



**South Tyneside and Sunderland  
Healthcare Group**

# Slow Low Efficiency Daily Dialysis

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Director of Operations

City Hospitals Sunderland  
and South Tyneside NHS Foundation Trusts  
working in partnership

# Dialysis in ITU through a Nephrologists Lens



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# Potential Similarities

- We see our colleagues disasters
- We pontificate about minutiae
- We are (overly?) critical of **others** escalation decisions
- It's the Kit and the Nurses who keep people alive!!

# Opinion Based Medicine

I have not worked clinically in a Hospital without a Renal Unit since I was a HO

50% of my clinical work is Haemodialysis

Historical position.....why fix something that isn't broken

New Build ..... New Opportunities

Start and Step Down

Delivery versus Theory (IHD)

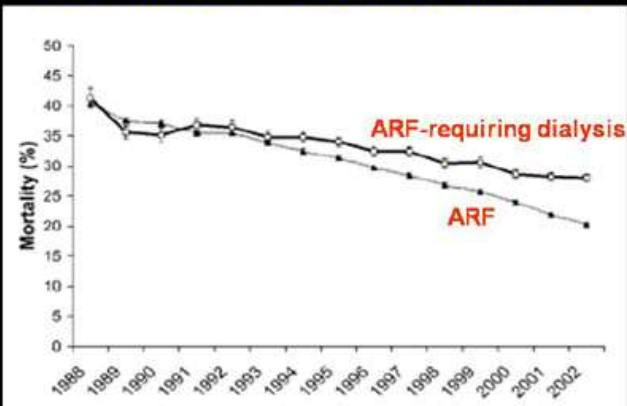


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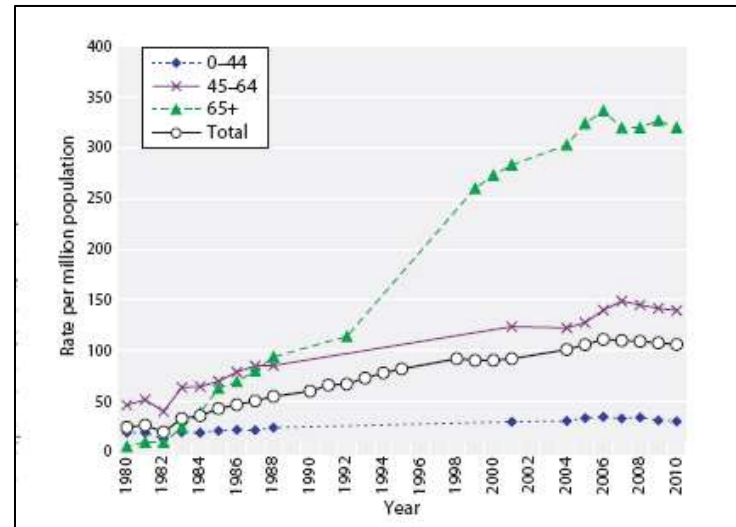
Much of my opinion / prejudice is driven by dialysis data outside of the Intensive Care setting....

# Context

## Declining in-hospital mortality in ARF and ARF-requiring dialysis



Walkar et al JASN, 17: 1143-1150, 2006



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# Mortality, LoS and Cost

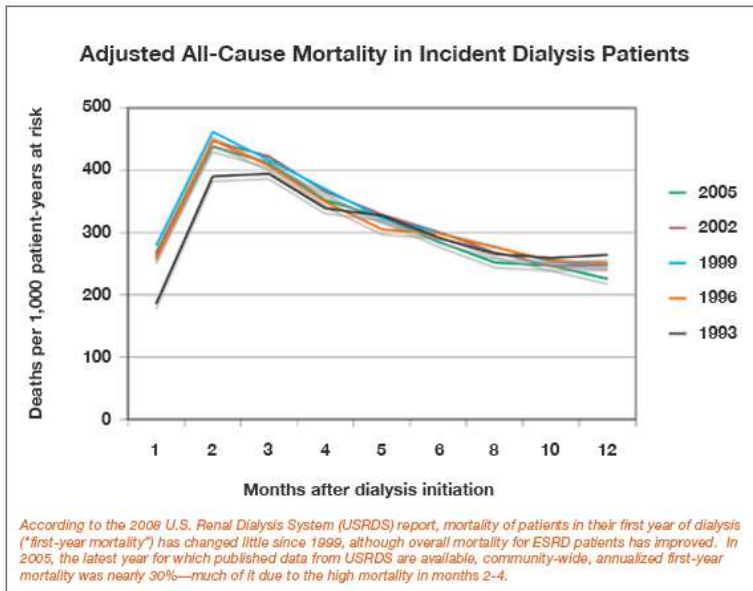
19,982 pts admitted to academic medical centre in SF  
9,205 pts with >1 creatinine results

Rise in creatinine	Multivariable OR (hospital mortality)	Increase in length of stay
≥ 0.3 mg/dl (26.4 μmol/L)	4.1	
≥ 0.5 mg/dl (45 μmol/L)	6.5	3.5 d (3.6 d)
≥ 1.0 mg/dl (90 μmol/L)	9.7	5.4 d (5.8 d)
≥ 2.0 mg/dl (180 μmol/L)	16.4	7.9 d (9 d)

Chertow et al. JASN 2005; 16:3365-3370



# Mortality



Survival:

Aged 40-44      8 years      (40 years)

Aged 60-64      4.5 years      (22 years)

USRDS



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# Can we predict?

Nephrol Dial Transplant (2001) 16: 2272

Obituary

**Nephrology  
Dialysis  
Transplantation**

## Peter Lundin (1944–2001) the physician/patient role model



this handicap. Peter Lundin quickly impressed the basic science and clinical faculty with his exceptional intellect and stern determination to succeed without requesting special benefit or consideration, despite thrice weekly 10–14 h sessions of haemodialysis. Peter Lundin earned a *summa cum laude* endorsement for his MD degree. As a nephrology fellow at Peter Bent Brigham Hospital Boston, he ranked at the top of his group and proved to be a first rate investigator. As a nephrologist, it is of interest that he was the first to state that serious heart disease after several years of haemodialysis treatment was the consequence of hypertension and not of accelerated atherosclerosis. He also recognized the salutary effects of exercise and initiated exercise programmes in the renal unit long before it became fashionable. Long before Kt/V became a nephrological household word, he recognized the dangers of underdialysis and wrote guidelines on how to deliver an ever-increasing target of so-called adequate dialysis. It certainly comes as no surprise to learn that he was a member of the committee which established the DOQI guidelines.

Peter Lundin found time to proffer emotional support to a great number of renal patients and he was instrumental in forming the National Association of Patients on Haemodialysis which later evolved into the American Association of Kidney Patients (AAKP). He was elected AAKP President and his very existence symbolized the triumph of overcoming the impediment of kidney failure.

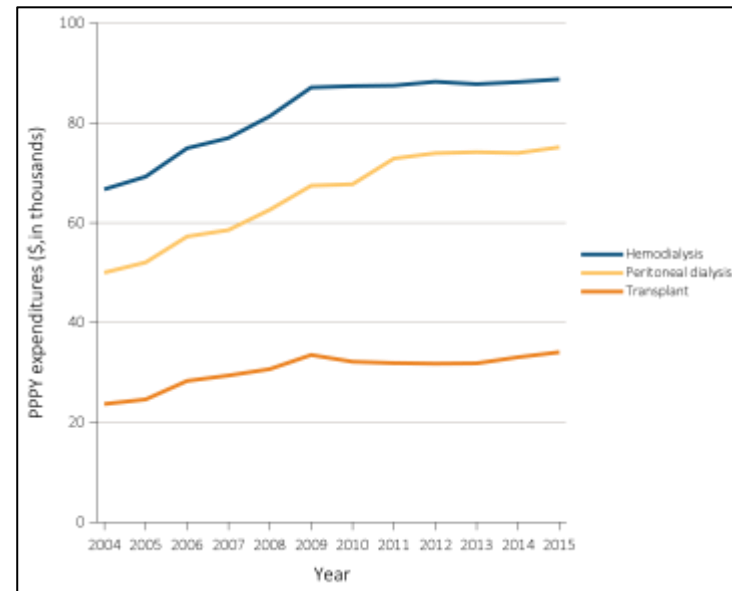
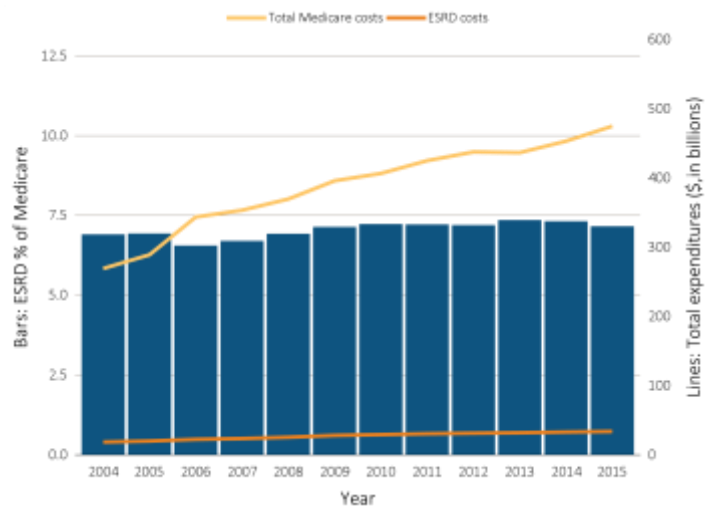
Despite the loss of three evenings per week for his dialysis, Peter Lundin was typically the first to volunteer to cover a colleague who had to miss a scheduled on-call obligation. He was not only a splendid physician, but also a remarkable teacher. A measure of Peter Lundin's impact on his students is their dedication of

It was with profound sorrow that his many friends in Europe learned that, in March this year, Andrew



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# Value for Money?



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# Variation

## DOPPS 3: Distribution of Facility Percent of Patients with $spKt/V < 1.2$ , by Country

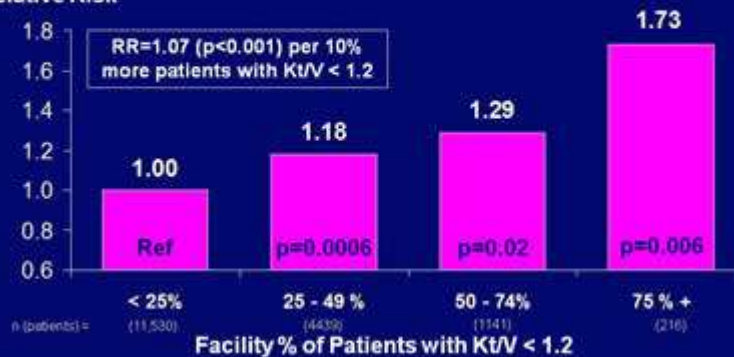
Facility % of Patients with  $spKt/V < 1.2$



DOPPS

## Risk of All-Cause Mortality by Facility % Patients with $Kt/V < 1.2$ \*

Relative Risk



DOPPS

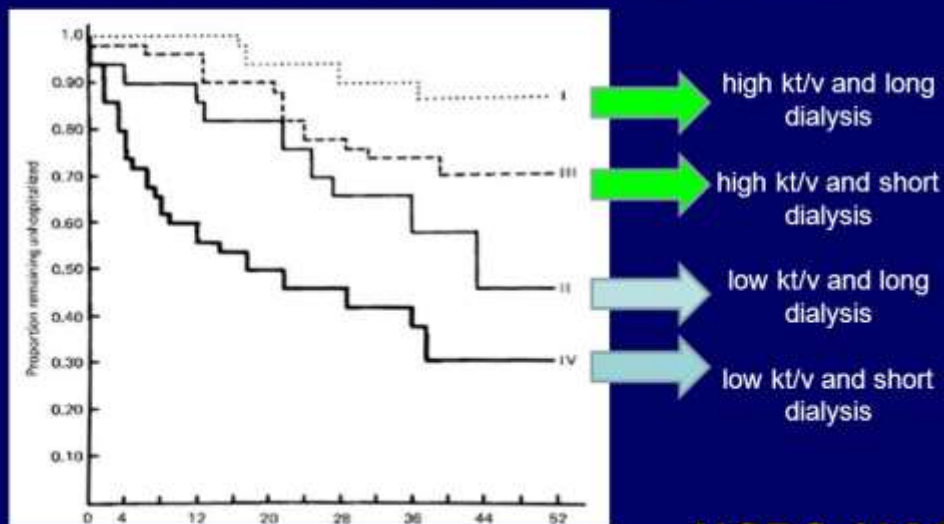
\*Facility % based upon prevalent cross-section of patients in each facility having ESRD > 1yr and adjusted for age, male, black, time on ESRD, BMI, and 14 summary comorbid conditions. Cox model adjusted for above factors, stratified by country and study phase, and accounted for facility clustering effects. DOPPS H4H8; n=21,461

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# The Evidence.....

## First Randomised Controlled Trial In Dialysis

Predialysis urea 38 vs 26 mmol. Dialysis 2.5-35h vs 4.5-5 h



NCDS 1980



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# HEMO

1846 Patients

18-80 years

Prevalent

eKt/V 1.16 versus 1.53 delivered

The New England Journal of Medicine

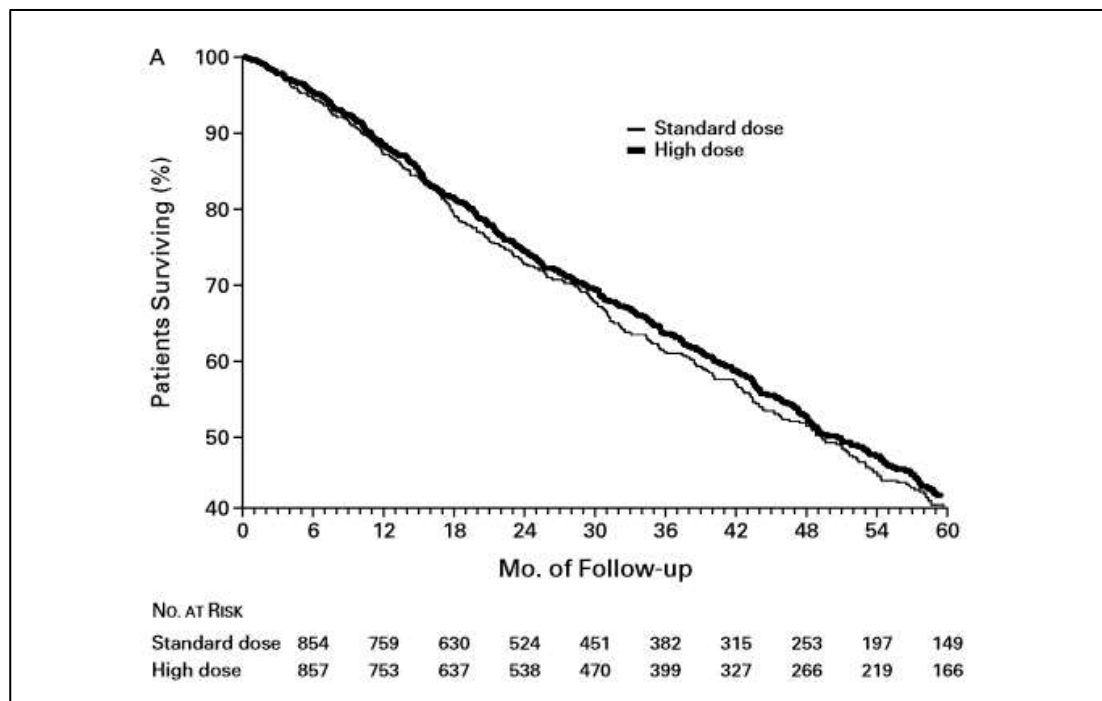
**EFFECT OF DIALYSIS DOSE AND MEMBRANE FLUX  
IN MAINTENANCE HEMODIALYSIS**

GARABED EKNOYAN, M.D., GERALD J. BECK, Ph.D., ALFRED K. CHEUNG, M.D., JOHN T. DAUGIRDAS, M.D.,  
TOM GREENE, Ph.D., JOHN W. KUSEK, Ph.D., MICHAEL ALLON, M.D., JAMES BAILEY, M.D., JAMES A. DELMEZ, M.D.,  
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EDGAR MILFORD, M.D., DANIEL B. ORNT, M.D., MICHAEL V. RICCIO, M.D., GERALD SCHULMAN, M.D.,  
STEVE J. SCHWAB, M.D., BRENDAN P. TEEHAN, M.D., AND ROBERT TOTO, M.D.,  
FOR THE HEMODIALYSIS (HEMO) STUDY GROUP\*

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# HEMO



The New England Journal of Medicine

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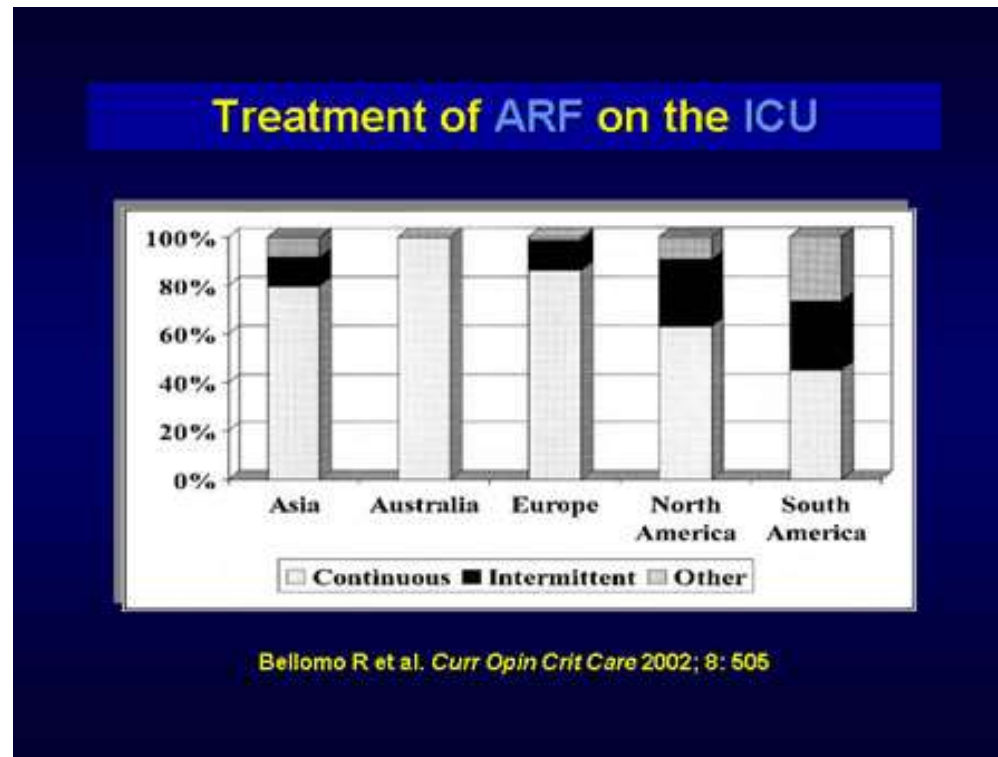
# Fenwick Versus Ronco



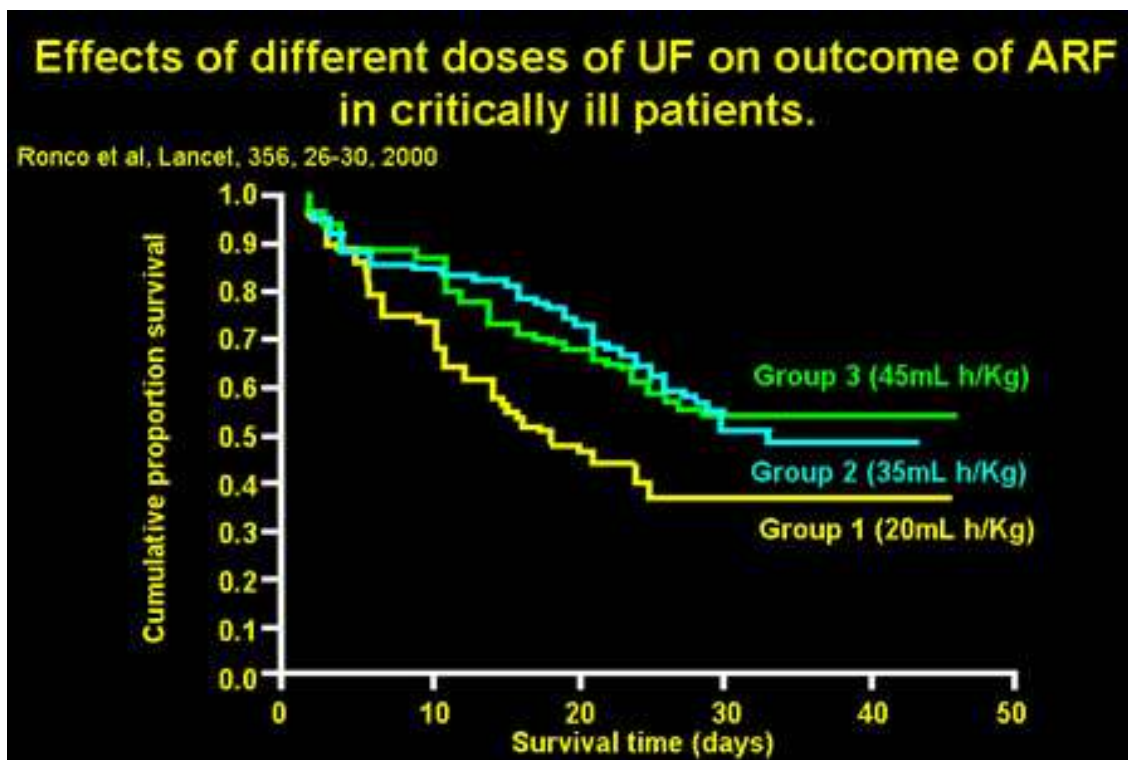
“Multiple Studies have confirmed the many physiological advantages of CRRT versus conventional HD every other day”



# We Cannot All Be Right?

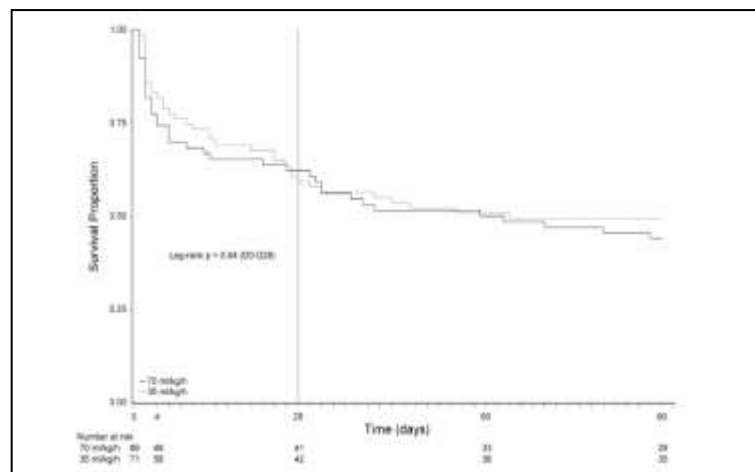
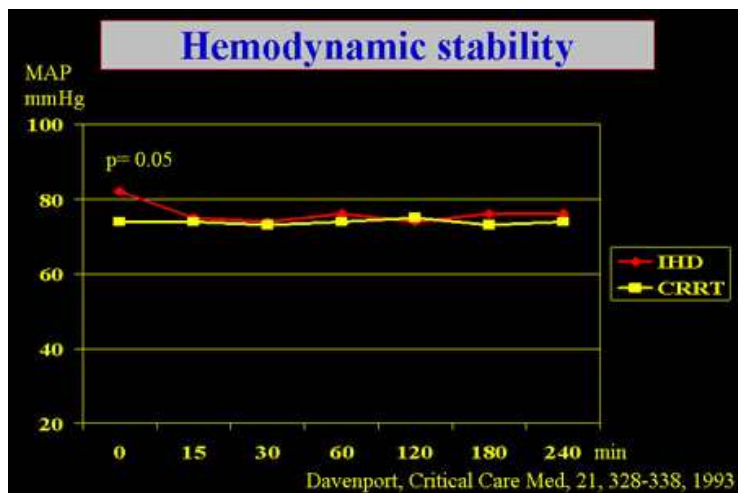


# Dose is Consistent



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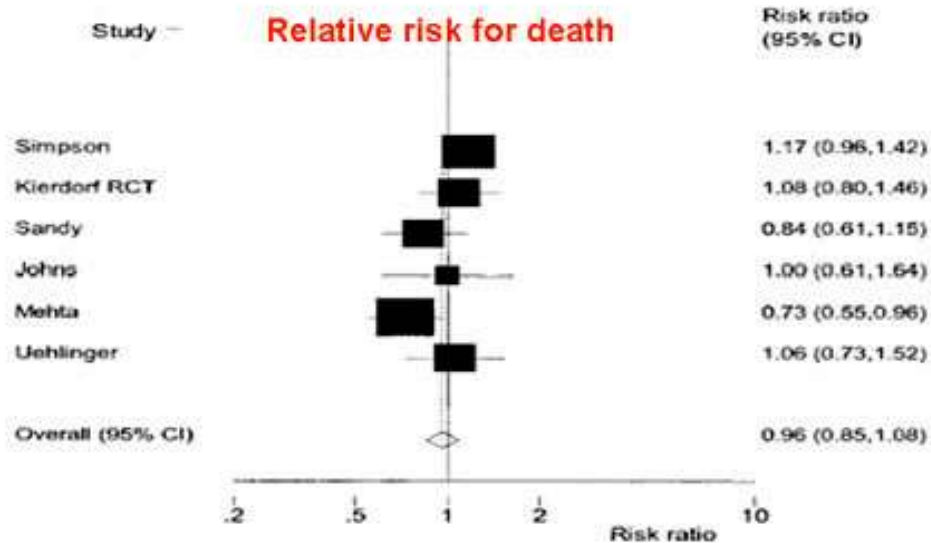
# Myth Busting



**High-volume versus standard-volume haemofiltration for septic shock patients with acute kidney injury (IVOIRE study): a multicentre randomized controlled trial**

# Early Meta-Analysis

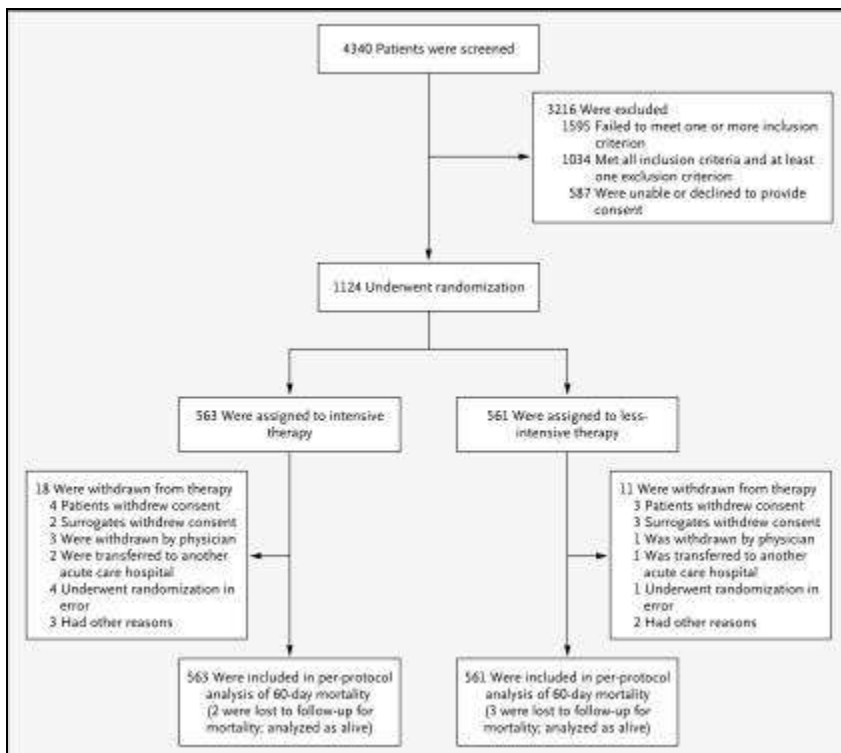
## Meta-analysis of randomized controlled trials of IHD vs. CRRT in critically ill patients with ARF



Tonelli et al Am J Kidney Dis 2002, 40: 875-885

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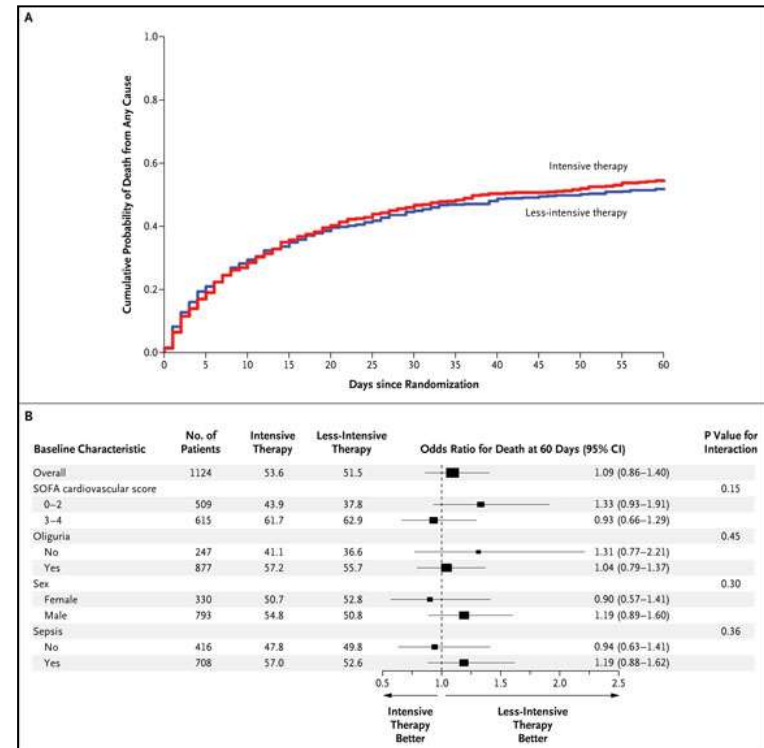
# Same Old.....



**Intensity of Renal Support in Critically Ill Patients with Acute Kidney Injury**  
The VA/NIH Acute Renal Failure Trial Network. **NEJM 2008**

# Design?

- CRRT
- 36 ml/kg/hr v 20 ml/kg/hr
- 21 hrs per day each
- 7% SLEDD
- IRRT
  
- 5.4 v 3.0 per week
- 1.1 v 2.0 day interval



# CONVINT

252 Patients (159 Male; Average Age 61)

Single Centre

Daily HD for 4 hrs versus CRRT 35mls/kg/hr

No CKD

The effect of continuous versus intermittent renal replacement therapy on the outcome of critically ill patients with acute renal failure (CONVINT): a prospective randomized controlled trial

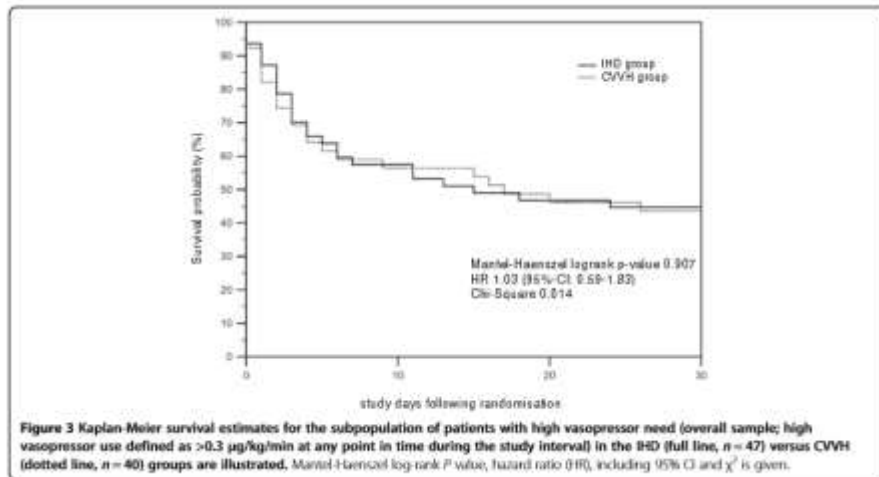
Joerg C Schefold<sup>1\*</sup>, Stephan von Haehling<sup>2</sup>, Rene Pischowski<sup>1,3</sup>, Thorsten Onno Bender<sup>1</sup>, Cathrin Berkmann<sup>1</sup>, Sophie Briegel<sup>1</sup>, Dietrich Hasper<sup>1</sup> and Achim Jörres<sup>1</sup>

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# CONVINT

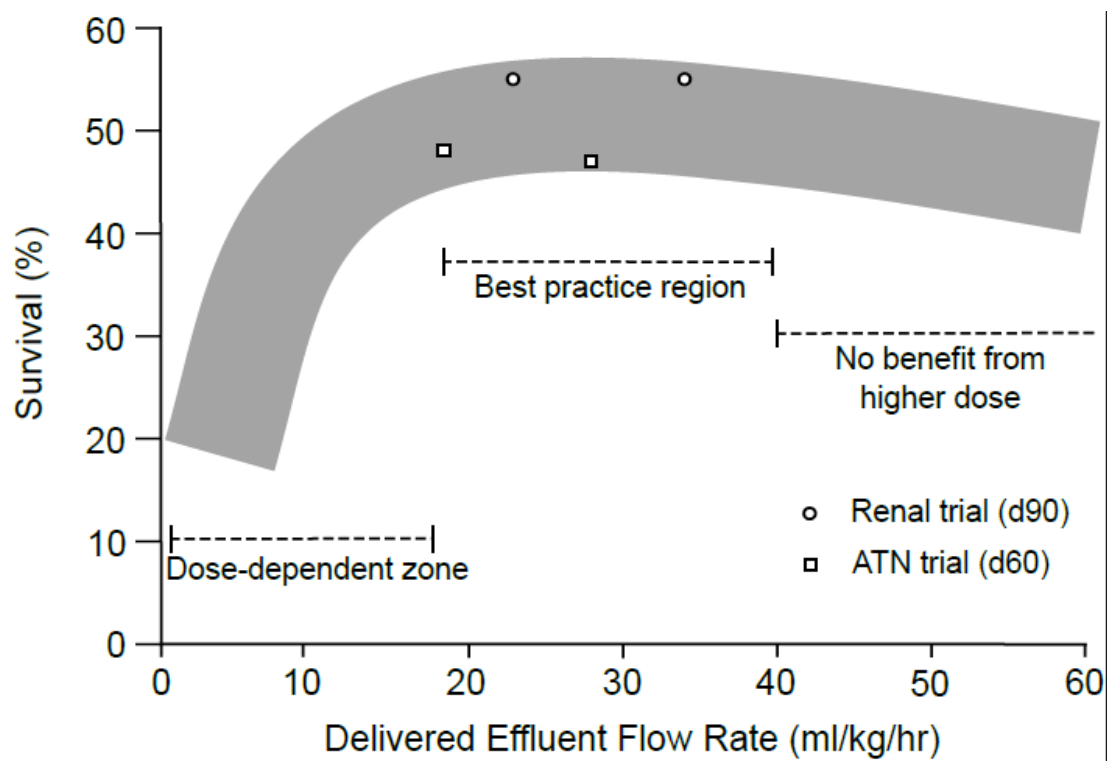


But.....

20% switched IHD to CRRT  
45% switched CRRT to IHD

Terminated Early.....

# ATN/RENAL



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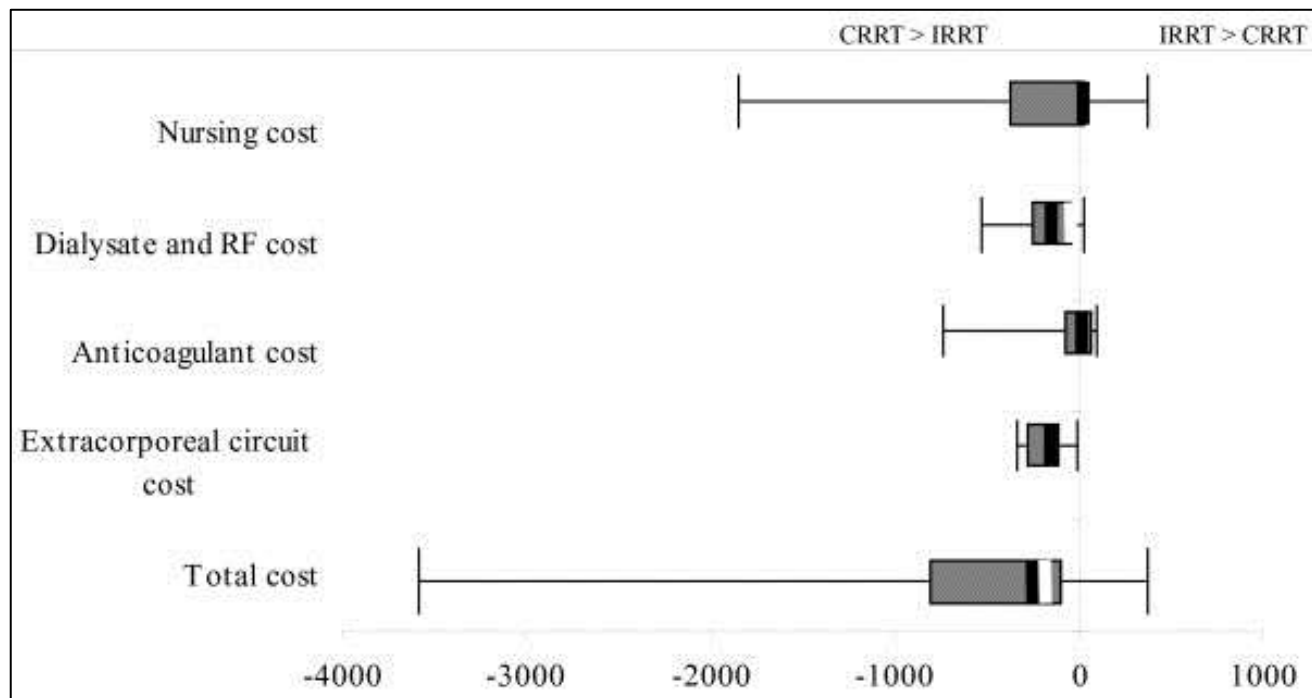
# Indicative Doses

Dialysis schedule	Frequency per week	stdKt/V
Conventional HD	3	2.0
SDHD	6	3.0
SDHD – Next Stage	6	2.0
NHD	3	3.0
NHD	6	6
CAPD	continuous	2.0

# Evidential Issues

- Case Mix
- Low Numbers
- Cross-over
  
- Even in trial conditions it is difficult to deliver dose
- In reality.....


# Cost



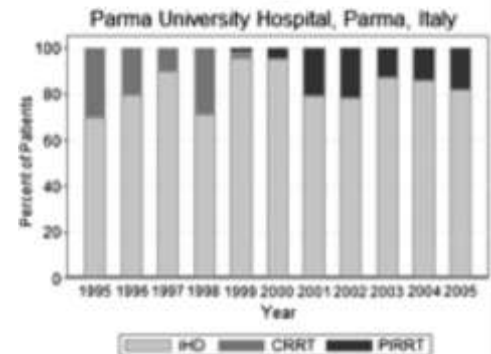
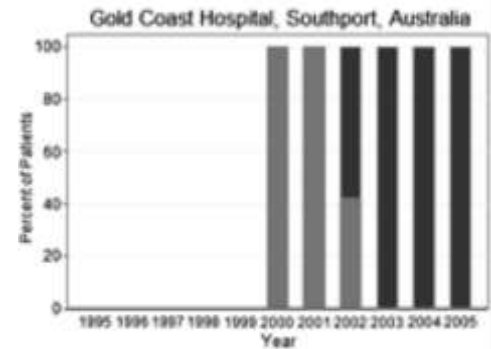
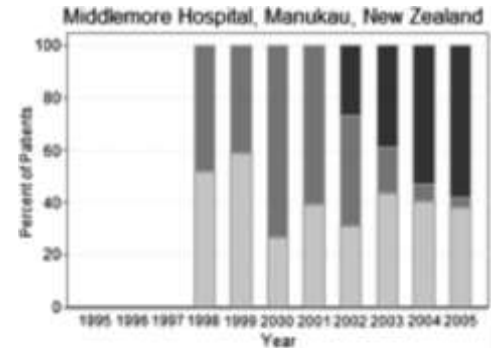
# Why SLEDD?

- Nursing Logistics
- Inconsiderate Patients
- Fenwick knows best.....

# Observational Change

Mortality rate comparison after switching from continuous to prolonged intermittent renal replacement for acute kidney injury in three intensive care units from different countries 

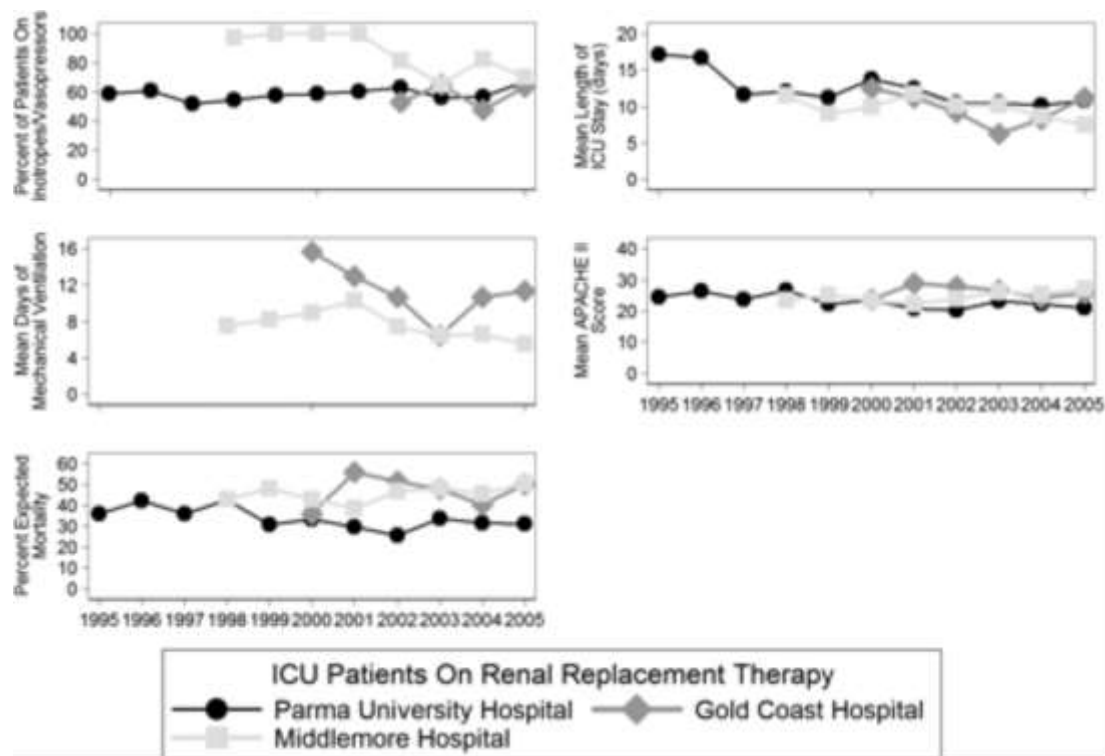
Mark R. Marshall, Julie M. Creamer, Michelle Foster, Tian M. Ma, Susan L. Mann ...



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# No Change



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# Modality is not a Clinical Decision

- The Evidence?
- Personal Prejudice
- Logistics

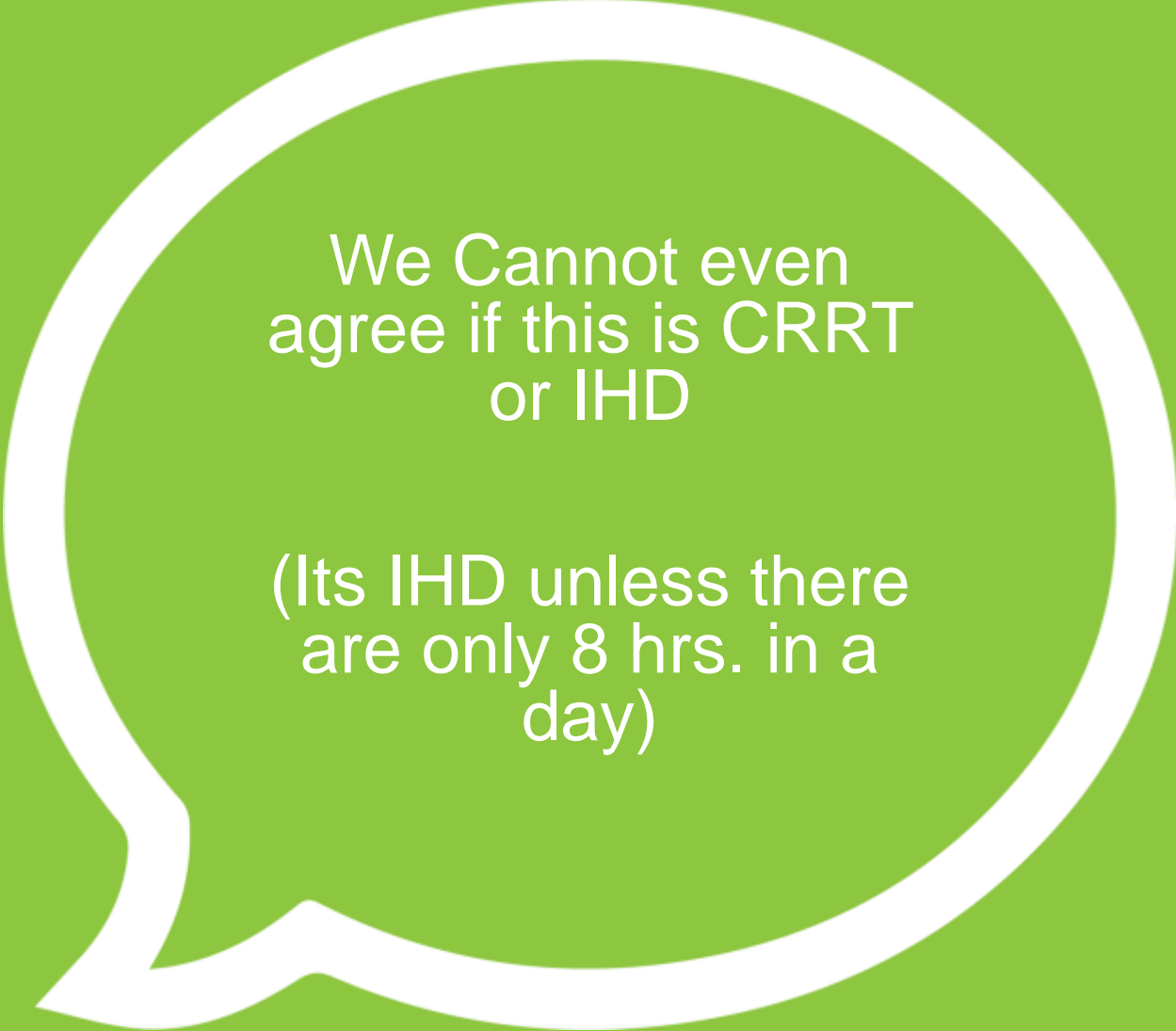
# If you accept they are equal

- Less Intrusive
- Easier to plan
- Easier to deliver – dose and practically
- Less anticoagulant
- Cheaper
  
- What's not to like.....

# Fenwick Versus Ronco



“Indeed as IHD becomes more like CRRT through SLEDD, the protagonists of CRRT will be delighted”



We Cannot even  
agree if this is CRRT  
or IHD

(Its IHD unless there  
are only 8 hrs. in a  
day)

- 
- Thankyou
  - Questions?