

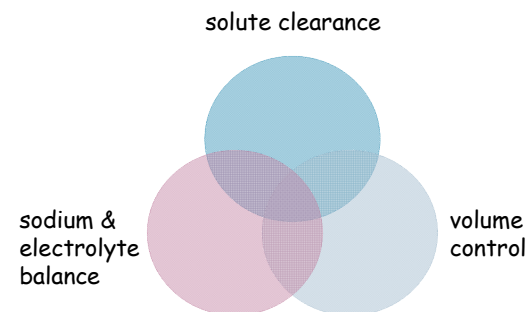
How much dialysis do patients need ?



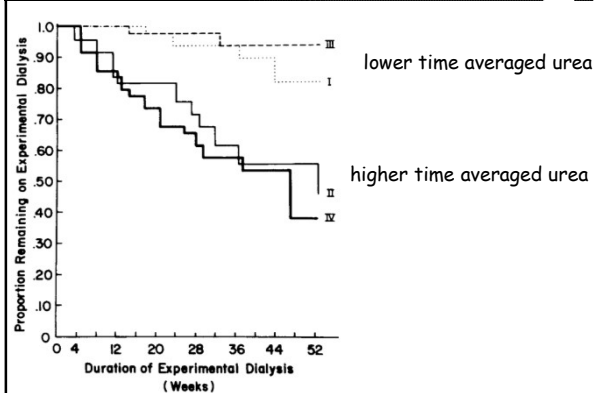
Andrew Davenport
UCL Centre for Kidney & Bladder Health
Royal Free Hospital
University College London



Dialysis prescription



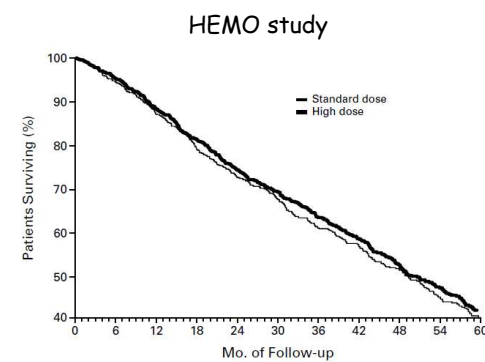
Where did Kt/V target come from ?



Lowrie et al NEngJMed 1981



No benefit from more urea clearance



Eknoyan et al NEngJMed 2002



No benefit from greater Kt/Vurea



Do we need greater separation ?



FNH trial (for Jo the plumber)



But remember

- 6276 patients screened
- 3481 (55%) eligible
- 3124 (49.8%) asked for consent
- 378 (6.0%) consented
- 245 (3.9%) randomized

Daily trial
mean
age 51 yr
Wt 78 kg

Nocturnal trial
mean
age 53 yr
Wt 85 kg

..... randomized patients not representative
of general US dialysis population

Sergeyeva et al JNephrol 2012

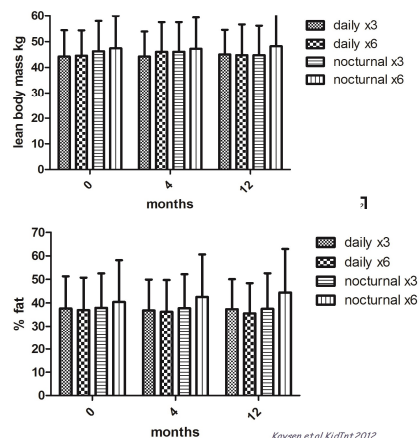


More frequent and longer dialysis

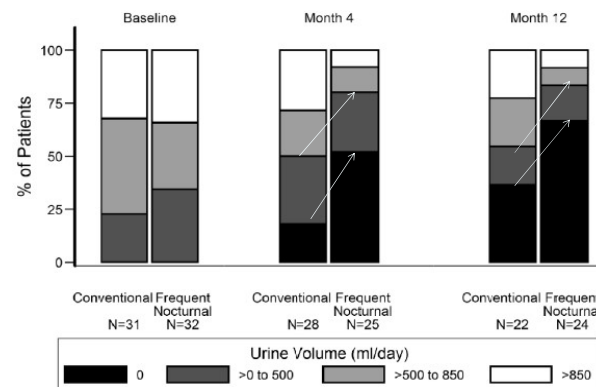


nutrition

- no difference
- ❖ albumin
- ❖ ePCR
- ❖ muscle mass
- ❖ fat



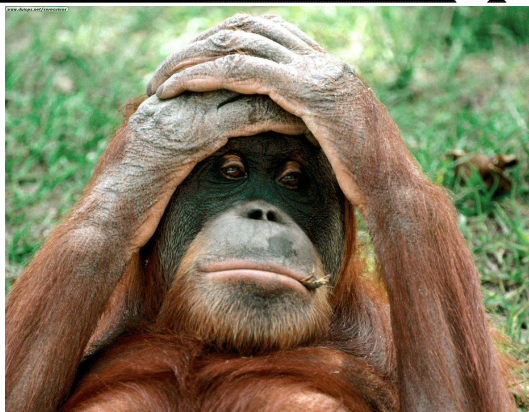
More frequent home haemodialysis



Daugirdas et al KidInt 2013



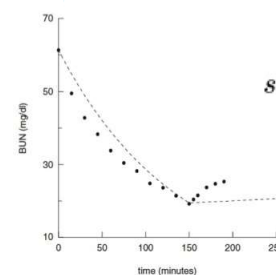
Why did trials not show a benefit ?



No benefit from greater Kt/Vurea



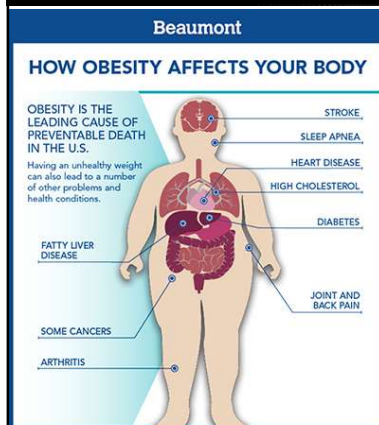
Is it the equation ?



$$stdKt/V = \frac{10080 \cdot (1 - e^{-Kt/V})}{t} \cdot \frac{1 - e^{-Kt/V}}{spKt/V + \frac{10080}{N \cdot t} - 1}$$



Obesity is a risk factor for survival



General population

increased risk

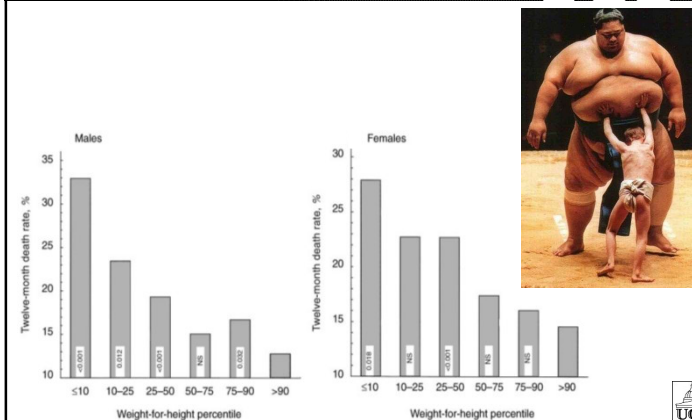
- mortality
- CVD
- cancer



But size matters in haemodialysis

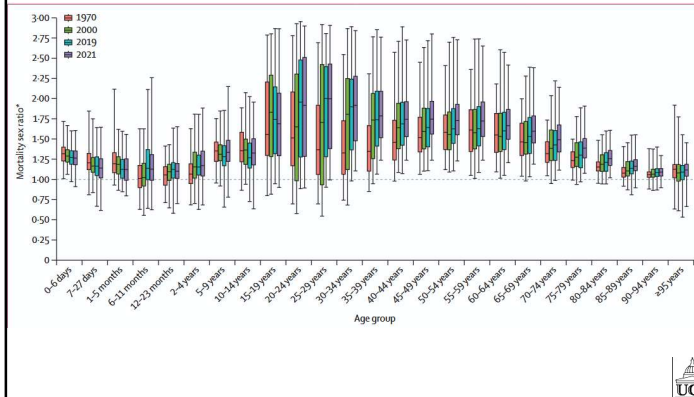


Kopple et al Kid Int 1999



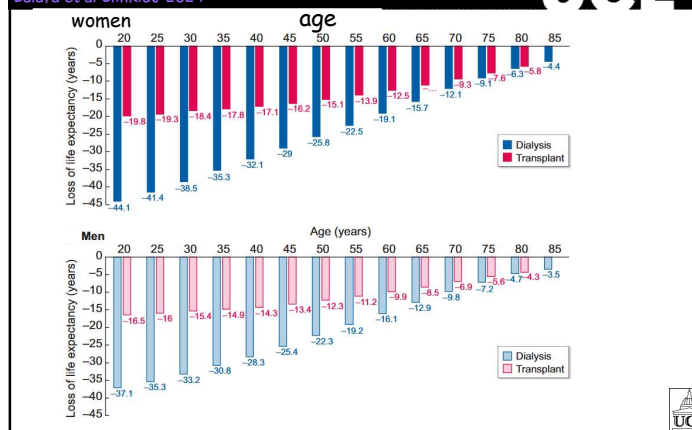
Women out survive men

GBD 2021 Demographics Collaborators Lancet 2024



But sex also matters

Balafa et al ClinKidJ 2024



Is it the patient ?



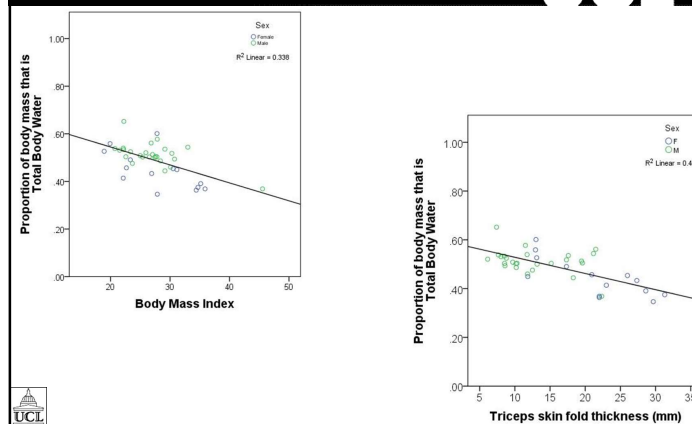
Weight	150kg	150kg
Height	178cm	178cm
Watson equation V	68 Litres	68 Litres



Percentage body fat	49%	29%
Bioimpedance V	60 Litres	75 Litres

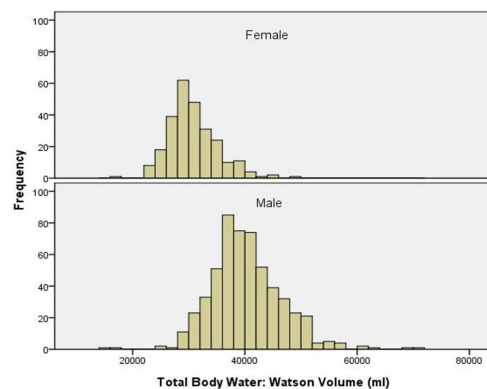


Body water measured by Isotope dilution



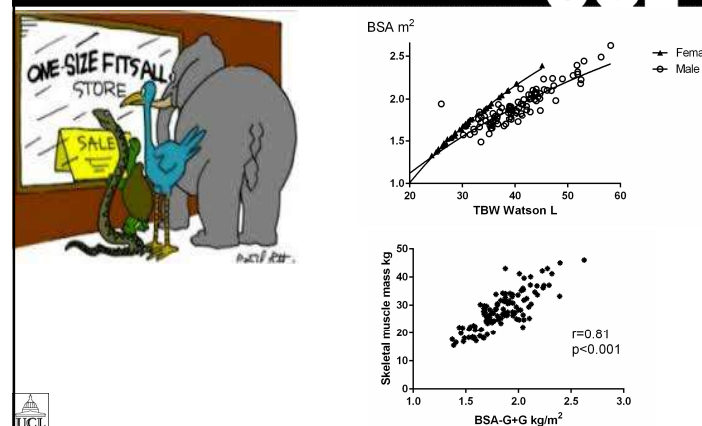
Female vs Male total body water

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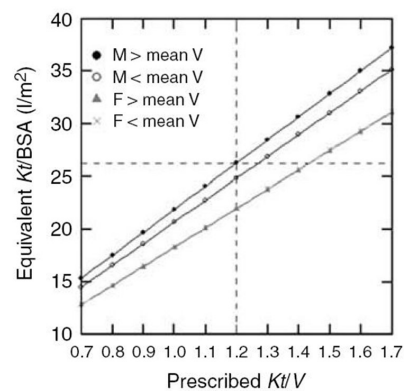
Dose based on "V"

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Prescribed vs Delivered Kt/V

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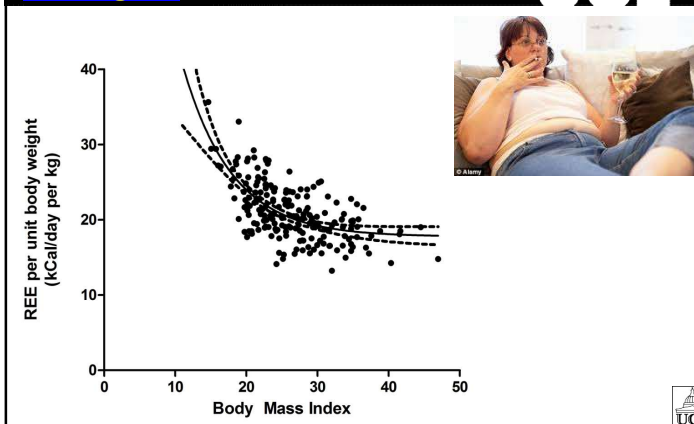
Spalding et al. KJ 2008; 74: 348-355

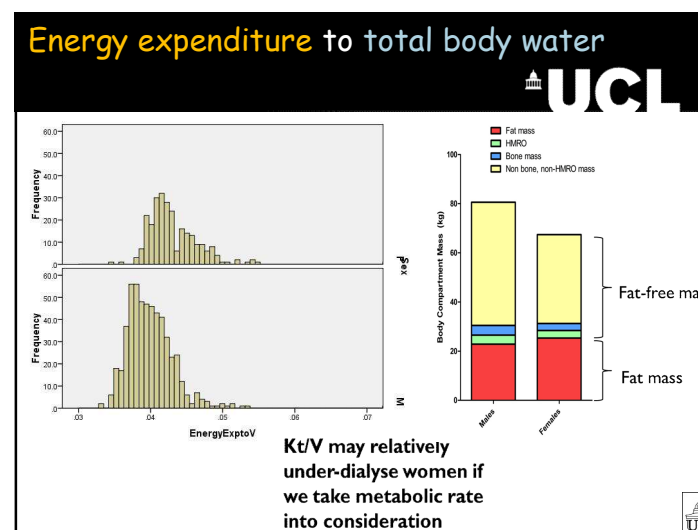
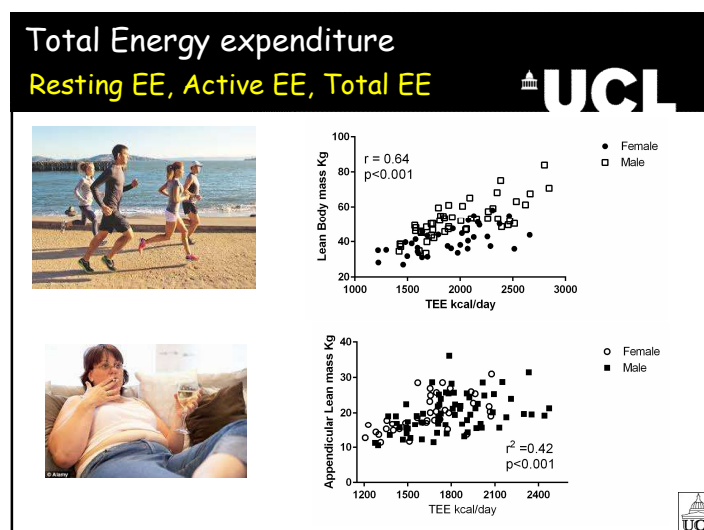
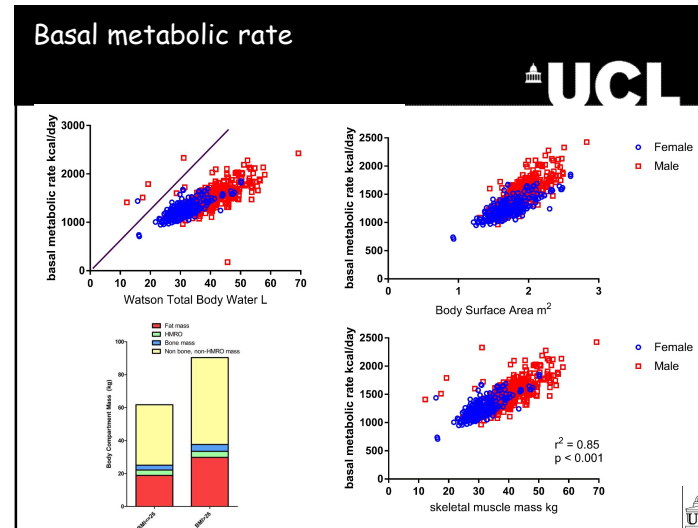
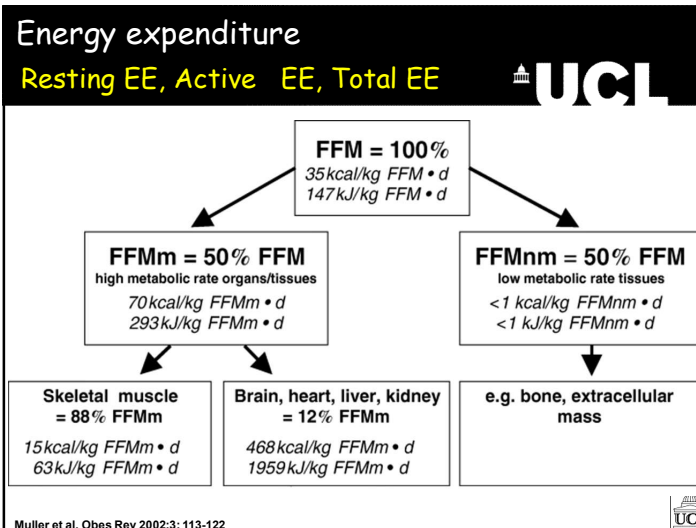


Energy expenditure

Resting EE, Active EE, Total EE

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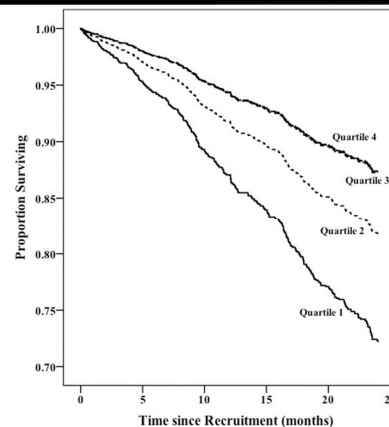




how should we assess delivered dialysis dose ?



Adult patient specific dosing based on BSA



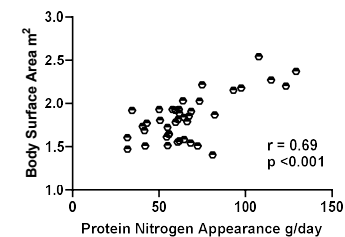
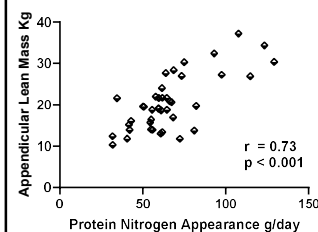
Kt/BSA quartiles
adjusted for age, sex,
ethnicity, comorbidity,
dialysis vintage, BMI
and physical activity level



Generation waste products of metabolism

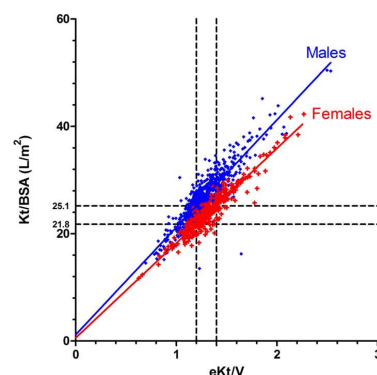


Dietary protein intake



Ensuring delivered Kt/V : new target

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New target
to deliver
 Kt/BSA 25 L/m²

Effective
 Kt/V 1.2 males
 Kt/V 1.4 females



Take Sidney for example

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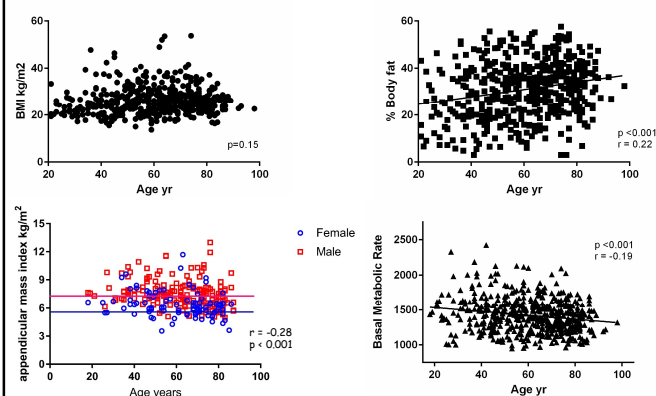


started dialysis aged 95

100th birthday

How do we change with age ?

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Adult patient specific dosing based on TEE

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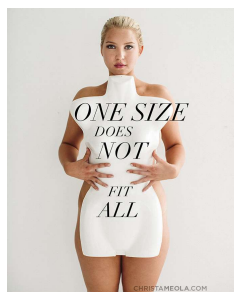
Some adult patients need greater clearance



- younger
- women
- smaller men
- less co-morbidity
- employed



Patient specific prescription



tailored to residual kidney function
protein intake and energy expenditure



Adult patient specific dosing based on TEE



Some adult patients need greater clearance



women
smaller men
physically active

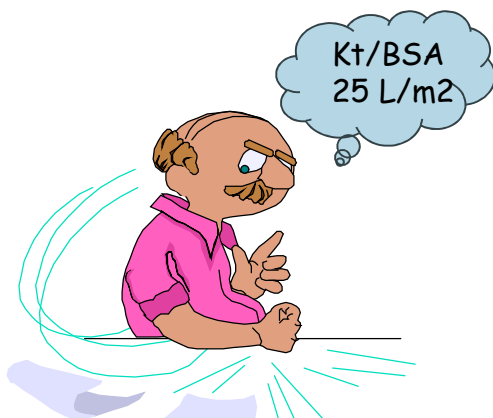


Current practice same KtV target
greater delivered dose of dialysis

- increasing BMI
- men > women



So how much urea clearance is needed ?



prescribing dialysis
treat patients as individuals