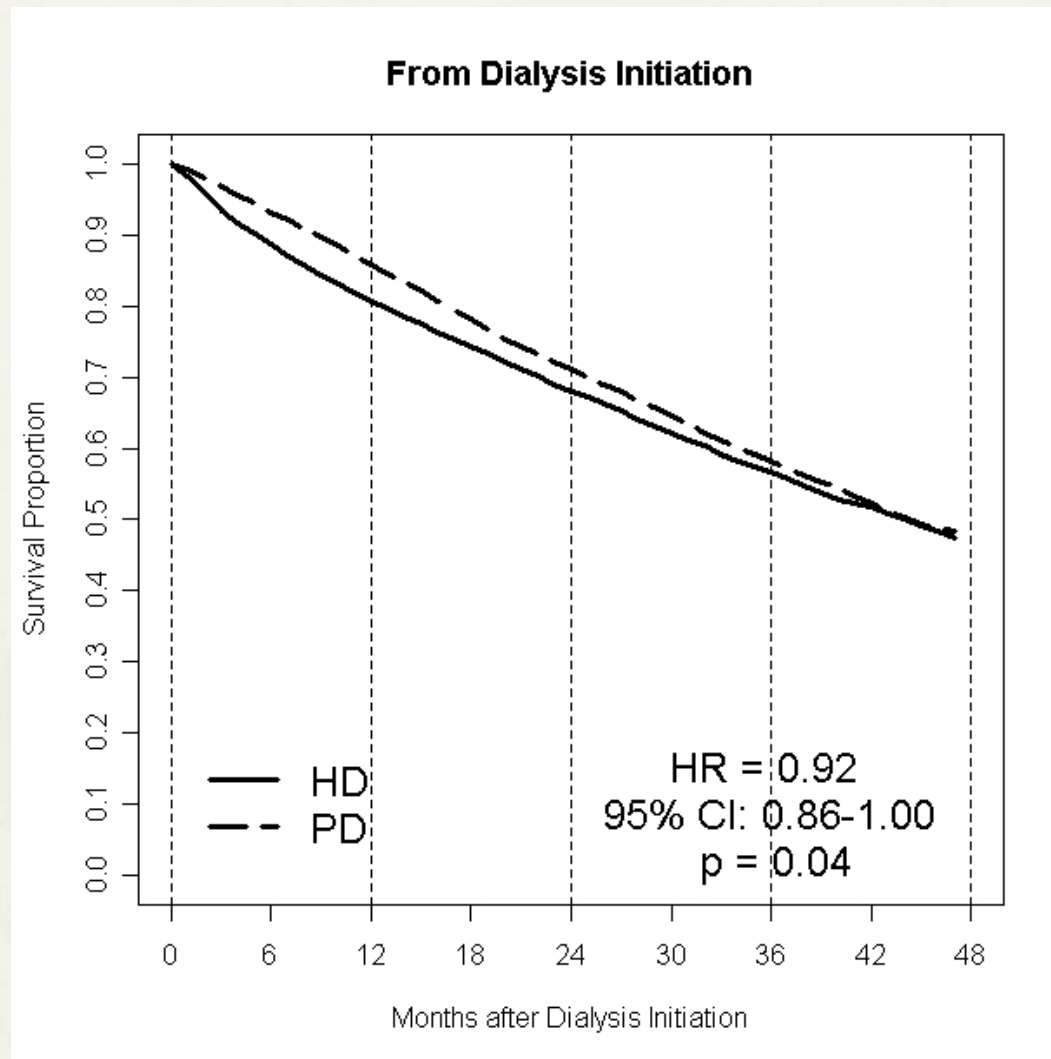
Eric D. Weinhandl, Robert N.
Foley, David T. Gilbertson,
Thomas J. Arneson, Jon J. Snyder,
and Allan J. Collins

J Am Soc Nephrol 21:499-506,
2010

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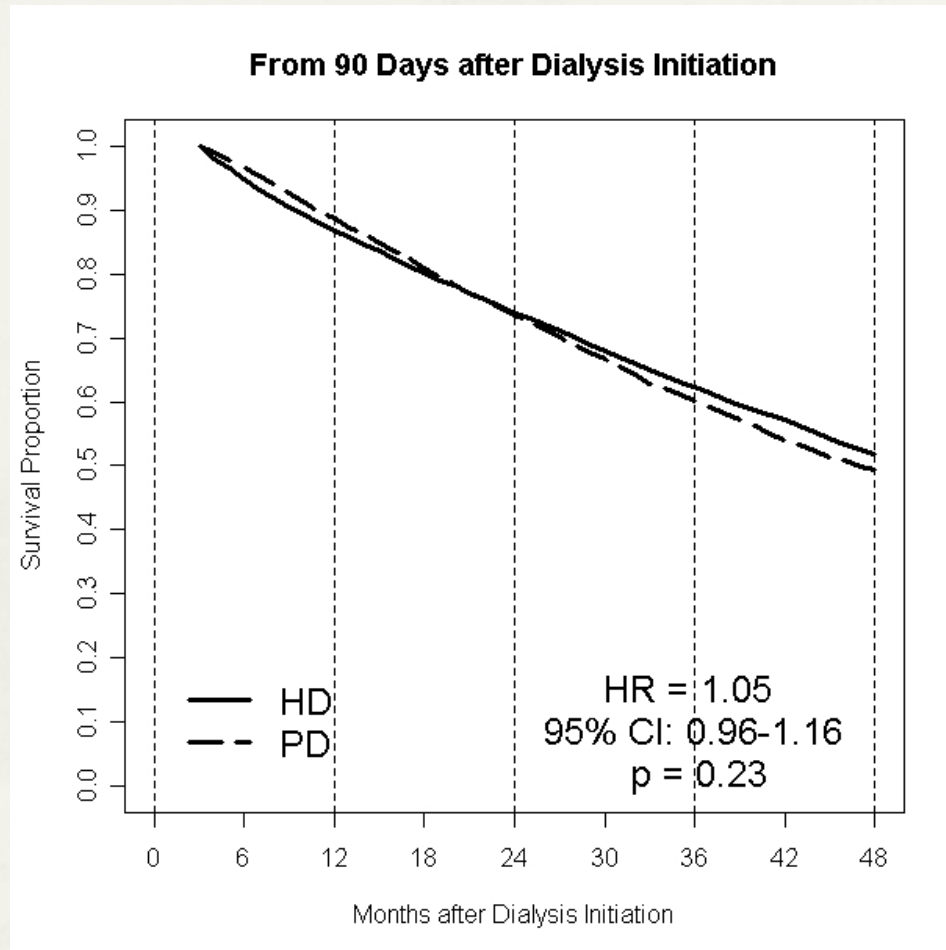
Survival from Day 0

Intention-to-treat analysis



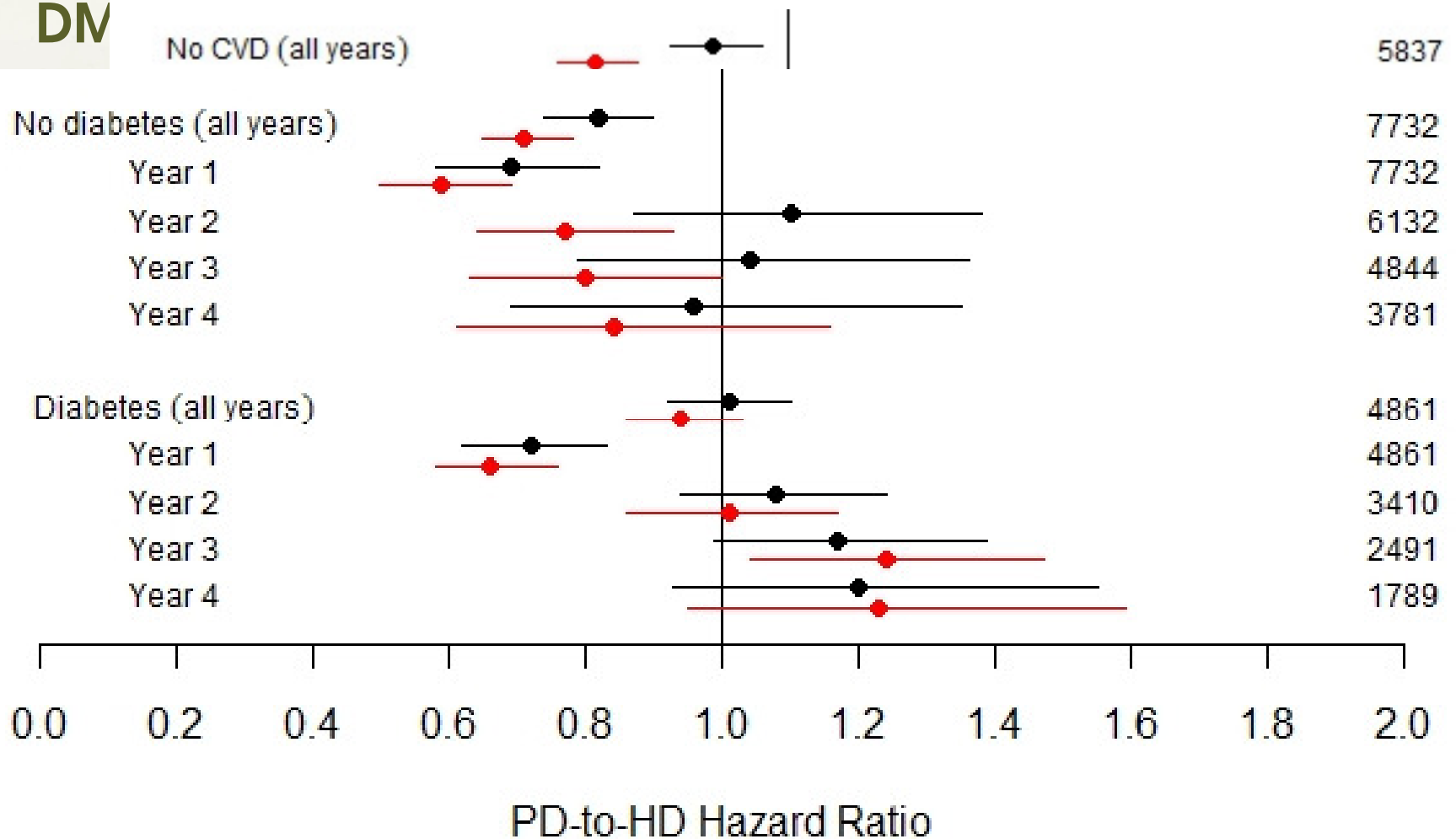
Survival from Day 90

Intention-to-treat analysis



Mortality Hazard Ratios (PD vs HD)

Follow-up from Day 0; subgroups by Age, CVD, and DM



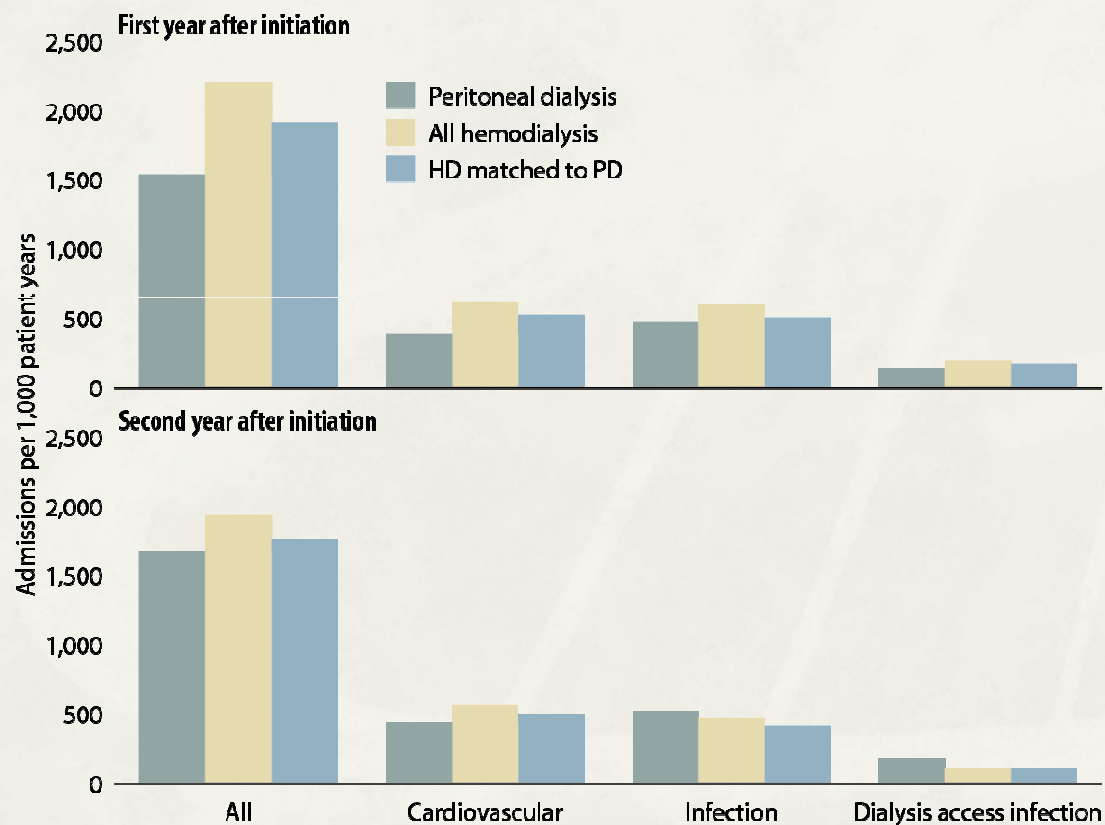
**PD vs HD matched
populations: outcomes in
the USRDS 2011 ADR**

**USRDS Coordinating
Center Staff**

USRDS

Unadjusted rates of hospitalization in 2006–2007 matched incident hemodialysis & peritoneal dialysis patients: all patients

Figure 3.8 (Volume 2)



Incident hemodialysis & peritoneal dialysis patients age 20 & older, 2006–2007; unadjusted. First-year rates show admissions from day 90 to one year after initiation; second-year rates include patients alive & uncensored at the end of the first year.

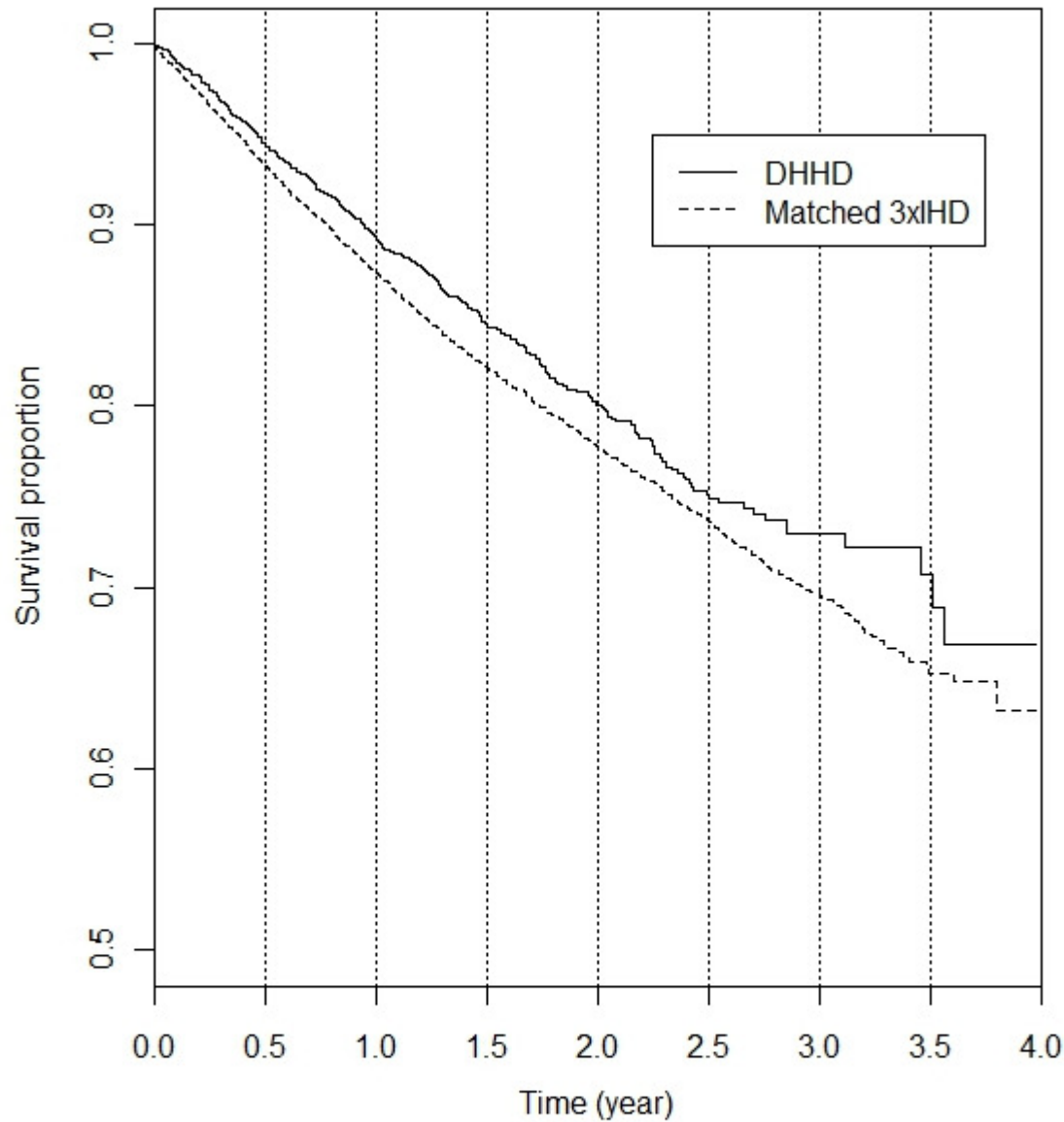
Comparative Mortality in NxStage System One Users and Matched Controls from the Thrice-Weekly In-center Hemodialysis Population

- Once again home hemodialysis populations are highly selected for the therapy
 - Lack of balance between controls and treatment groups such as in an RCT
 - Matching of populations or statistical matching with probability weighting
- Direct matching results
- Presented NKF Spring Clinical Meeting 2011.

All-cause Mortality

- Rates per 100 patient-years
 - Frame of reference: 205 deaths per 1000 pt-yr in '08 period-prevalent dialysis patients (USRDS)

	DHHD	IHD	Difference
ITT	110	127	-17
AT	112	137	-25



1873	1770	1674	1054	635	346	134	40
9365	8743	8185	5118	3124	1714	666	187

Number at risk (top row: DHHD, bottom row: matched 3xIHD)

ITT analysis

HR 0.87
 95% CI (0.78, 0.97)

Survival at 1 year

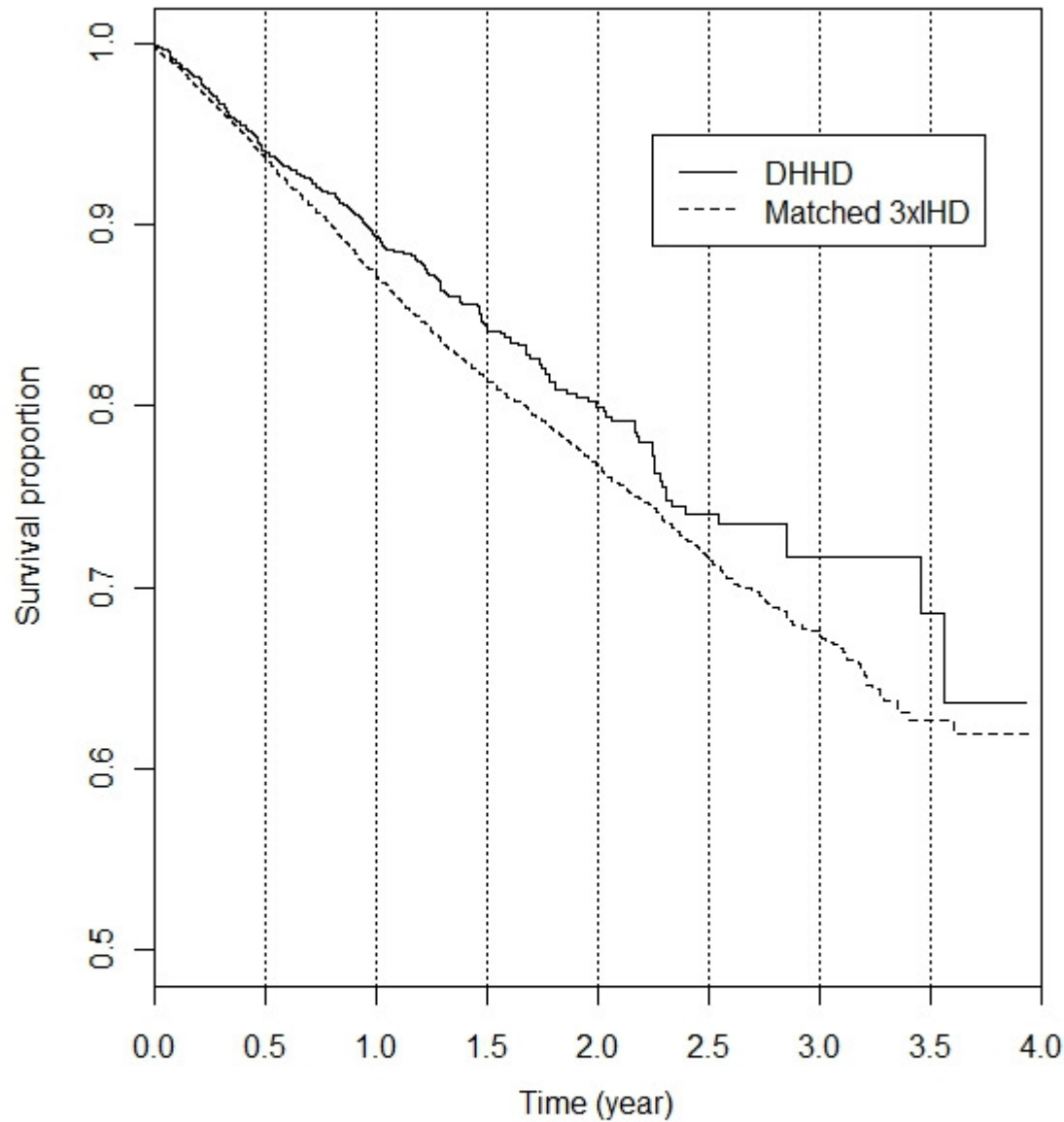
DHHD 89.4%
 IHD 87.4%

Survival at 2 years

DHHD 80.1%
 IHD 77.8%

Survival at 3 years

DHHD 72.9%
 IHD 69.8%



1586	1309	1059	598	317	143	56	19
7930	6947	6139	3650	2160	1130	438	112

Number at risk (top row: DHHD, bottom row: matched 3xIHD)

AT analysis

HR 0.82
95% CI (0.72, 0.94)

Survival at 1 year

DHHD 89.4%
IHD 87.3%

Survival at 2 years

DHHD 80.0%
IHD 76.7%

Survival at 3 years

DHHD 71.7%
IHD 67.6%

Summary

- It appears it is time for the traditional three times per week hemodialysis to be modified based on the high morbidity and mortality based on the intermittent nature of the therapy
- PD therapy, in appropriate groups, is comparable as with HD
- Frequent hemodialysis 5-6 days per week has been shown in clinical trials to have some advantages, yet good criteria are needed to advance this therapy in practice
- One last thing to consider:

**“Insanity: doing the same thing over
and over again
and expecting different results”.**

Albert Einstein

Absolute standardized differences before & after hemodialysis patients are matched to peritoneal dialysis patients

Figure 1.2 (Volume 2)

