



Dialysis in Australia and New Zealand

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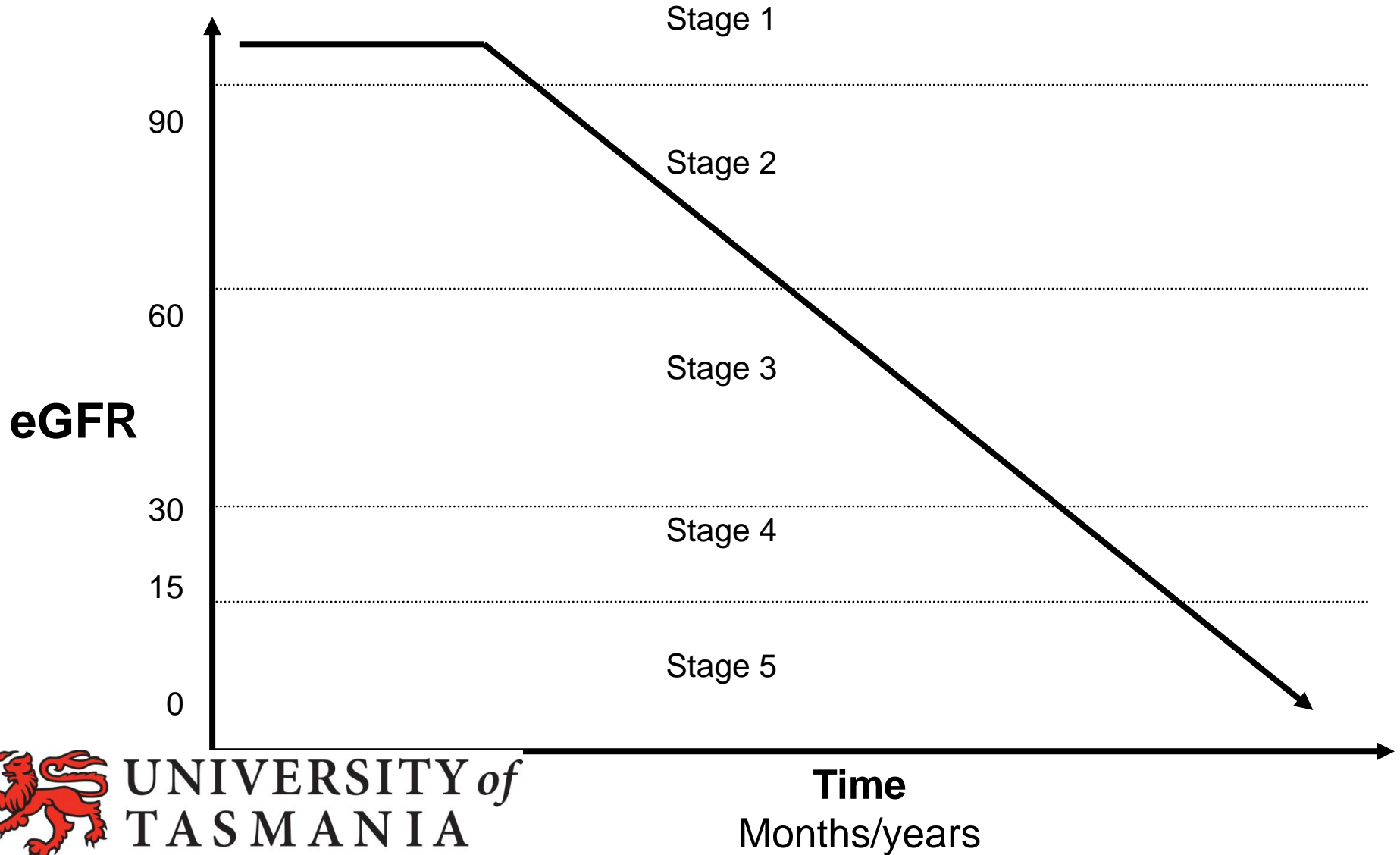
Overview

- CKD in Australia & NZ
- Pathways and choice of dialysis
- Methods and location of dialysis
- Home therapies
- Safety in dialysis
- Questions

Overview

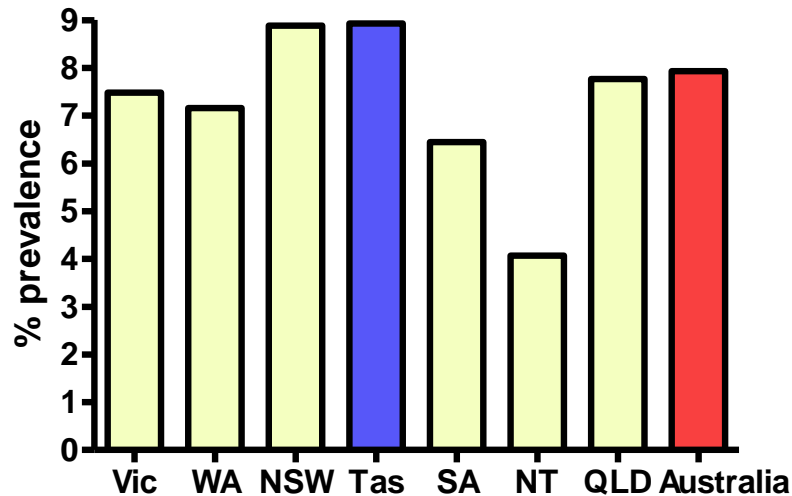
- CKD in Australia & NZ

Stages of CKD



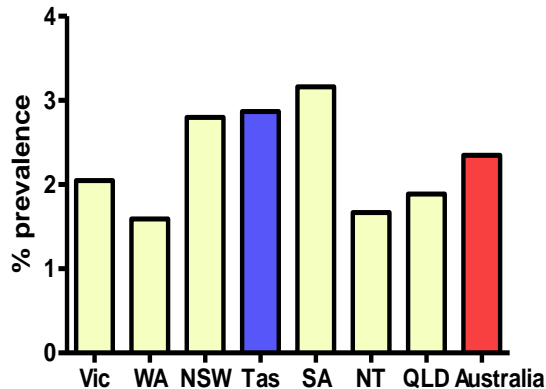
CKD is common in Australia

AUSDIAB eGFR < 60mls/min

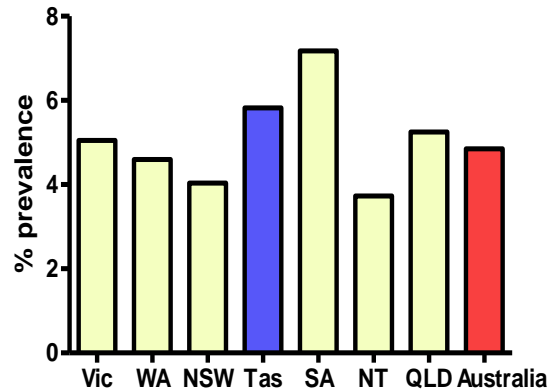


Courtesy of AUSDIAB
Study investigators (1999)

AUSDIAB Proteinuria



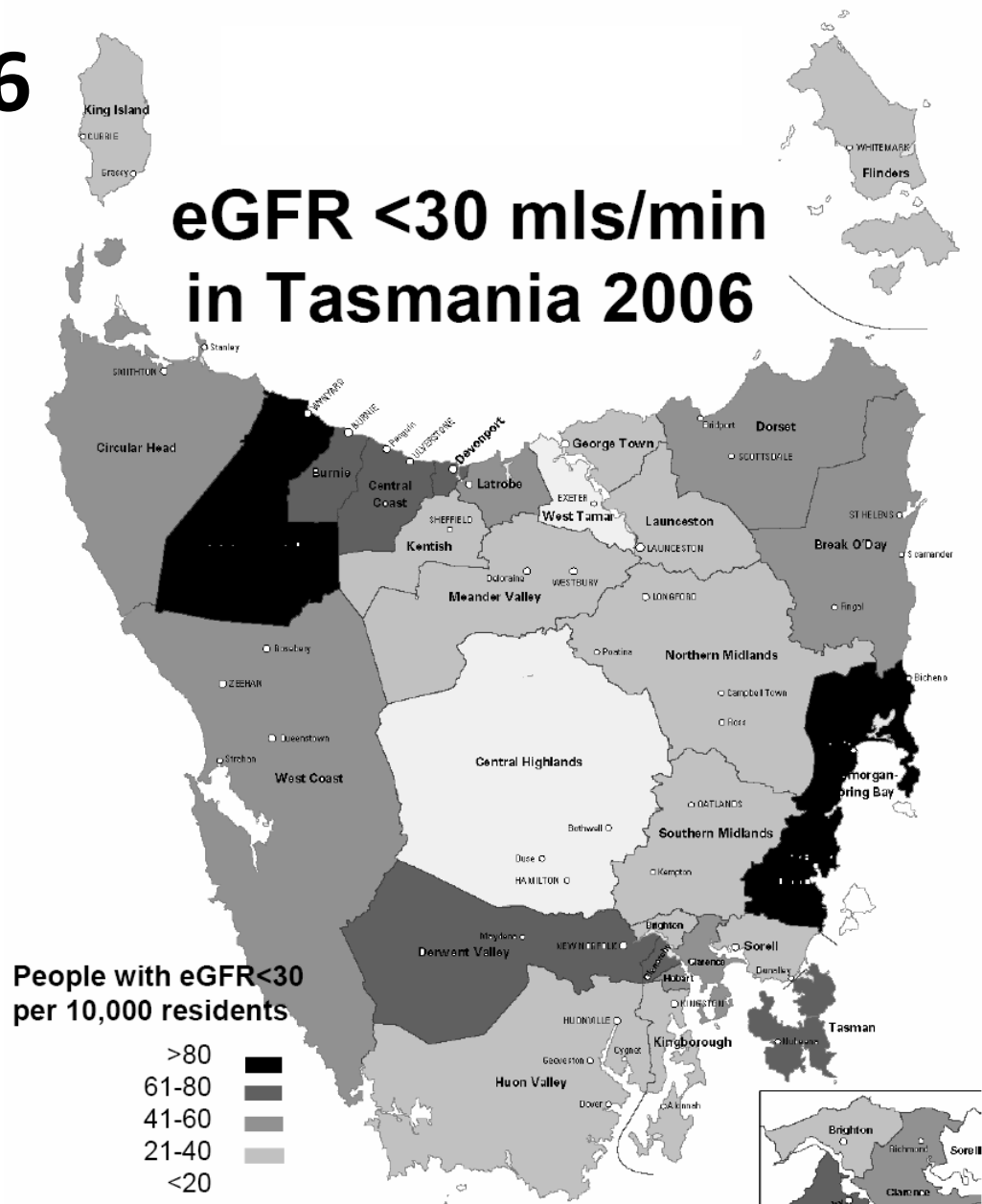
AUSDIAB Haematuria



CKD in Tasmania 2006

- 1 in 6 tested had CKD
- Increase of 80%
- 7-fold geographic variation

**eGFR <30 mls/min
in Tasmania 2006**

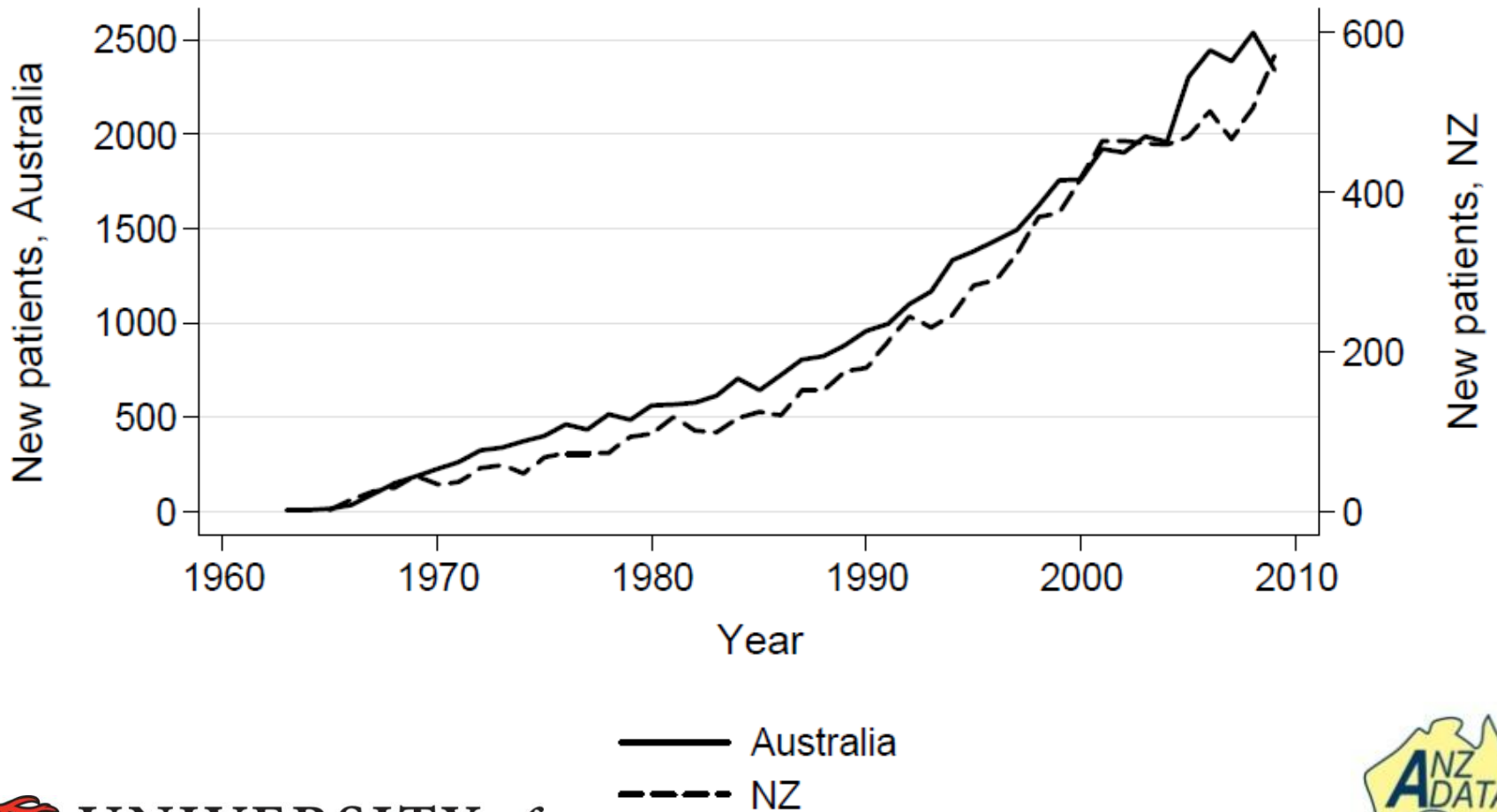


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TASMAP
Tasmanian Mapping and
Information Project

Jose & Kirkland, *Nephrology* 2009

New Patients Australia and New Zealand

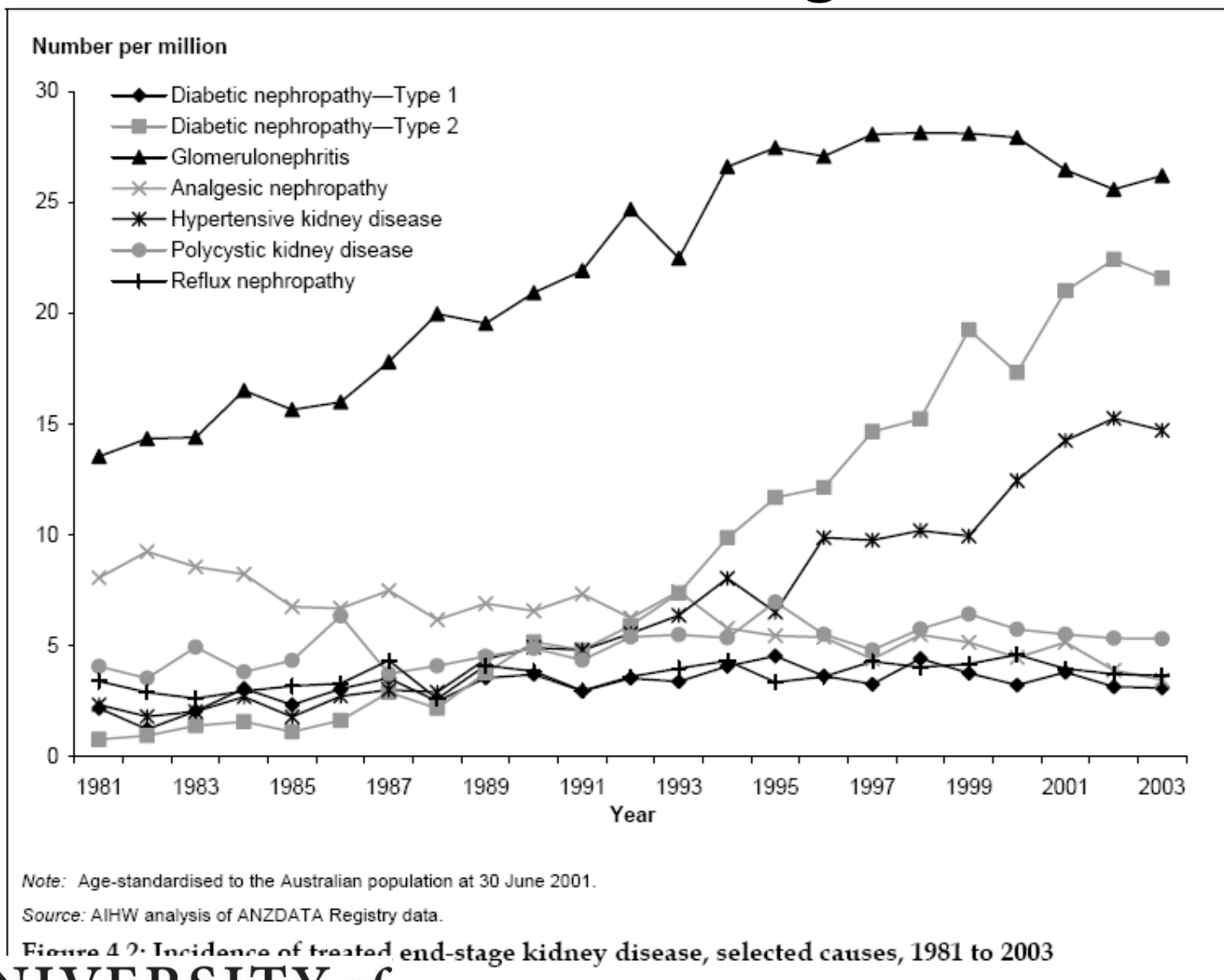


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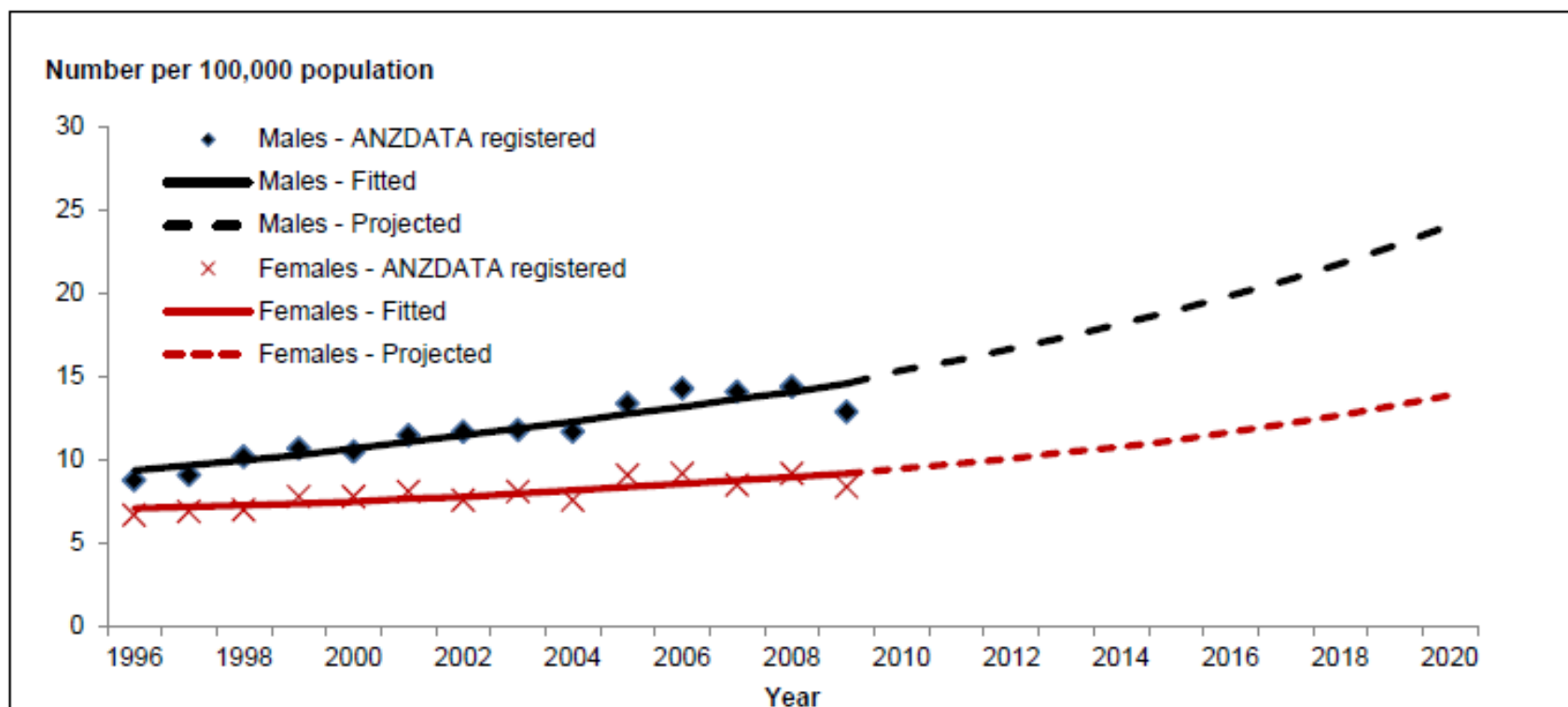


ANZDATA report 2010

Incidence of end-stage CKD



Projections - Australia

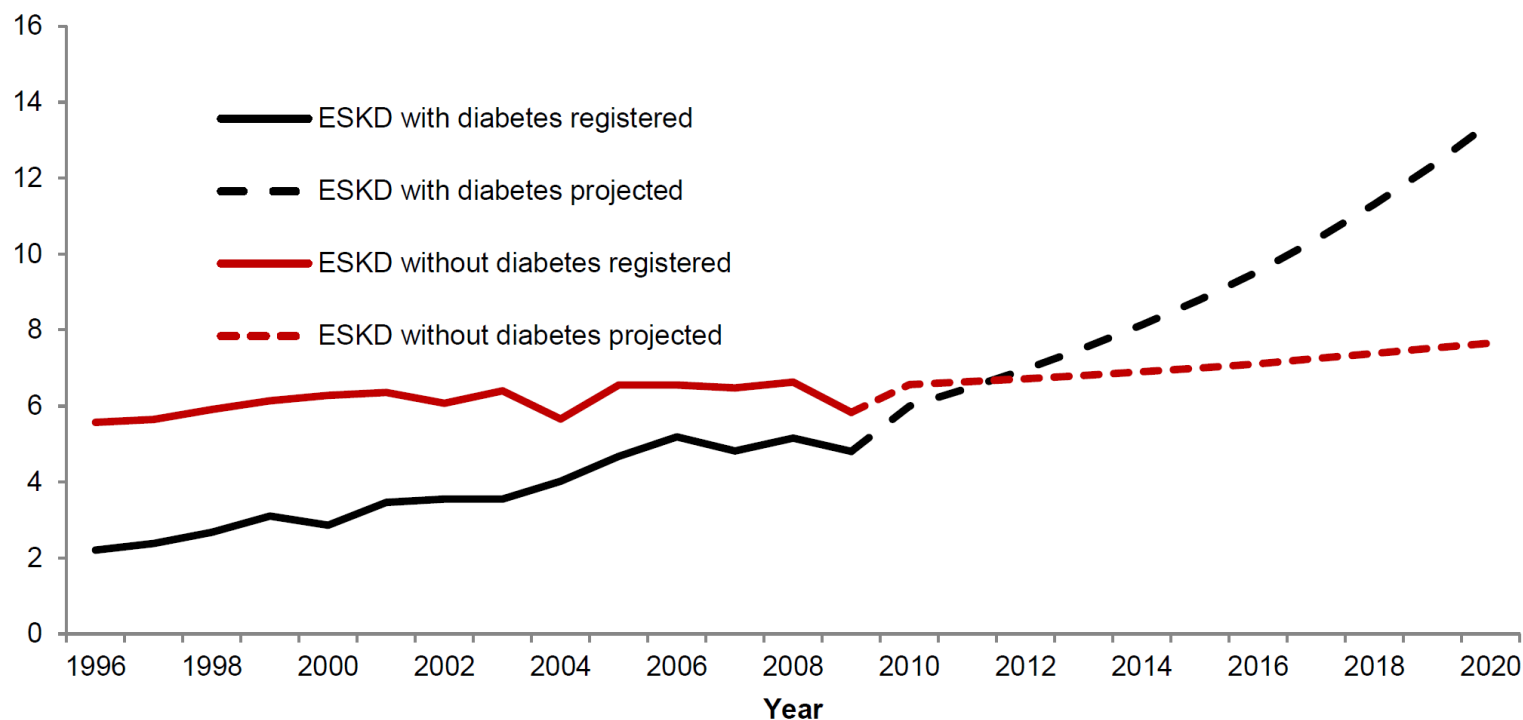


Source: Registered cases during 1996–2009 used for calculating incidence rates from ANZDATA .

Figure 2.1: Incidence rates of registered and projected treated ESKD by sex, Australia, 1996–2020

Contribution of Diabetes?

Number per 100,000 population

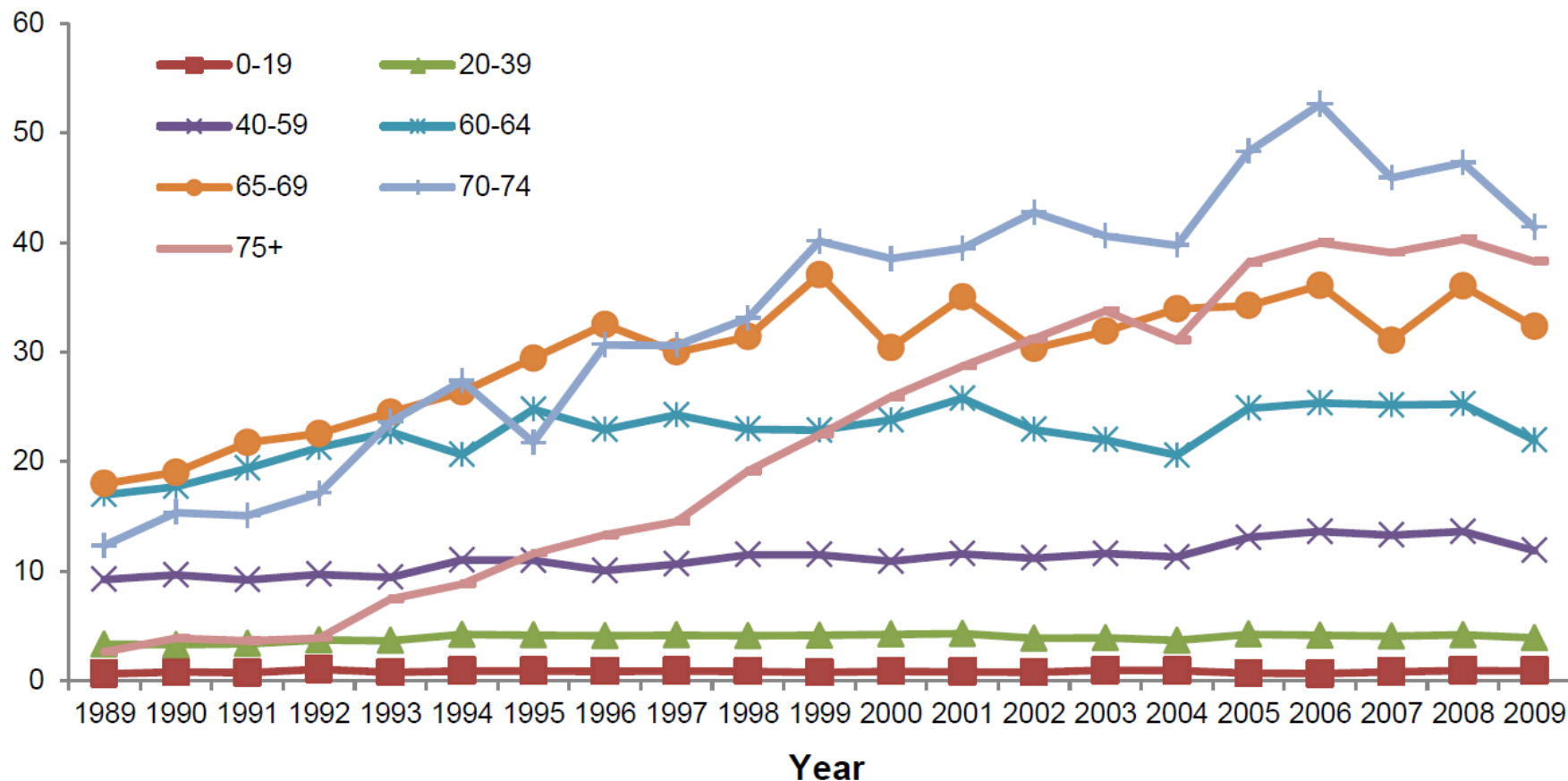


Source: Registered cases during 1996–2009 from ANZDATA .

Figure 2.6: Incidence rates of registered and projected treated ESKD with and without diabetes, Australia, 1996–2020

Age-specific incidence rate of treated ESKD

Number per 100,000 population



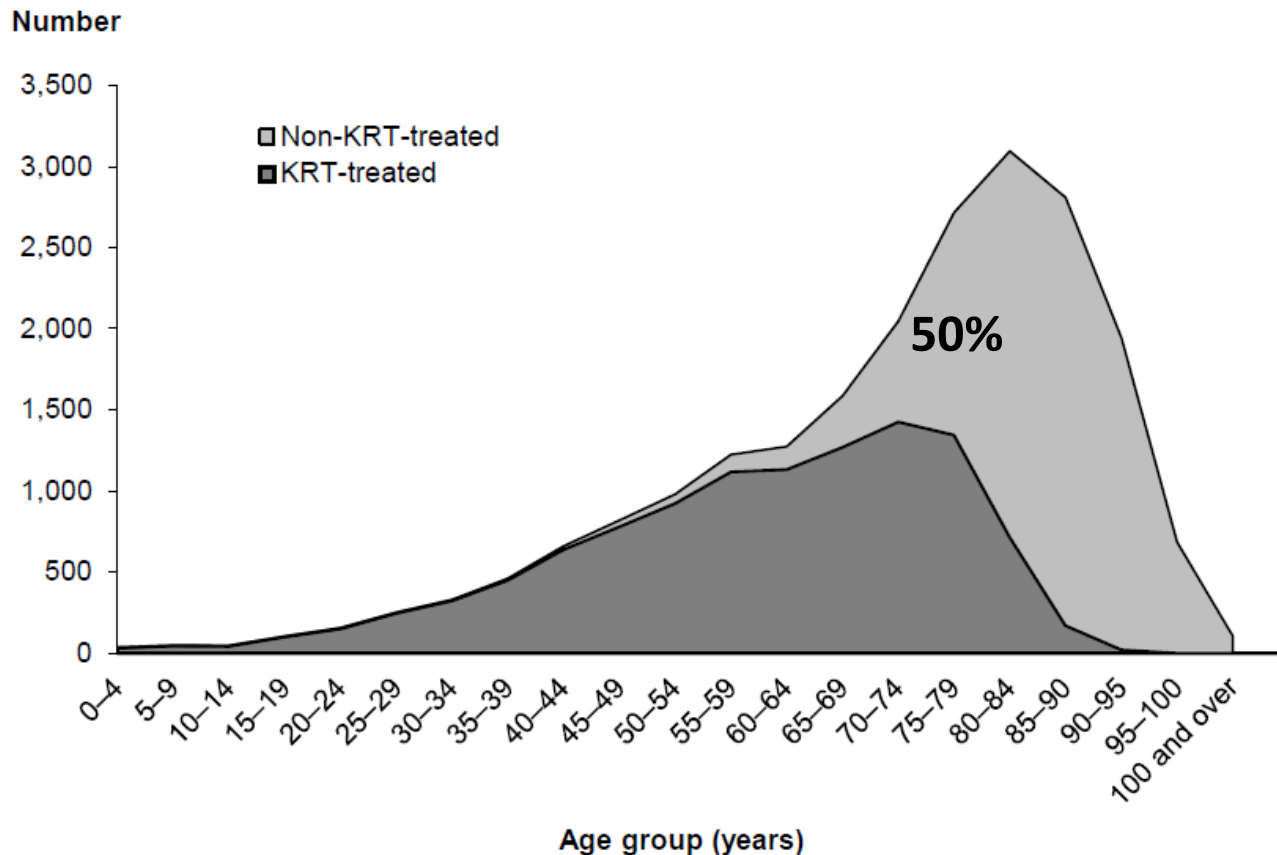
Source: AIHW analysis of ANZDATA.

Figure 1.1: Age-specific incidence rates for treated ESKD, by age, Australia, 1989–2009

Overview

- CKD in Australia & NZ
- Pathways and choice of dialysis

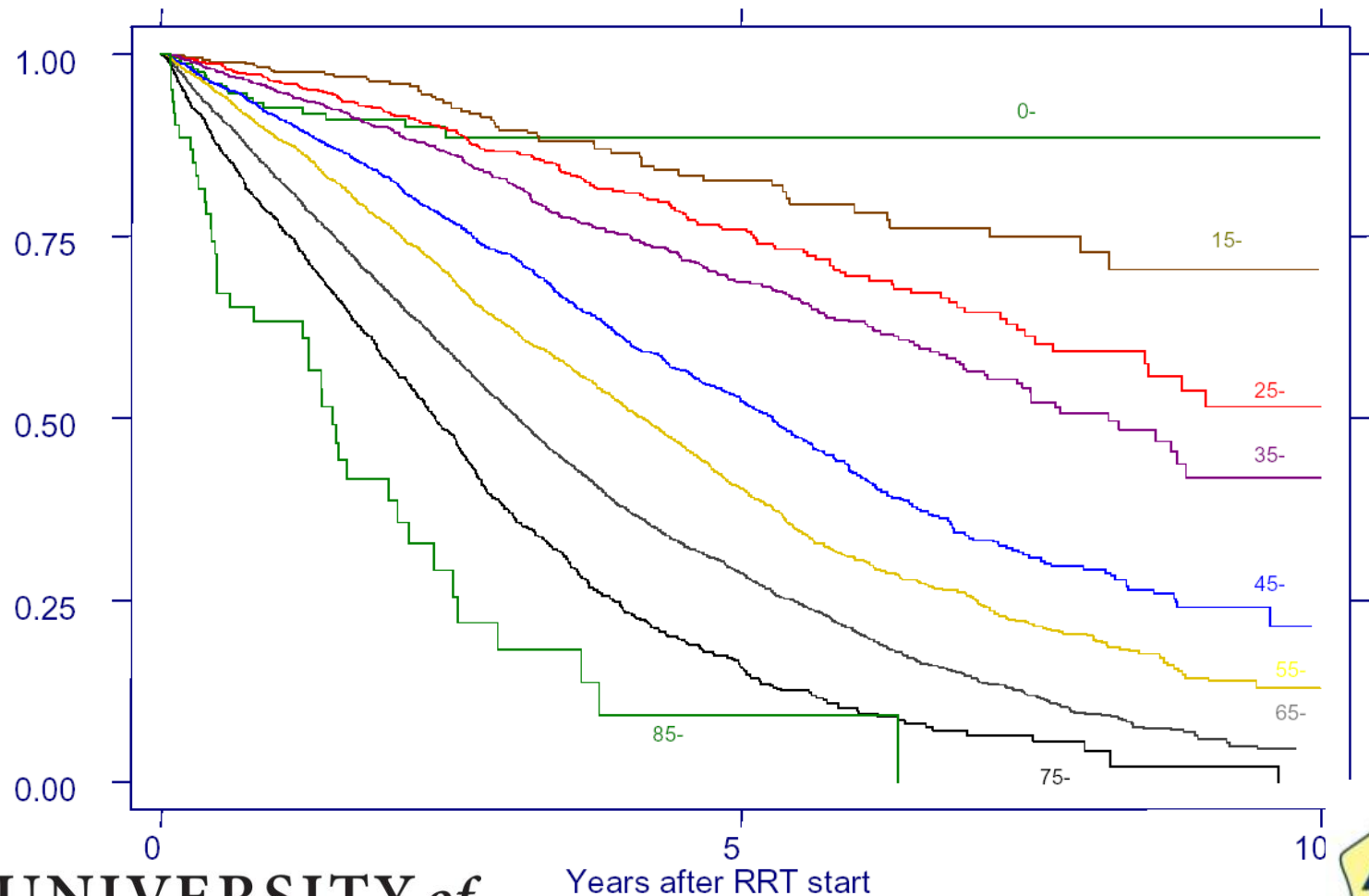
Many elderly not getting dialysis



Source: Linked ANZDATA Registry, AIHW National Mortality Database and National Death Index.

Figure 4.3: Number of KRT-treated and non-KRT-treated cases, by age group at ESKD onset, 2003-2007

Survival on dialysis



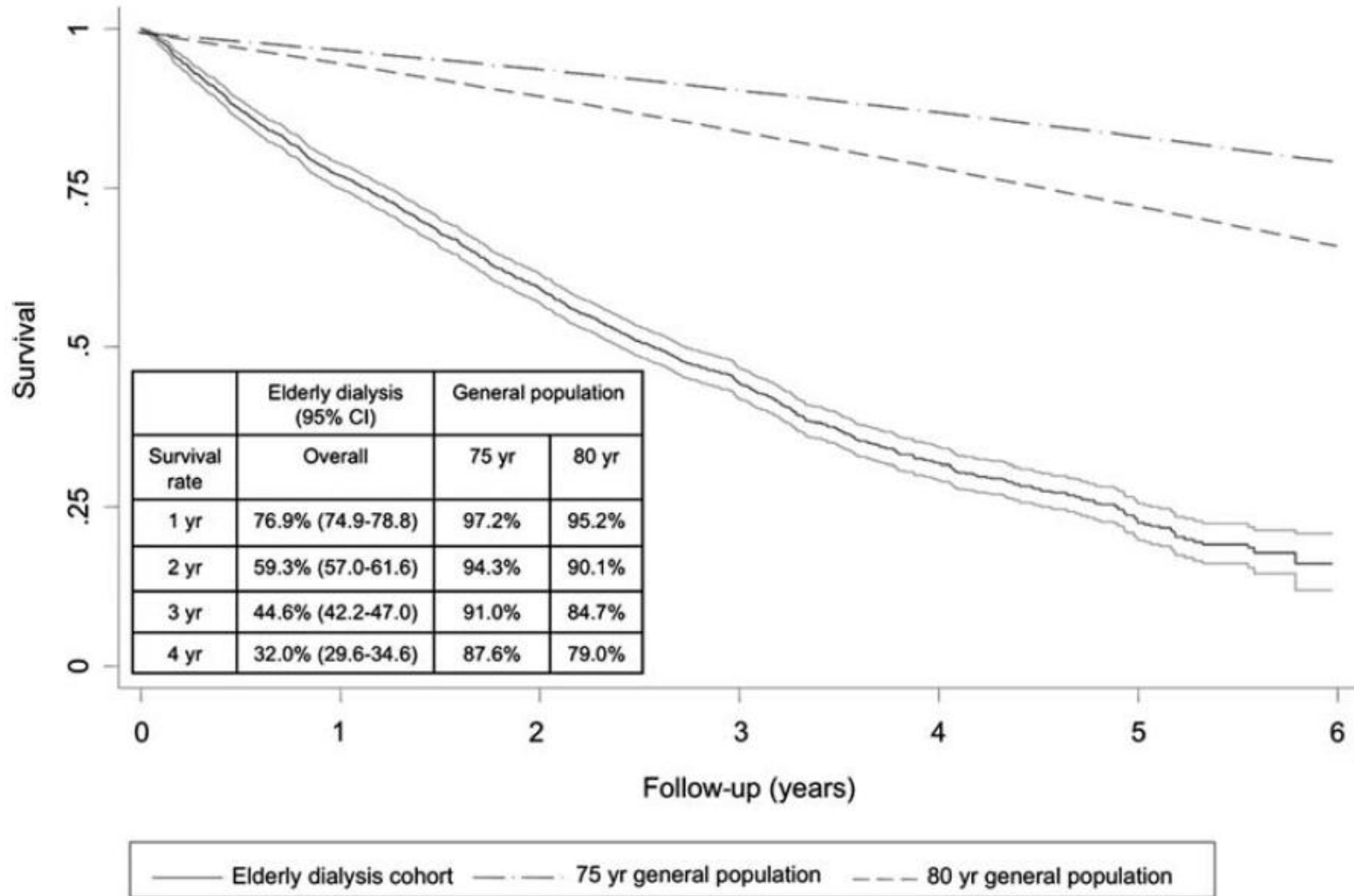
Directions in Australia

- Recognition of outcomes other than survival
- Development of alternative pathways to dialysis
- Empowerment of consumers

Caring still Matters



Dialysis in the elderly



Dialysis in the elderly

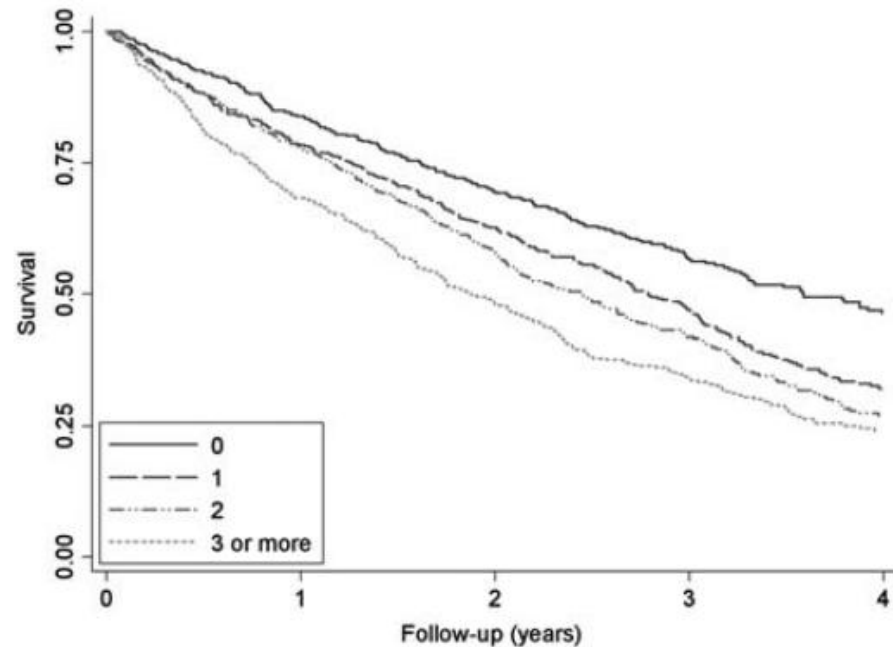


Fig. 2. Survival of patients aged ≥ 75 years initiating dialysis in Australasia between January 2002 and December 2005 according to comorbid score (calculated as the numerical addition of baseline comorbid conditions significant on univariable analyses: coronary heart disease, cerebrovascular disease, peripheral vascular disease, chronic lung disease and diabetes).

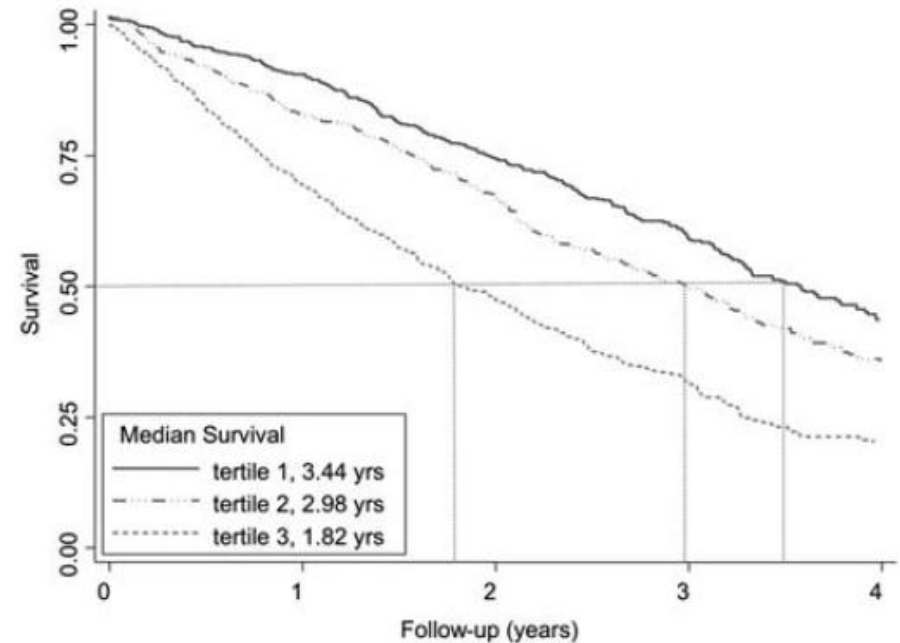


Fig. 4. Patient and practice variables discriminate low, medium and high risk of mortality in elderly dialysis patients. Observed survival in Kaplan-Meier survival curves of tertiles of risk defined by the multivariable model.

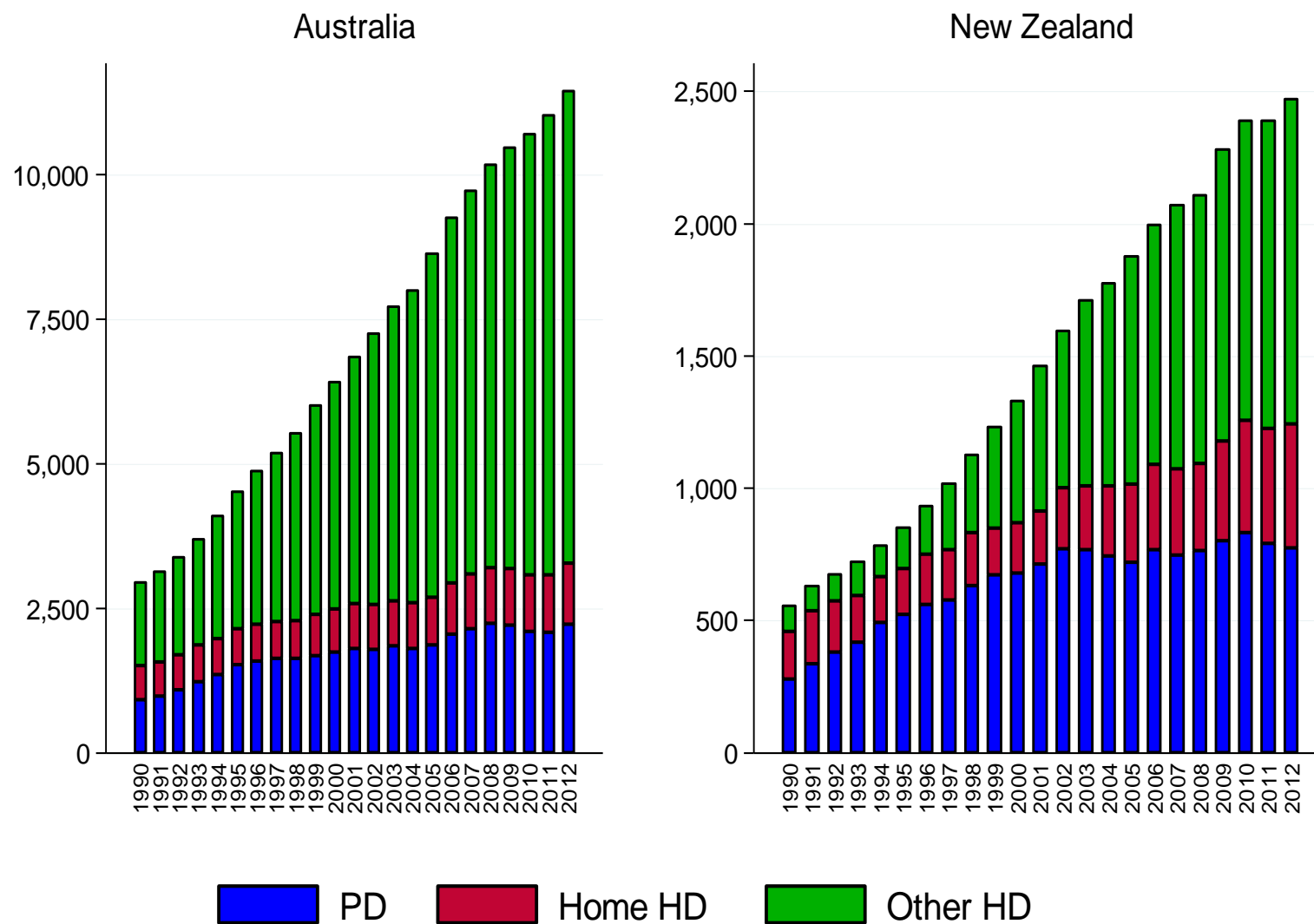
Review

Renal supportive and palliative care: position statement

SU CRAIL, ROB WALKER and MARK BROWN FOR THE RENAL SUPPORTIVE CARE WORKING GROUP*

Care with dialysis

Figure 4.11



Prevalent numbers at year's end

Figure 4.4a

Prevalent Dialysis Patients (Australia)

31 December 2012

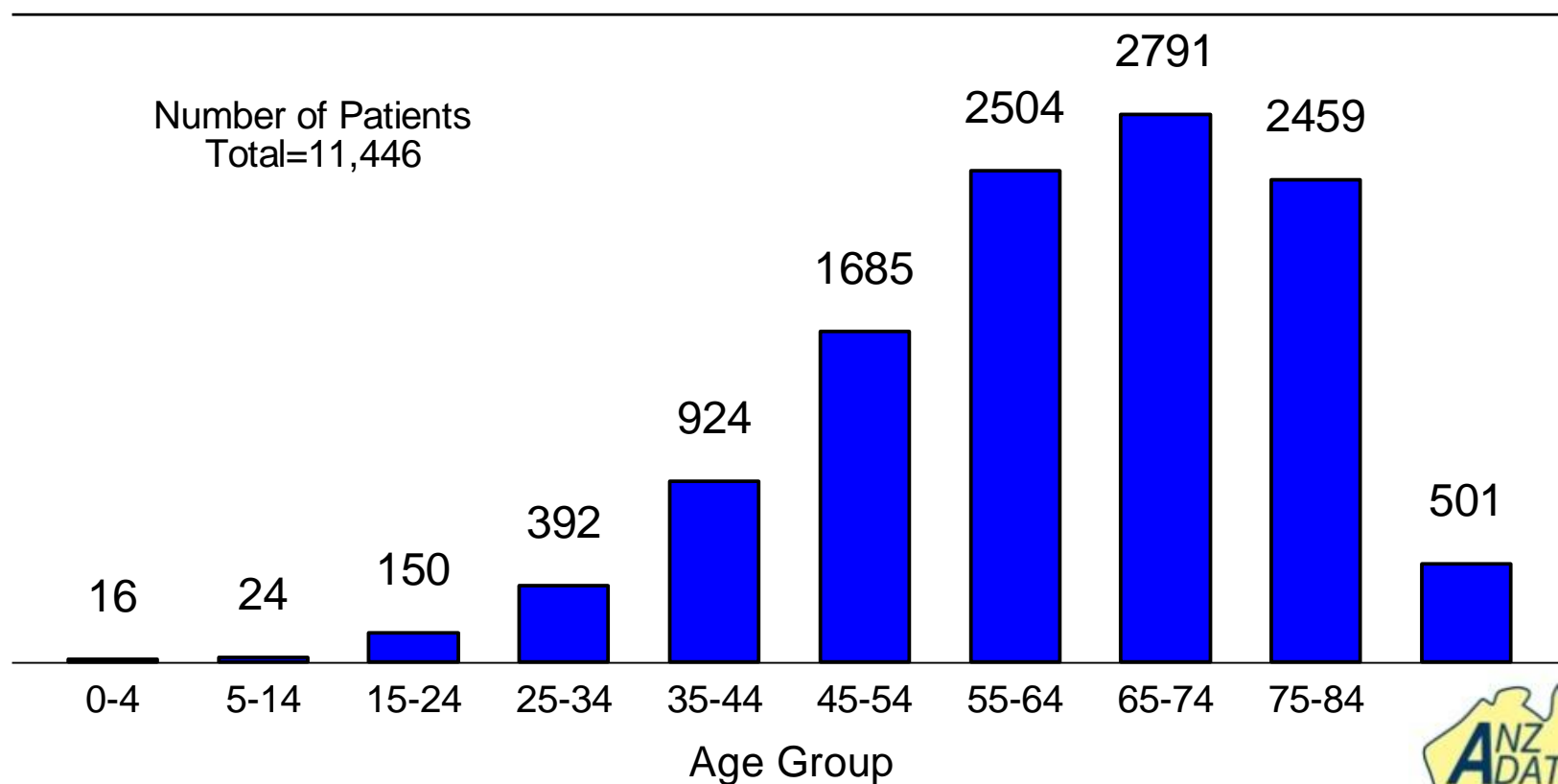


Figure 4.6a

Prevalent Dialysis Patients (New Zealand)

31 December 2012

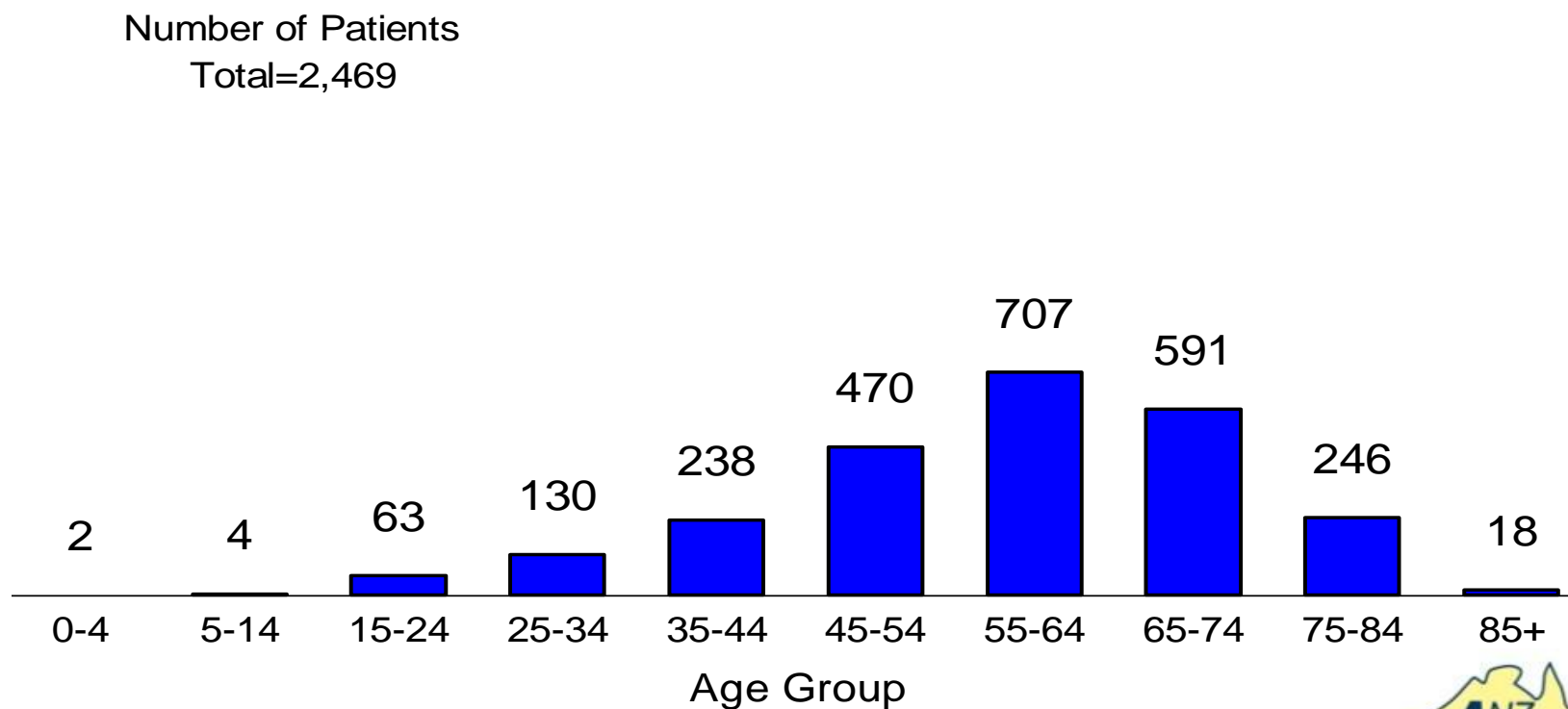
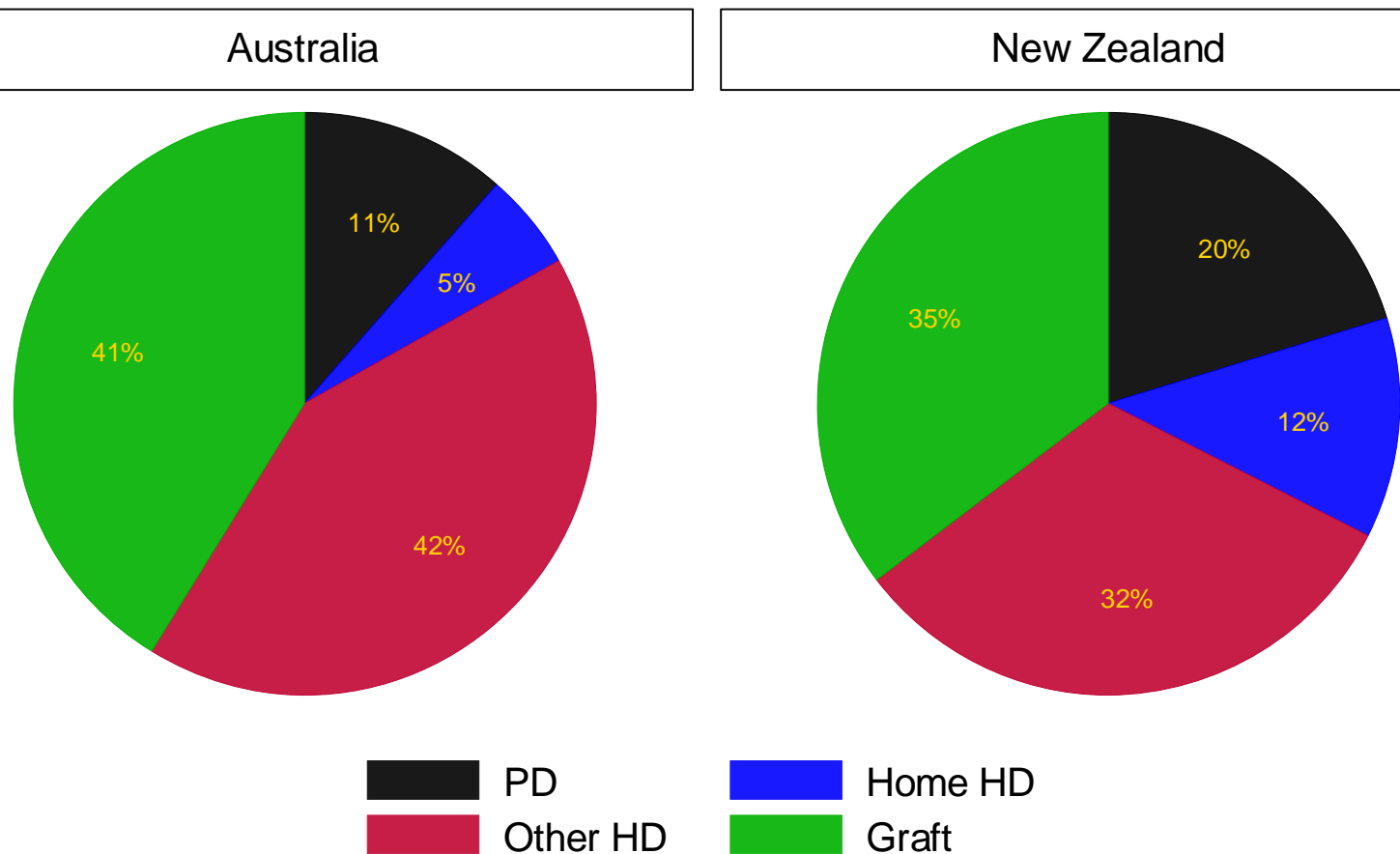


Figure 4.7

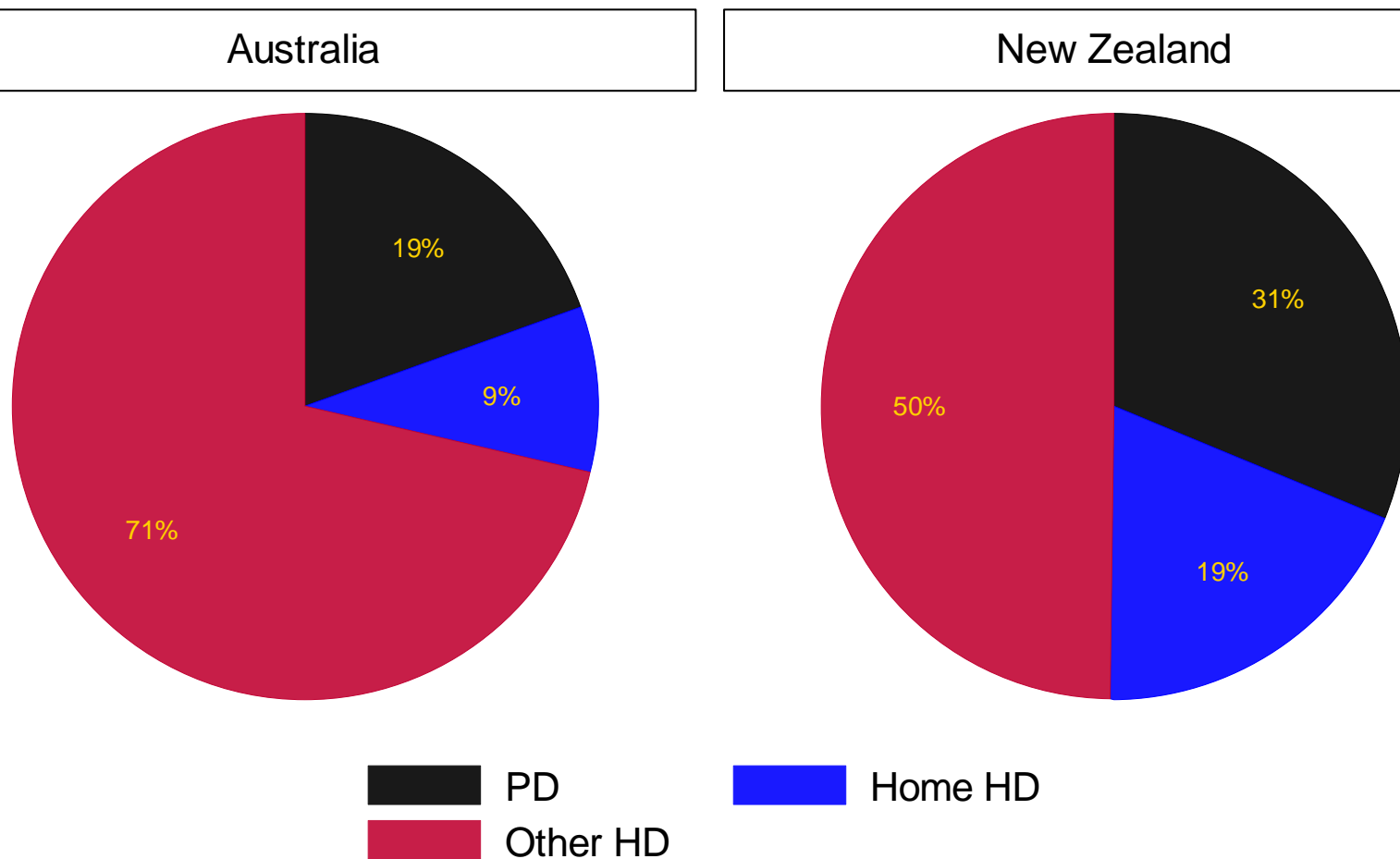
RRT Modality by Country



Modality at end of 2012

Figure 4.8

Dialysis Modality by Country

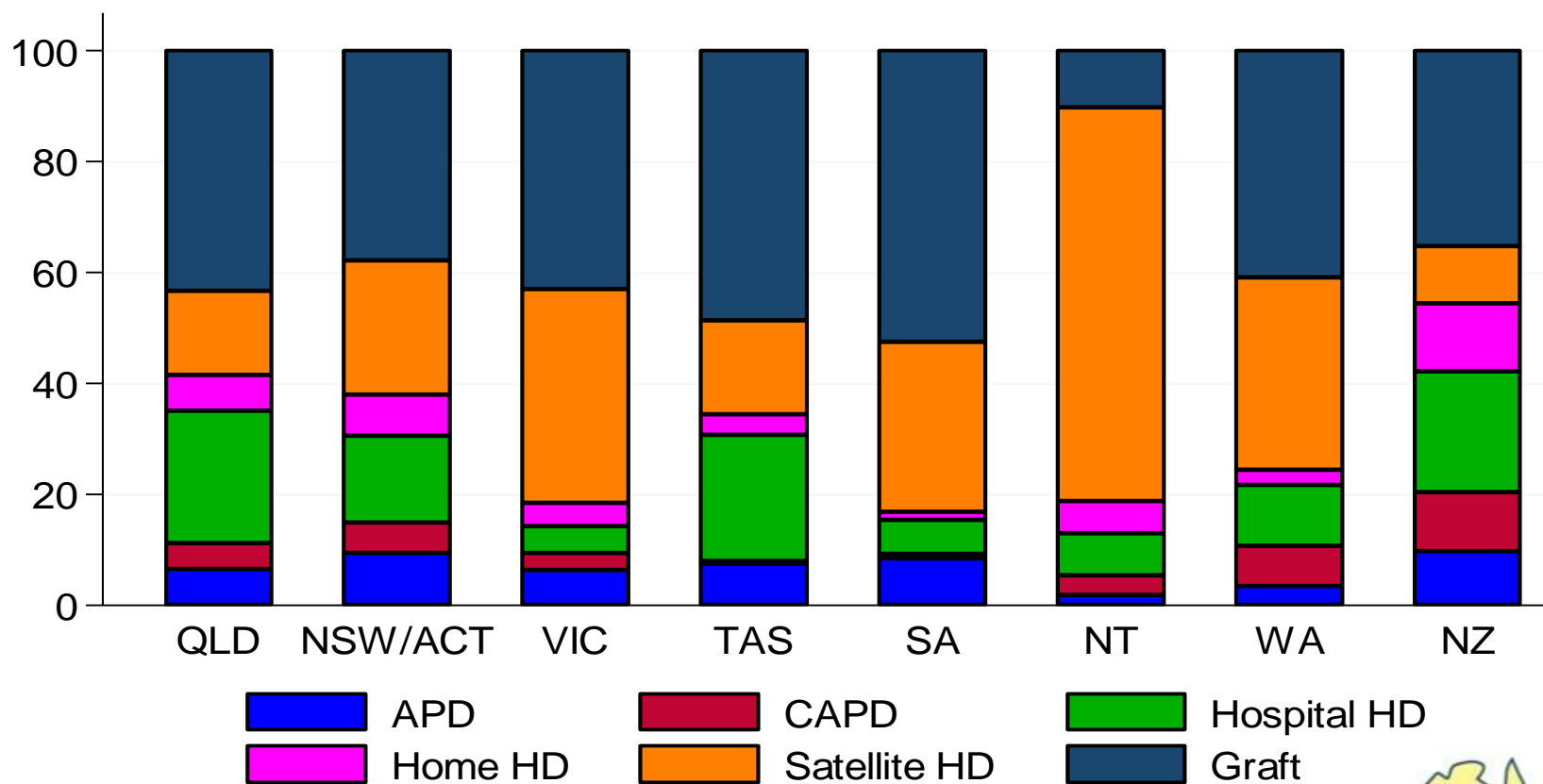


Modality at end of 2012, dialysis only

Figure 4.9

RRT Modality by State

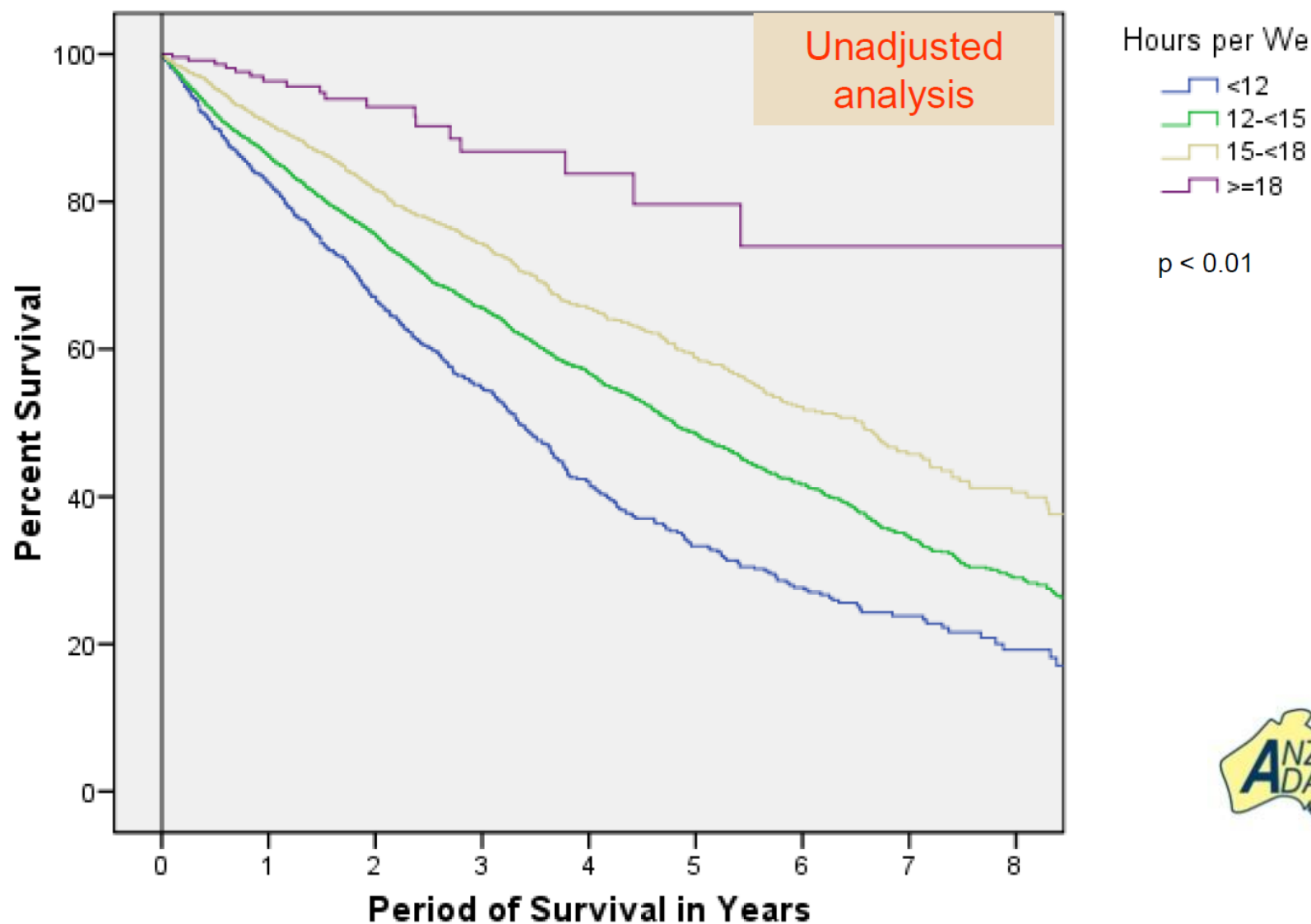
at end of 2012



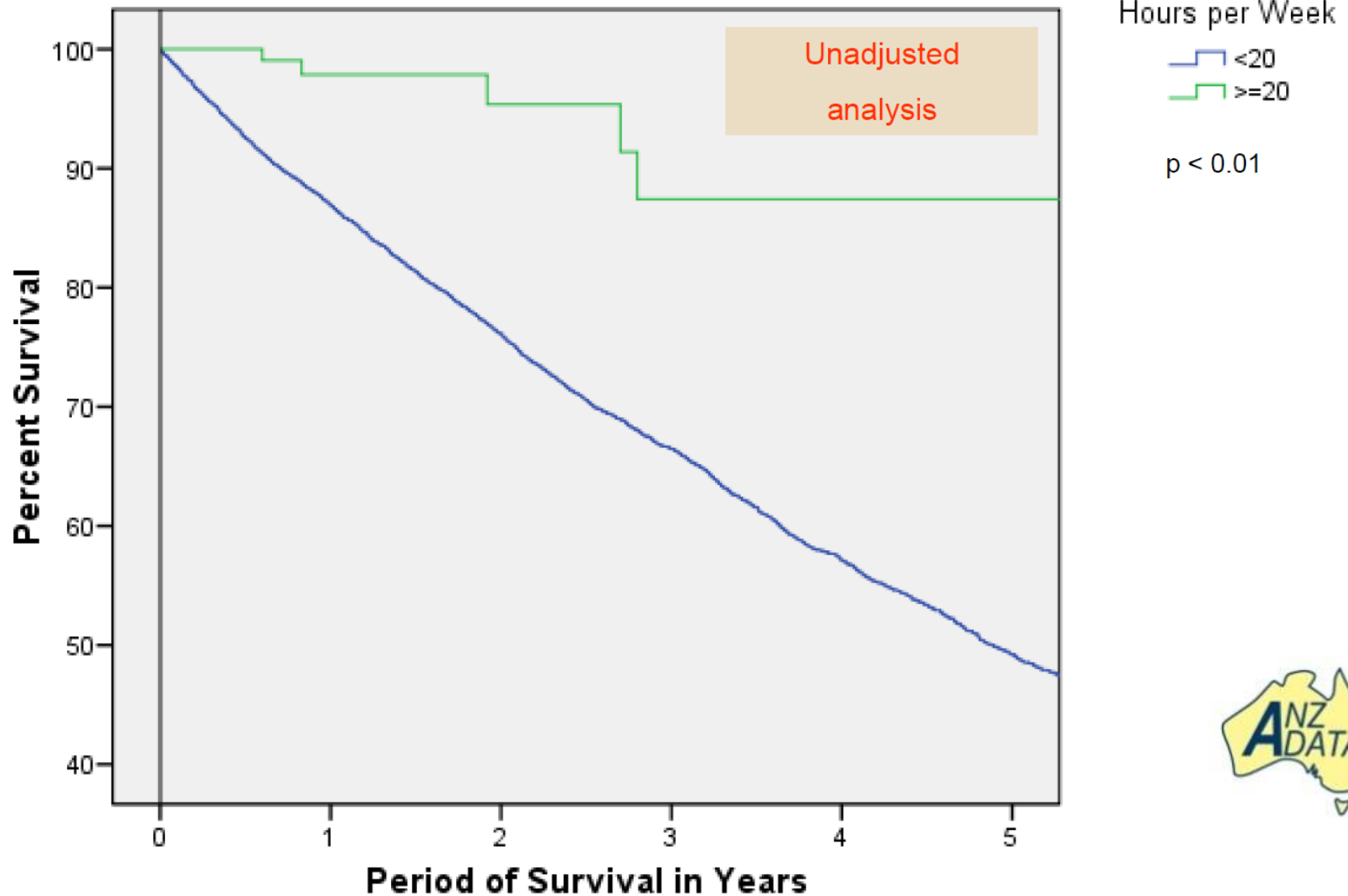
Overview

- CKD in Australia & NZ
- Pathways and choice of dialysis
- Methods and location of dialysis
 - Frequency of dialysis
 - Time on dialysis

Haemodialysis Patient Survival
Australian Patients on HD1997 - 2006 at 90
Days after First Treatment By Hours per Week.
Age ≥ 19



Haemodialysis Patient Survival
Australian Patients on HD 1997 - 2006
at 90 days after First Treatment.
Age ≥ 19 .



Haemodialysis Patient Survival
Australian Patients on HD 1997 - 2006
at 90 Days after First Treatment.
Age ≥ 19

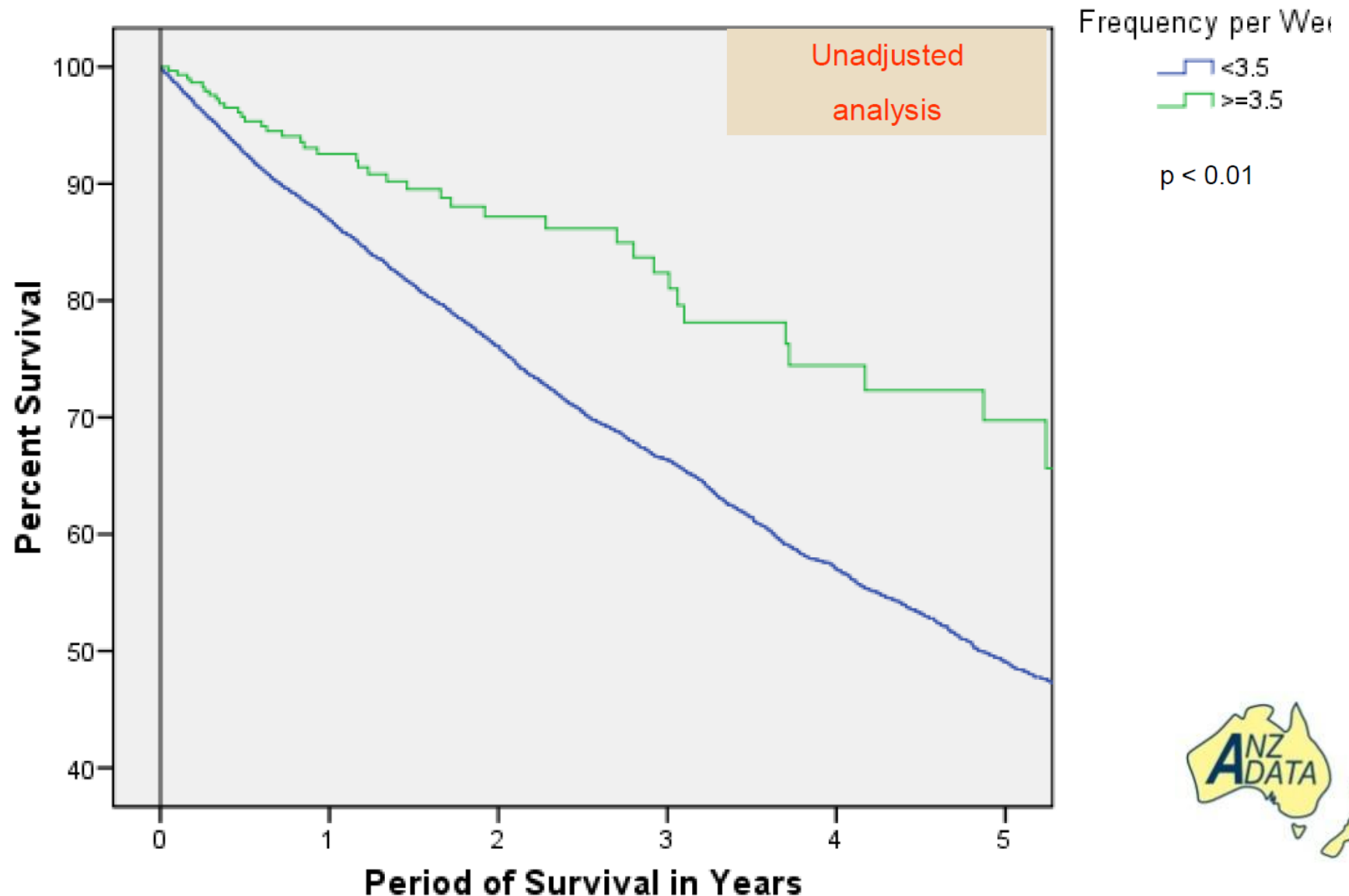


Figure 5.19

Percentage of Patients Dialysing 3 Days per Week
Dialysing 4.5 Hours or Longer per Session

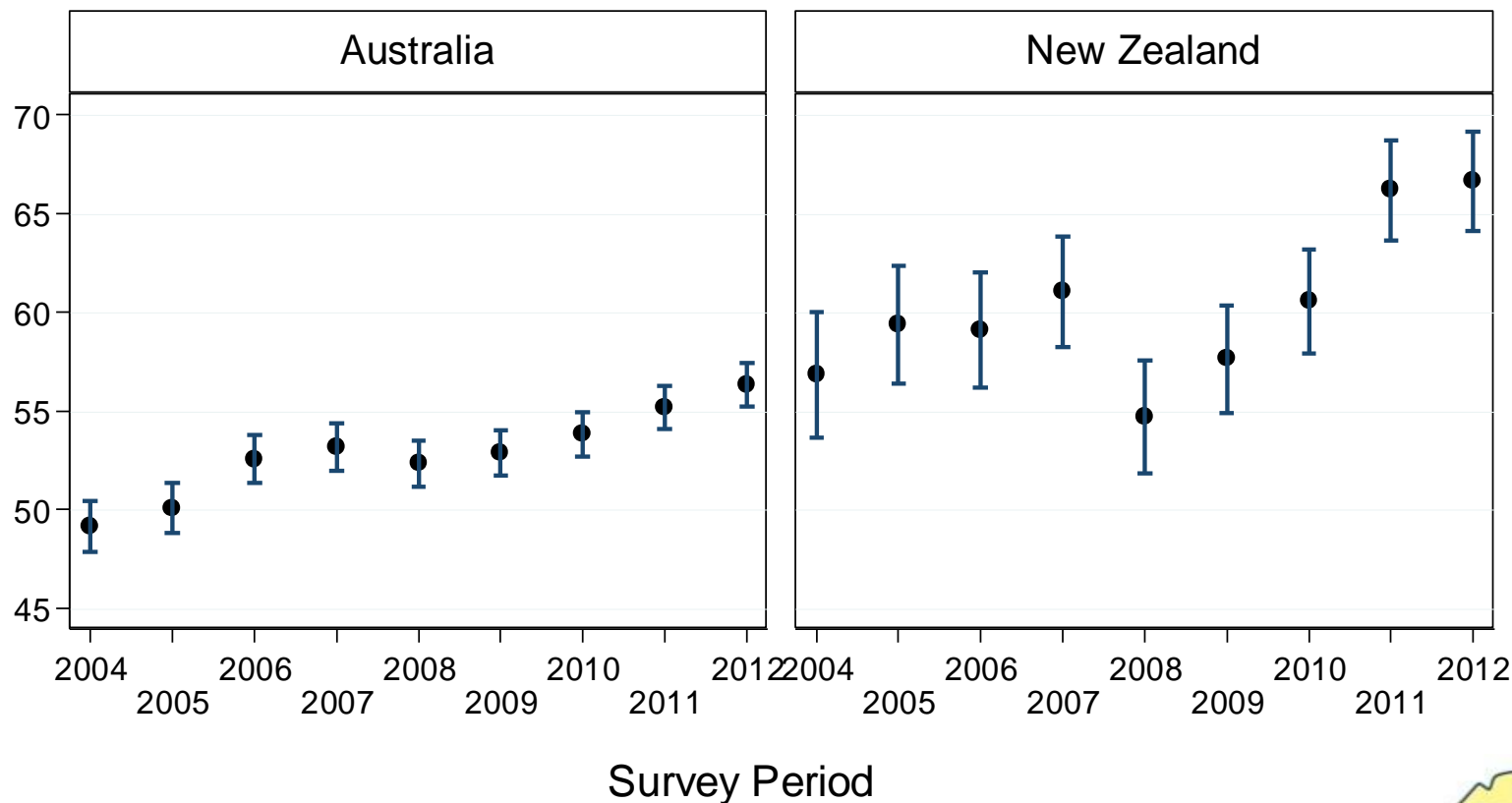


Figure 5.20

Percentage of Patients Dialysing >12 Hours per Week

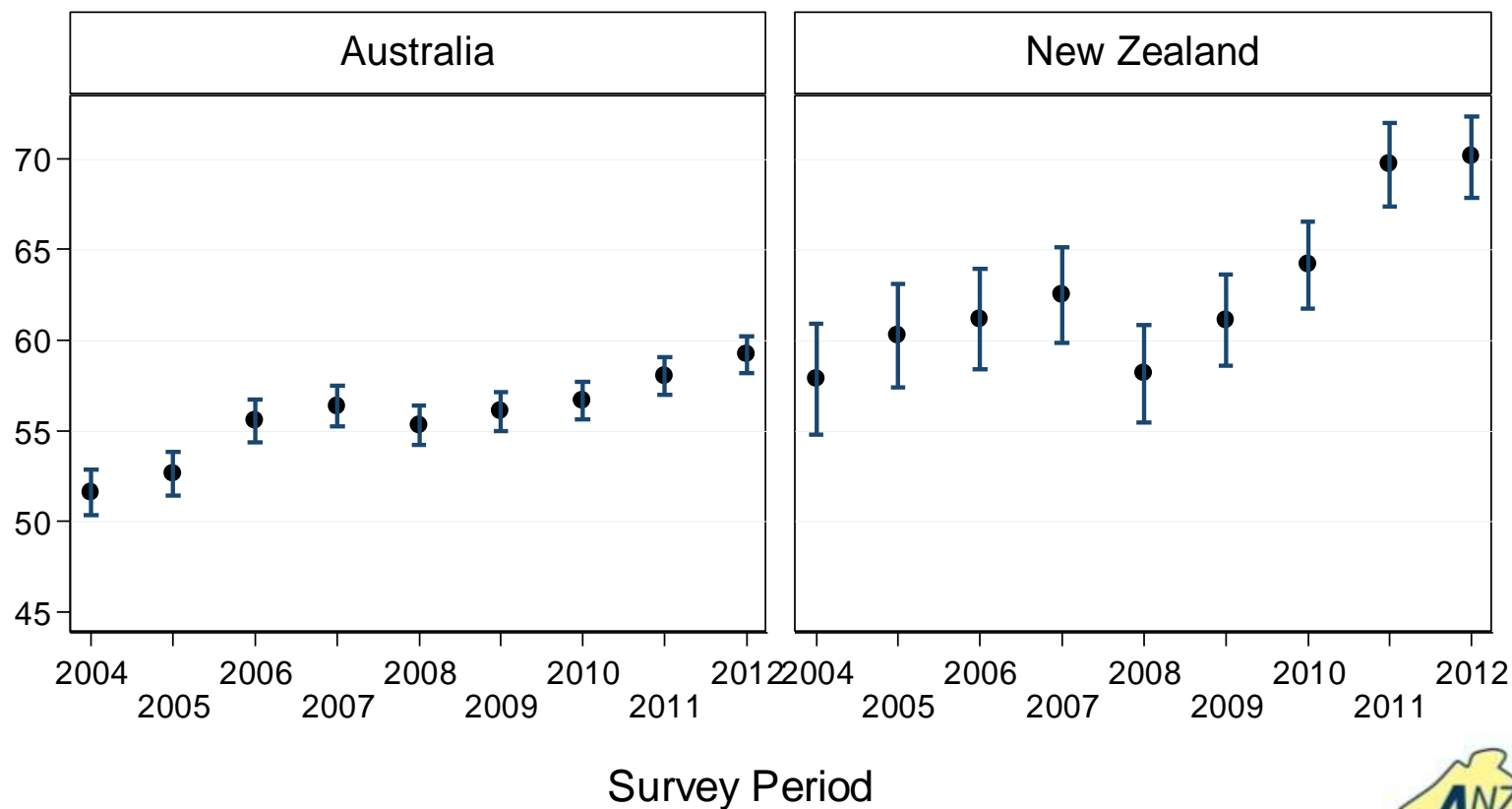


Figure 5.25

Patient Survival - Haemodialysis at 90 Days
2001 - 2012
Censored for Transplant - Australia

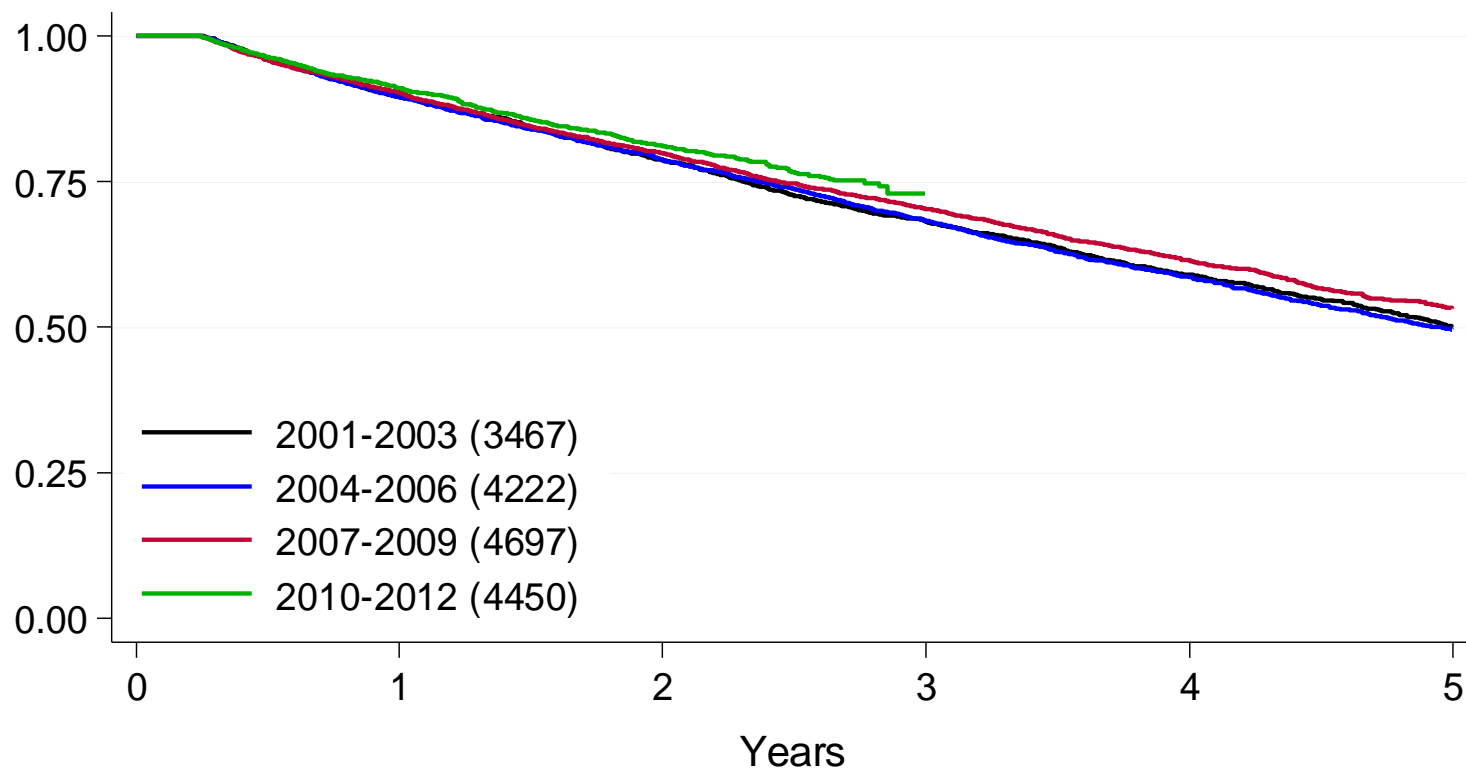
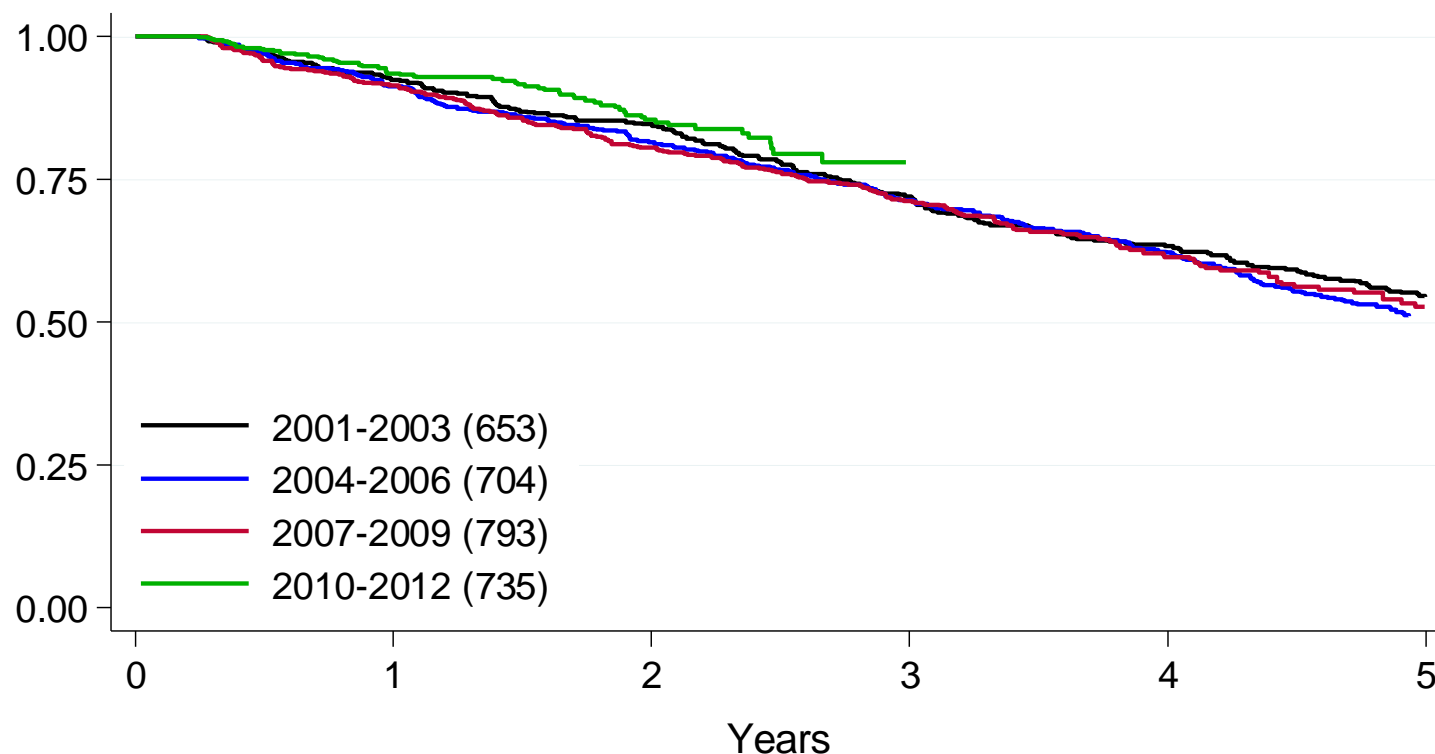


Figure 5.26

Patient Survival - Haemodialysis at 90 Days
2001 - 2012
Censored for Transplant - New Zealand

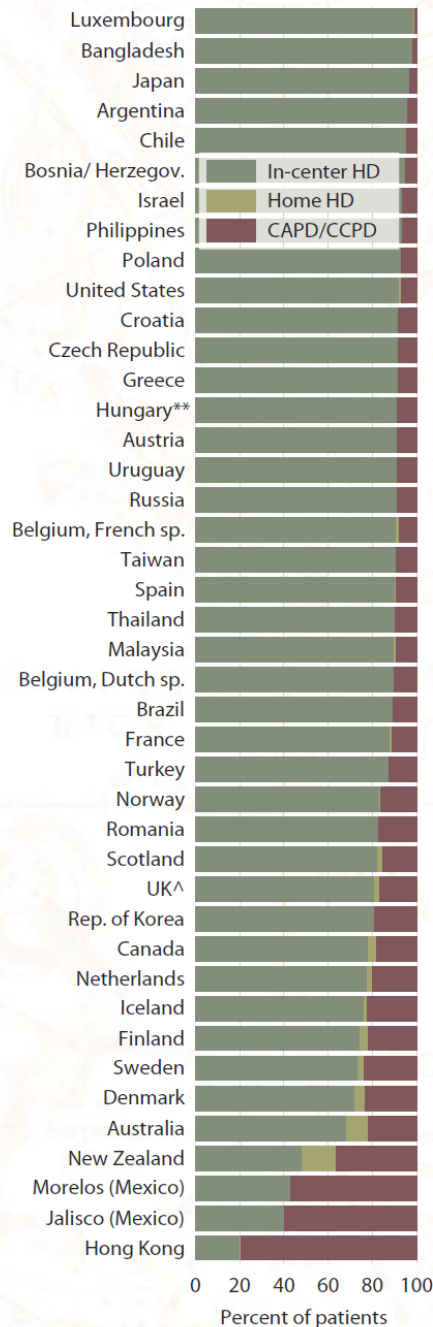


Overview

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- Home therapies

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Percent distribution of prevalent dialysis patients, by modality, 2008



Worldwide variation in Home Dialysis

Dialysis issues



“Home” dialysis.....

Anywhere, anytime

Community Dialysis



Community Dialysis

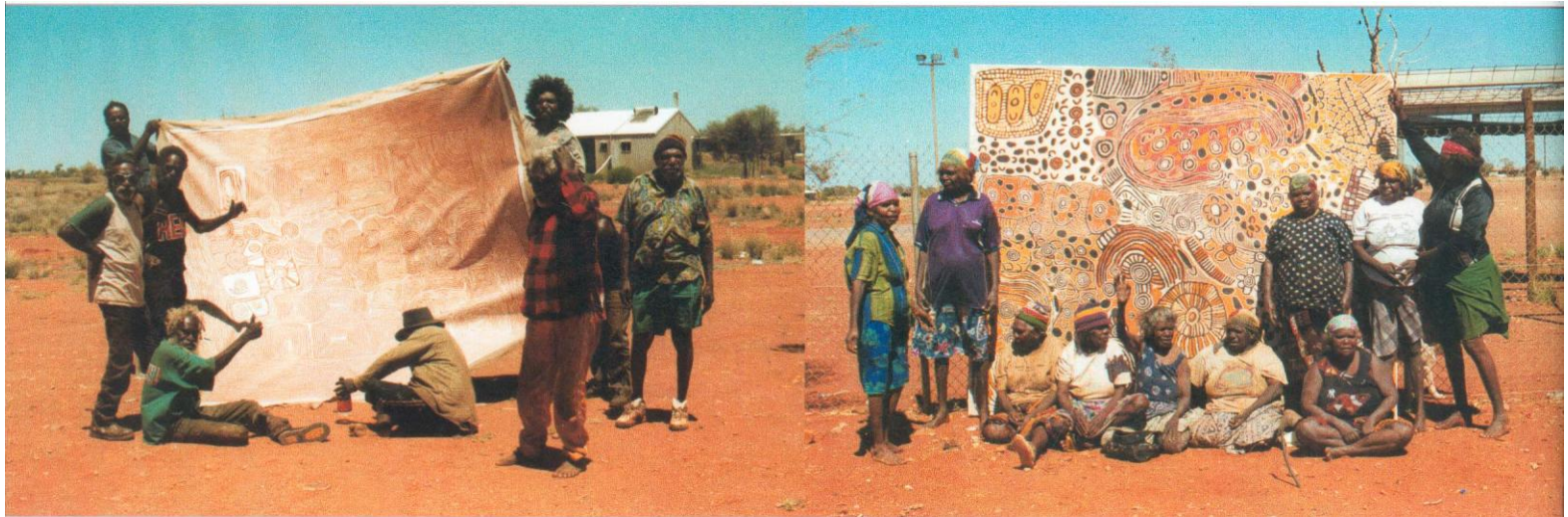


Dislocation – not relocation



Courtesy: Dr Paul Rivalland, WDNWPT

Getting paintings ready at Kiwirrkurra (WA) and Walungurru (Kintore – NT)



Courtesy: Dr Paul Rivalland, WDNWPT

PD training



Courtesy: Dr Paul Rivalland, WDNWPT

Mobile dialysis



Mobile dialysis



Quotidian Haemodialysis

- Quotidian Haemodialysis Definition:
 - More than 3 sessions per week
 - And/or a treatment duration of 5.5 hours or more per session
- Conforms with the International Quotidian Dialysis Registry definition

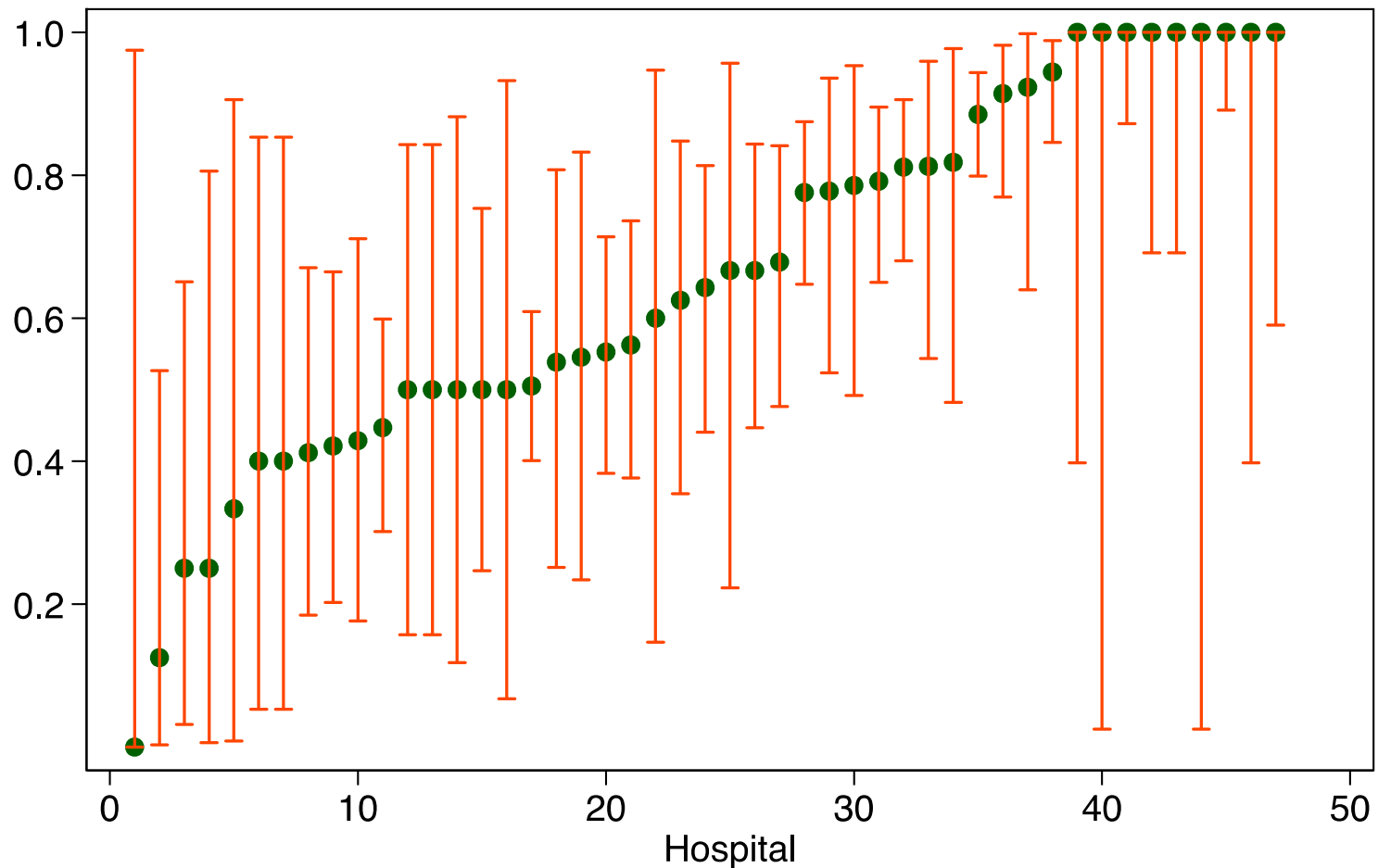
Quotidian Haemodialysis

- The term “quotidian” denotes an event that recurs daily.
- In hemodialysis traditionally refers to daily, or “frequent” hemodialysis treatments.
- There has been a increase in the interest in “alternative” or “funky” hemodialysis treatment.

Quotidian Haemodialysis

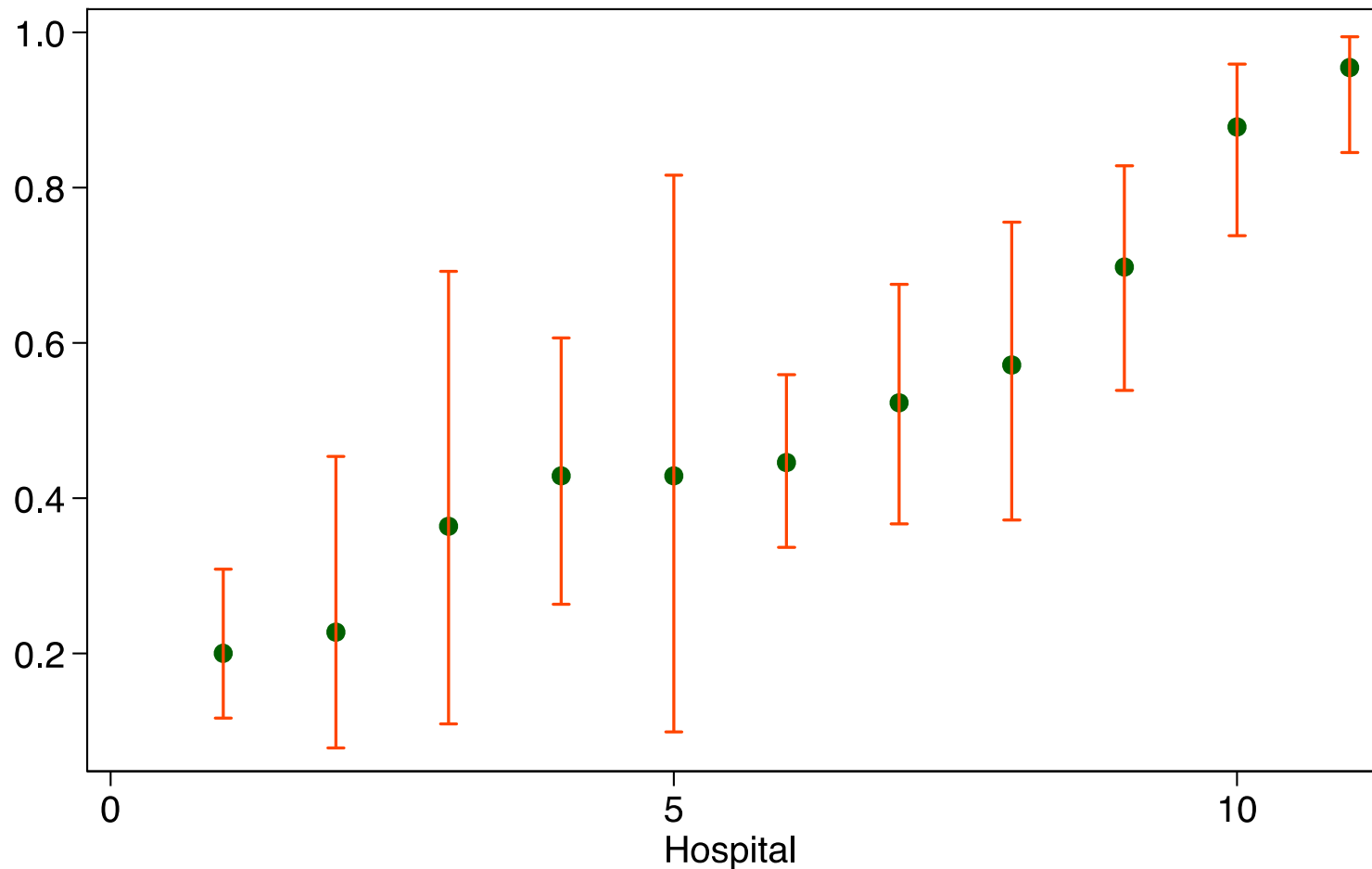
Proportion of Home HD Patients on Quotidian Dialysis

Australia 31 Dec 2011



Quotidian Haemodialysis

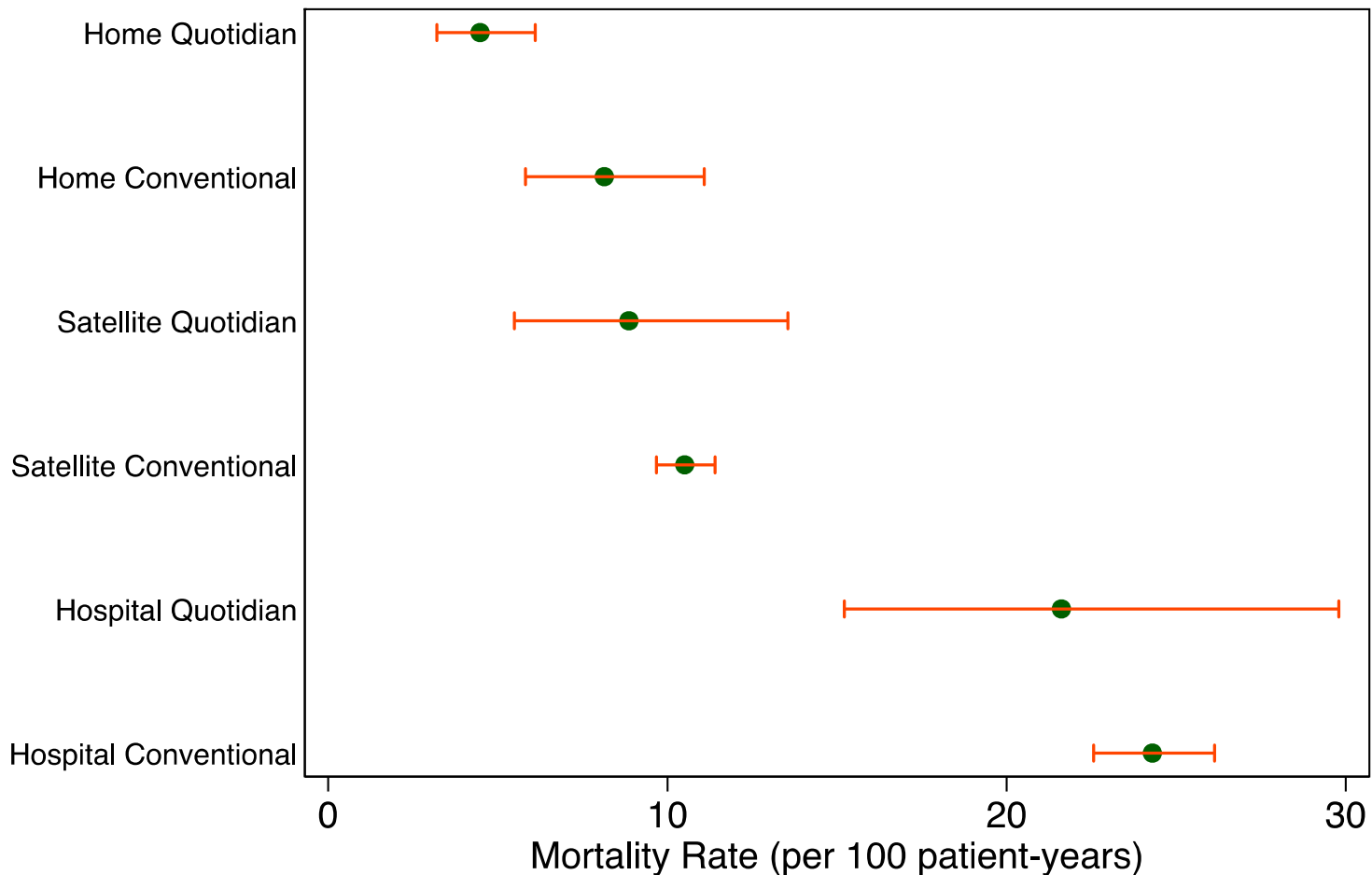
Proportion of home HD patients on quotidian dialysis
New Zealand 31 Dec 2011



Quotidian Haemodialysis

Crude Haemodialysis Mortality Rates

Australia and New Zealand 2011



Cost savings

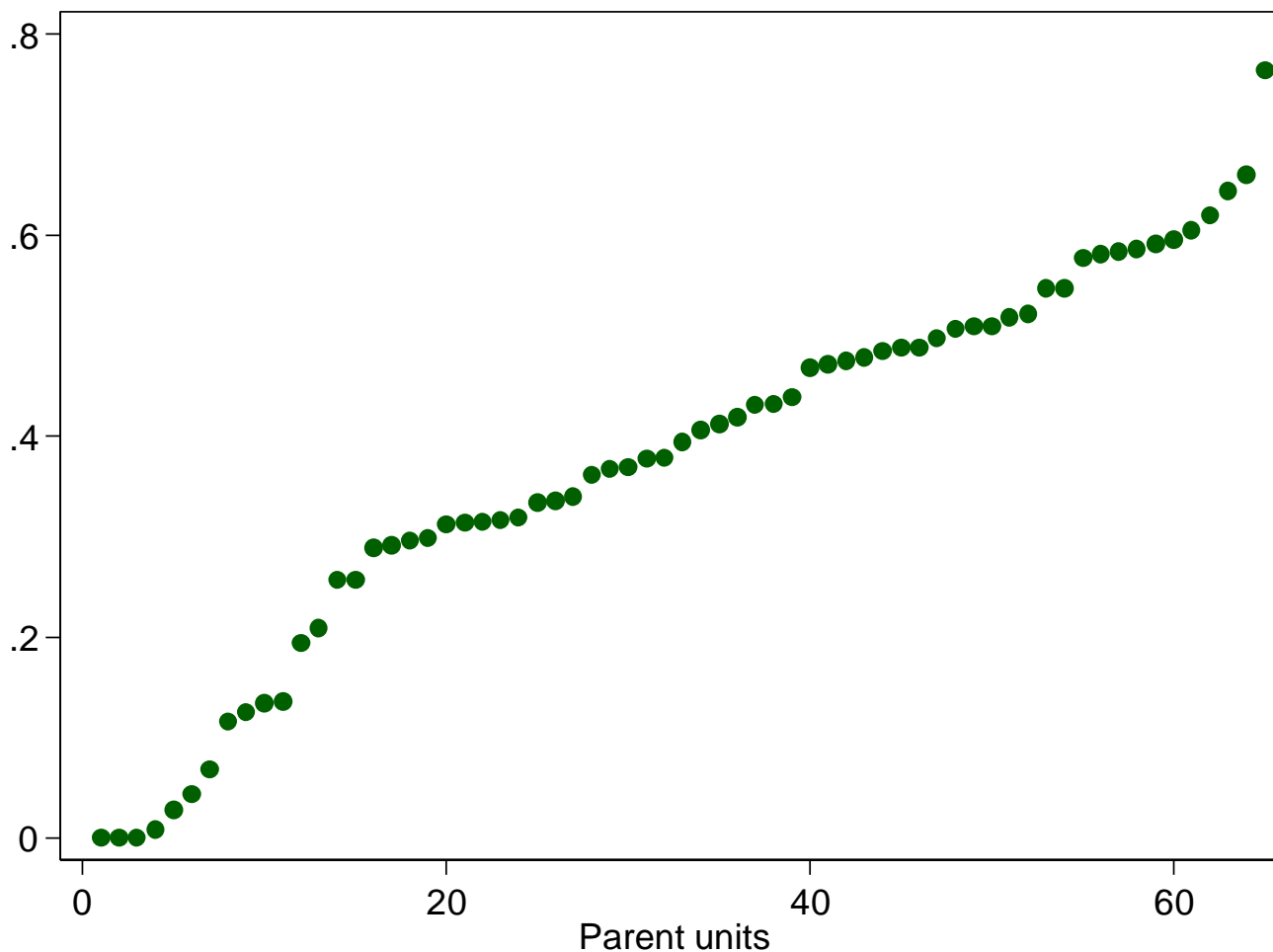
Nocturnal haemodialysis: An Australian cost comparison with conventional satellite haemodialysis

JOHN WM AGAR, RICHARD J KNIGHT, ROSEMARY E SIMMONDS,
JANEANE M BODDINGTON, CLAIRE M WALDRON and CHRISTINE A SOMERVILLE

Renal Unit, The Geelong Hospital, Barwon Health, Geelong, Victoria, Australia

Satellite dialysis	\$36,284 pa	(4hrs x 3)
Nocturnal Home HD	\$33,392 pa	(8hrs x 6)
Cost savings	<u>\$116,750 pa</u>	for 30 pts

Proportion of PD by unit



Proportion of PD at 90 days by unit, Australia and NZ, 1991-2004

PD vs HD in ANZ

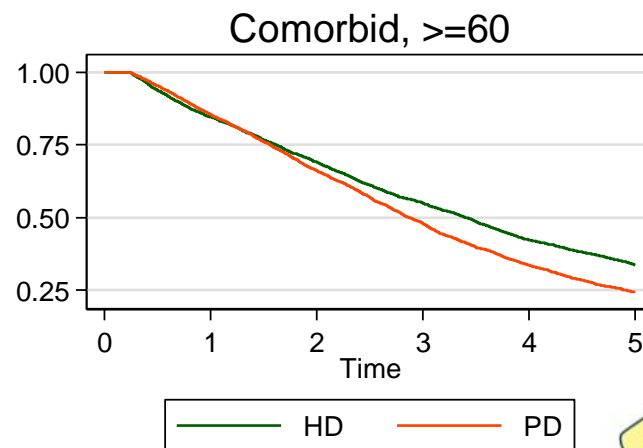
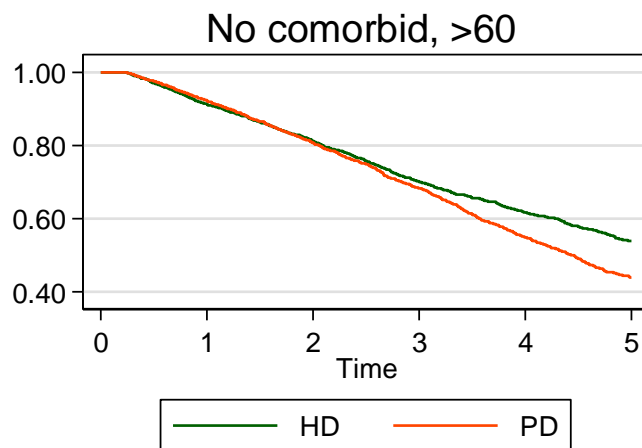
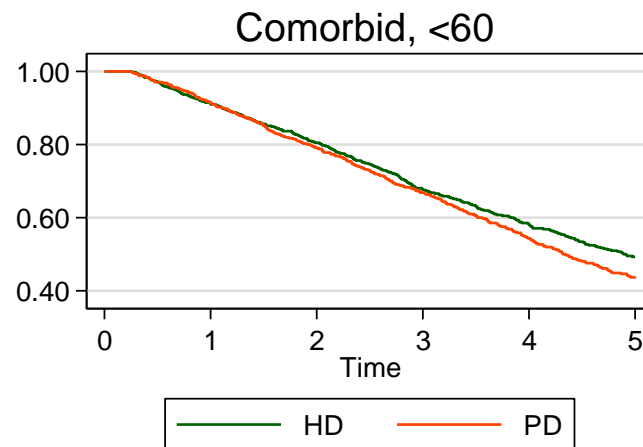
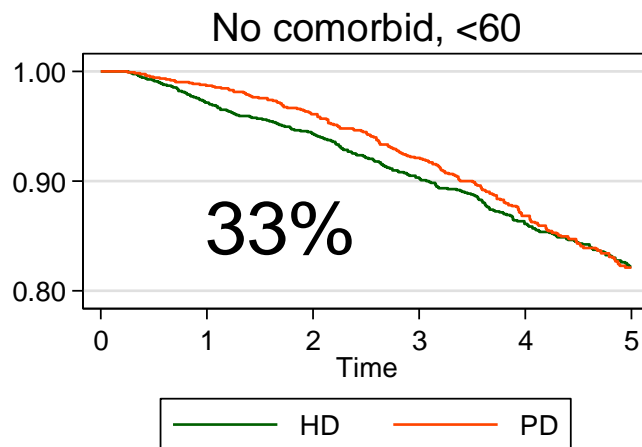


Table 3. Patient Factors that impact on PD success

Patient preference for PD ^{38,39}
Body weight (usually BMI 20-30 kg/m ²). ⁴⁰ Abdominal obesity may preclude
Motivation to perform home self-care treatment ³⁹
Training – ability to retain and recall information. Language/need for an interpreter may be a barrier ⁴¹
Adequate manual dexterity for bag changes ^{41,42}
Sufficient strength to handle bags (especially APD)
Visual acuity – although visually impaired may be trained
Absence of medical and surgical contraindications e.g. previous abdominal surgery with adhesions ³⁸
Time commitment for PD
Desire to travel ³⁹ – easier with PD compared to HD
Social worker assessment – finance, work, family, community
Support person availability – demand on other members of household may be a barrier ^{39,42}
Clean and clear area for bag changes
Adequate storage area with access for supply, delivery
Good access between storage and bag change area

PD: peritoneal dialysis; BMI: Body mass index; APD: automated peritoneal dialysis; HD: haemo

What factors impact on success?

Jose et al, Nephrology 2011; 16: 19-29

Table 4. Requirements for PD training and support

Pre-dialysis training essential from modality choice until the start of dialysis
Multidisciplinary team involvement ³⁸ with social worker support
Centralised and standardised training practices based on adult-learning principles ^{41,72,73}
Dedicated training space with adequate hygiene and area for equipment ⁷³
Training tailored to individual's learning capacity, native-language and specific needs ^{41,72,73}
Practical training - preferably with home-based instruction ⁴¹
Appropriate duration spread over a number of days ^{41,72}
Dedicated trainers with nursing qualification and experience in education techniques ⁴¹
One-on-one trainer to patient ratio ⁴¹
24-hour telephone support ^{73,78}
Continuous re-training of patients and PD staff ^{66,74,77}

PD: peritoneal dialysis

Benefits of home dialysis

- Does it produce *healthier* outcomes?
- Are people *happier* on Home dialysis?
- Does it provide QOL benefits?
- Does it provide survival benefits?
- Does it provide cost benefits?
 - If so, to whom?

Metanalysis of QOL in RRT

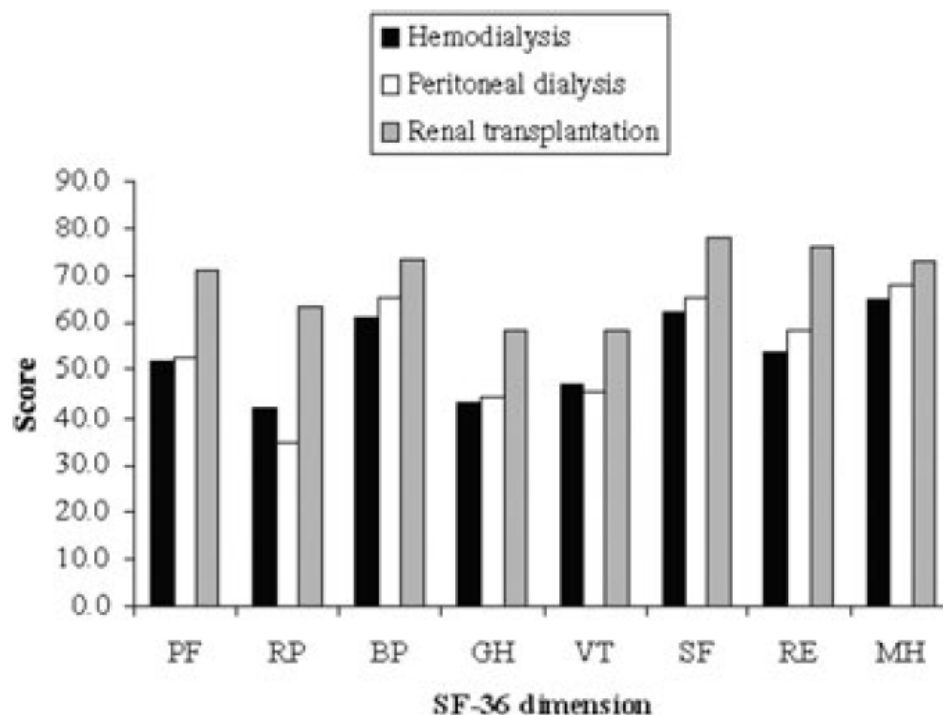


Figure 1 SF-36 scores from all articles: random-effects-model means. BP, Bodily Pain; GH, General Health Perceptions; MH, Mental Health; PF, Physical Functioning; RE, Role Limitations due to Emotional Functioning; RP, Role Limitations due to Physical Functioning; SF, Social Functioning; VT, Vitality.

Change in QOL over time

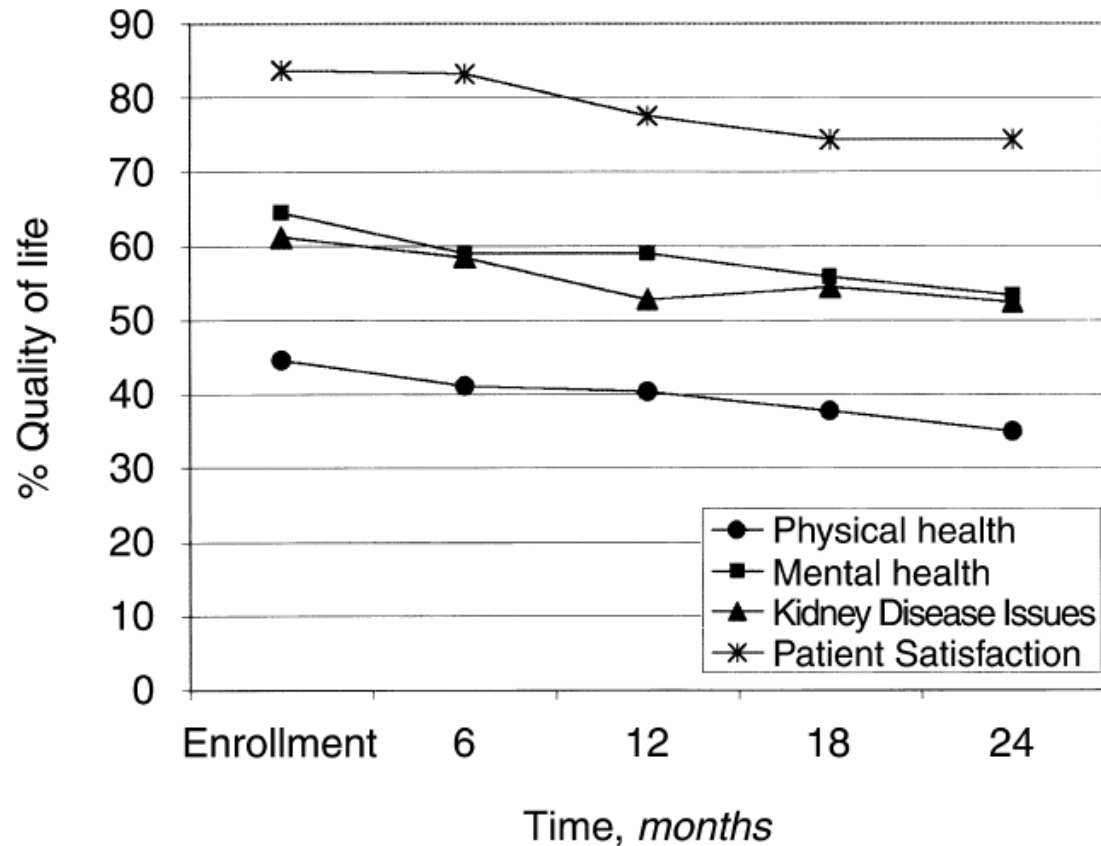
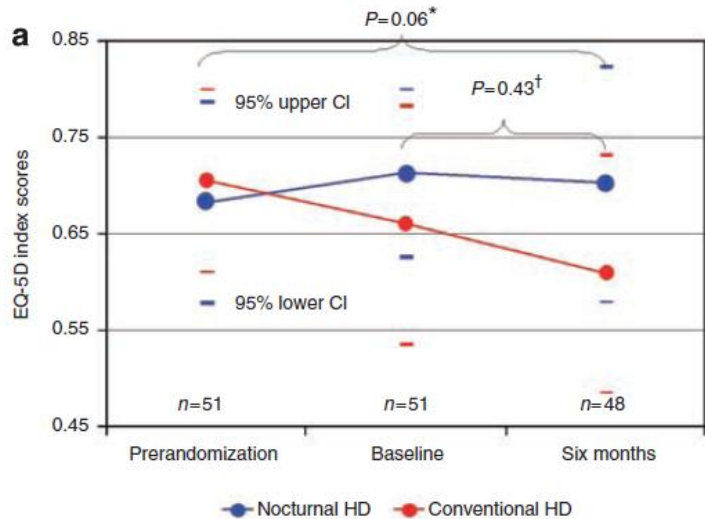


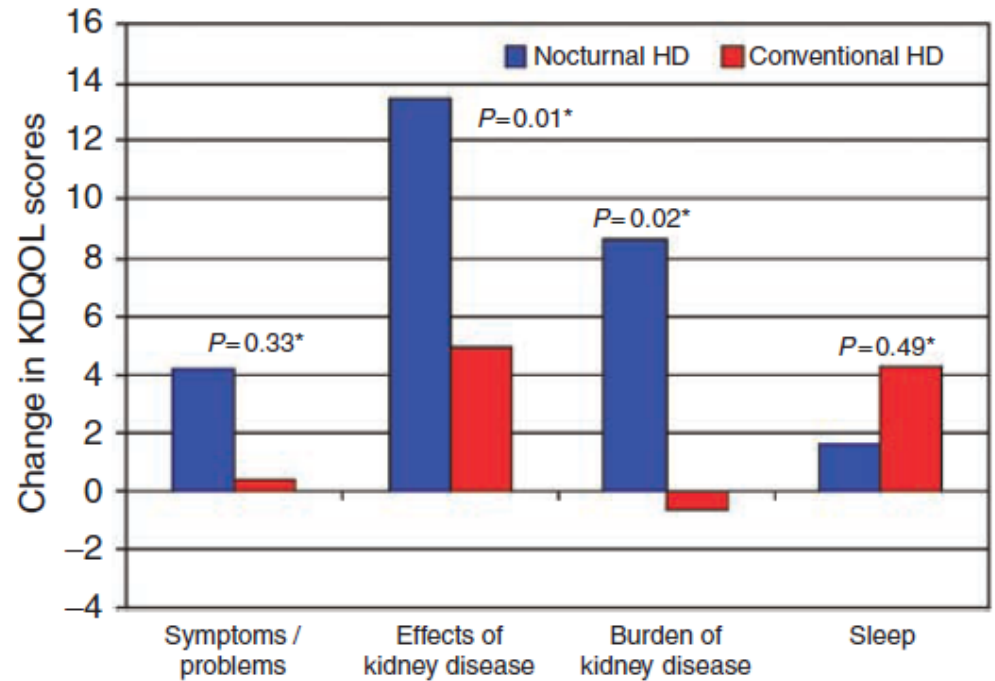
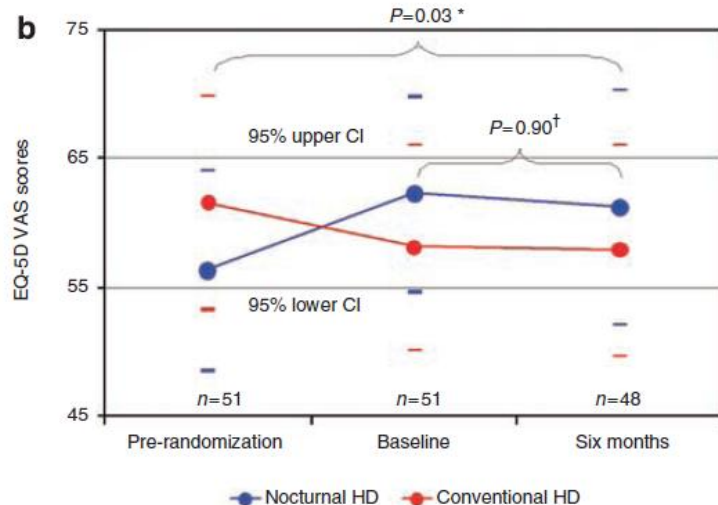
Fig. 1. Quality of life (QoL) dimension scores from the time of enrollment (mean months on PD 22 ± 14) to 24 months later, in the 20 patients who completed all five questionnaires. Decline over time was significant for all four QoL dimensions.

Nocturnal hemodialysis does not improve overall measures of quality of life compared to conventional hemodialysis



* Comparing change in EQ-5D index score from randomization to 6 months, for NHD vs CHD

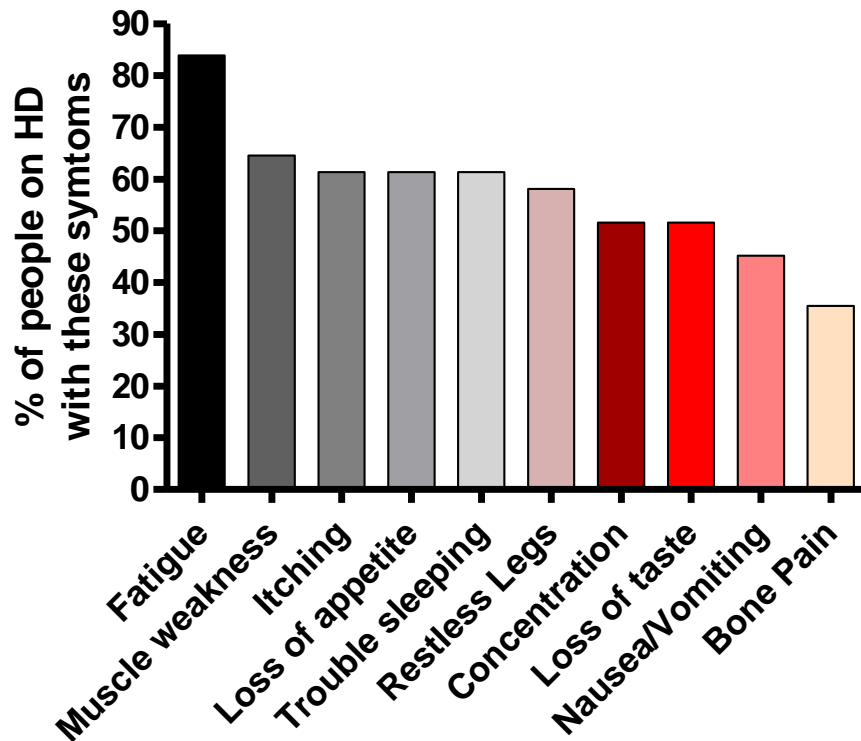
† Comparing change in EQ-5D index score from baseline to 6 months, for NHD vs CHD



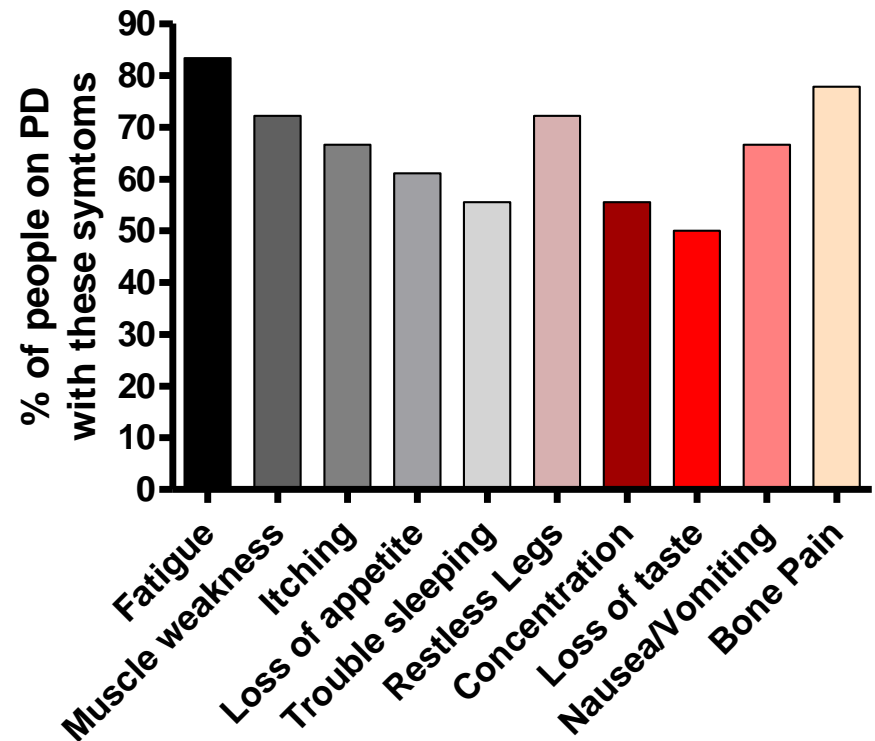
* Comparing change in KDQOL scores from baseline to 6 months, for NHD vs CHD

Out of sight, out of mind:

Symptoms on HD

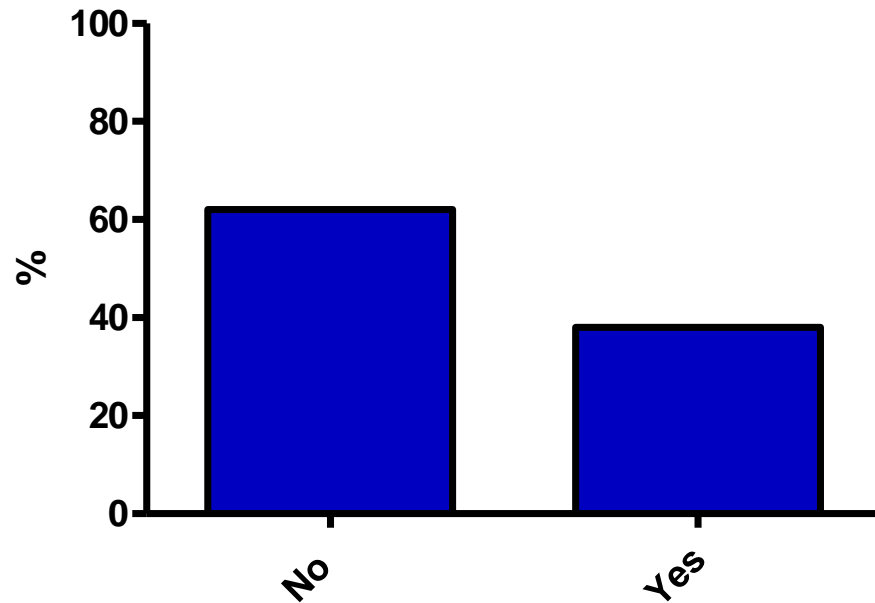


Symptoms on PD

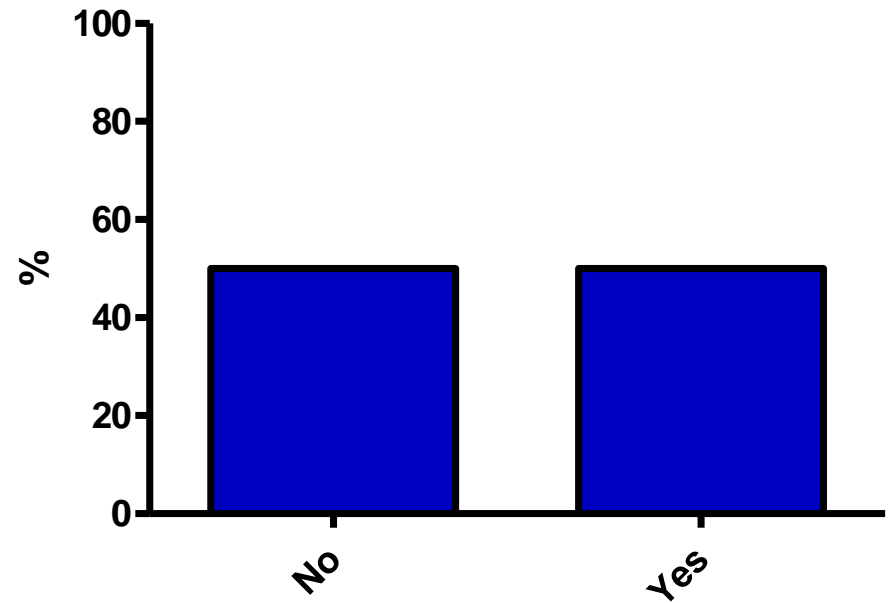


Out of sight, out of mind:

HD depression

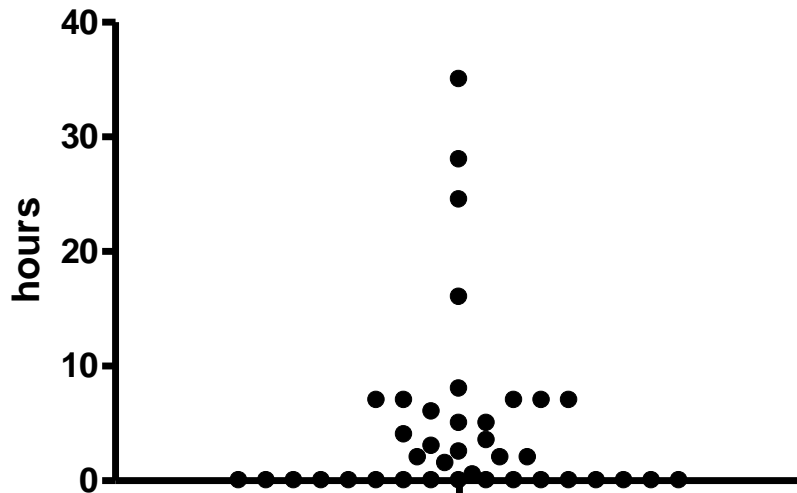


PD depression

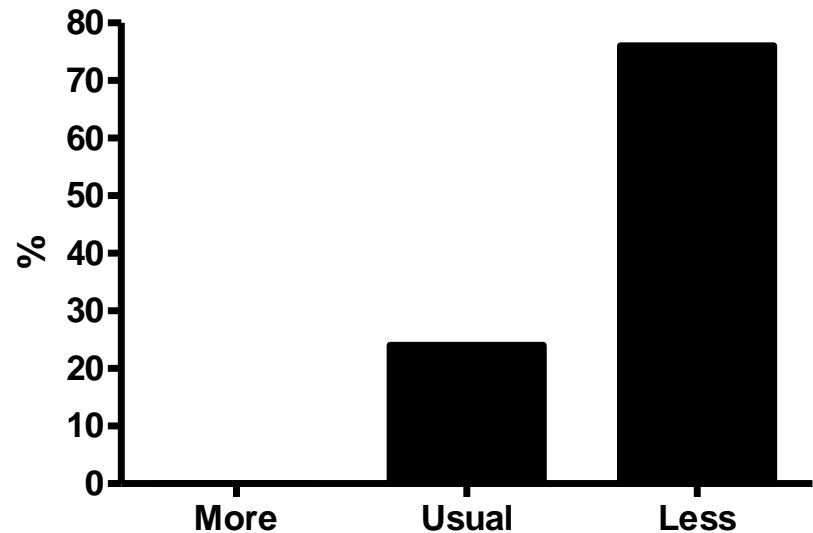


Out of sight, out of mind:

Estimated hours outside each week



Time outside compared to before dialysis



How to develop and happy and healthy home dialysis program?

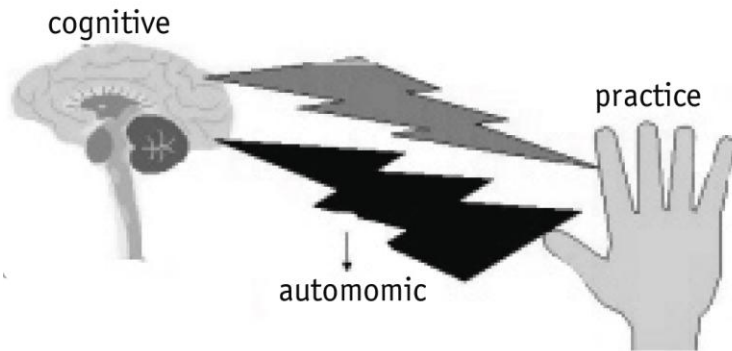
1. Education
2. Choice
3. Communication
4. Training
5. Support

Normalise the pathway back home

Role of cognition & motor skills

In people with CKD:

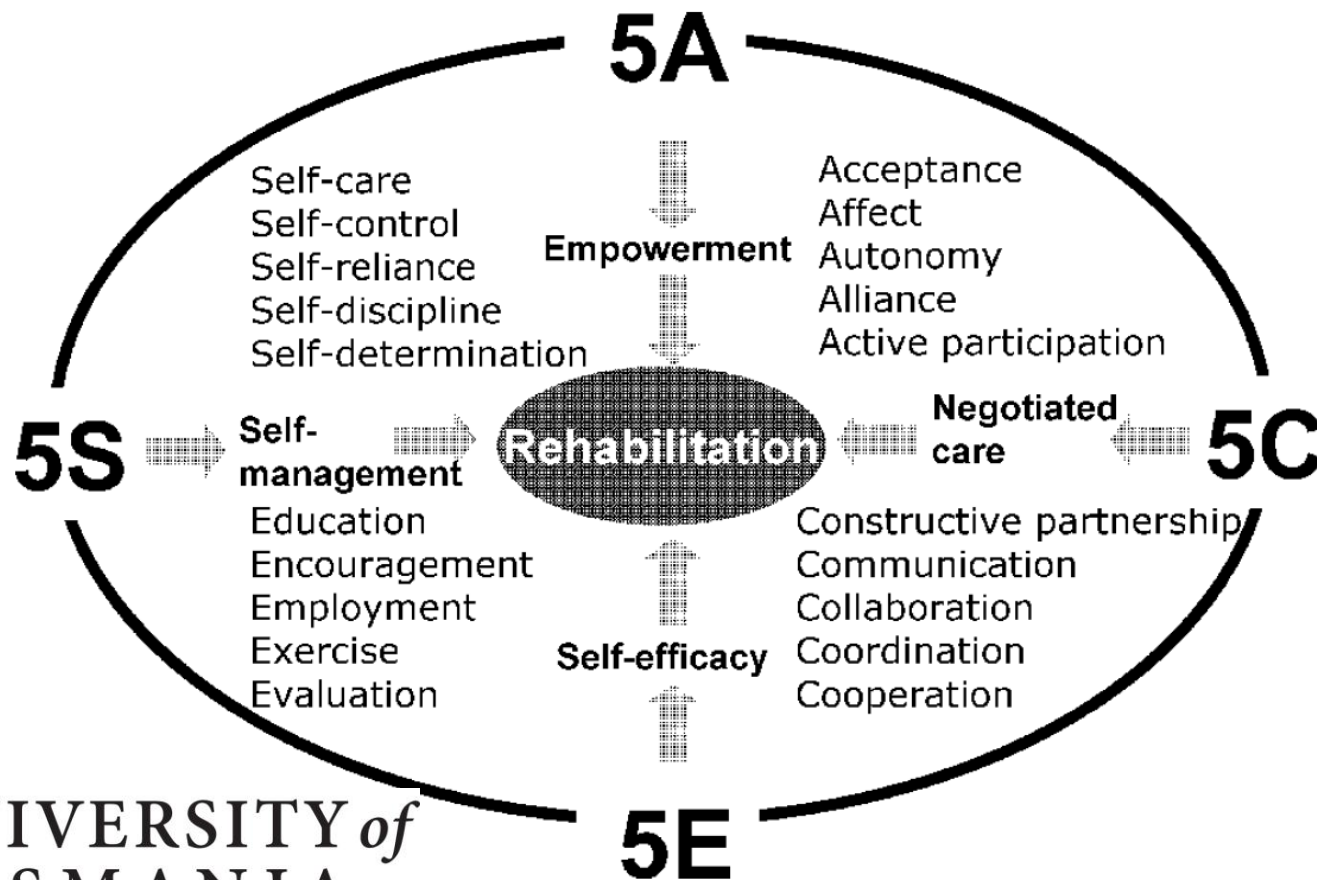
- High prevalence of cognitive impairment¹ with defects in:
 - concentration
 - learning
 - memory
 - decision-making
- Increased frailty with decline in²
 - physical activity
 - muscle strength
 - muscle mass
 - speed
 - coordination



¹ Murray AM, Neurology 2009; 73: 916. ²Johansen, J Am Soc Nephrol 2007; 18: 2960

Empowerment of patients

“An empowerment program is a valuable intervention for improving the self-management of patients”



Overview

- CKD in Australia & NZ
- Pathways and choice of dialysis
- Methods and location of dialysis
- Home therapies
- Safety in dialysis

Safety in dialysis

- Adverse events – how safe is dialysis?
- The safe physical environment
- Physical health and safety
- Mental health and safety

Renal replacement therapy

- How much of the kidney are we really replacing?
 - Blood pressure
 - Phosphate control
 - Cardiovascular events
 - QOL
 - Sleep
 - Hospitalisations
 - infections



Safe physical environment

- Home assessment prior to commencing home dialysis
- Space for dialysis
- Space for storage
- Local access to hand hygiene facilities
- Disposal of medical waste
- Equipment quality
- Water quality
- Electrical safety
- Lighting
- Environmental temperature
- Other people in the home
- Domestic animals (pets)
- Security (of equipment and personal whilst on the machine)



Physical health and safety

- Healthcare-associated infections (HAI)
 - Vascular access-associated
 - PD-Peritonitis
- Dialysis access bleeding / clotting
- Air embolism
- Medication use
- Electrolyte control
- Cognition
- Vision
- Frailty
- Encapsulating sclerosing peritonitis
- Amount of haemodialysis – consideration of too much dialysis

Mental health and safety

- Support / education / effect of errors on confidence
- Access to 24hour on-call services
- Social isolation
- Fatigue
- Effects on carer, partner & family

Fatal vascular access haemorrhage

Where	Era	Deaths identified	Reference
Maryland, USA	2000-2007	88	Ellingson et al KI 2012; 82:686
New York, USA		100	Gill et al, For Sci Med Path 2012
USA	2000-2006	1654	Ball, Nephrol Nurs J 2013; 40 (4): 297-303
Australia & NZ	2000-2012	55	Jose et al, ANZSN 2014
Case reports			

81% occurred at home (Gill et al)

93% as a therapeutic complications

5% accident

2% suicide

Life-threatening vascular access haemorrhage

Table 2. Causes of Adverse Events

Case No.	Human Error(s) or Machine/ Disposable Defects	Immediate Cause of Adverse Event	Details
1	Human error	Blood loss	Ignored machine alarms; improper threading of connections; placement of wetness detectors in incorrect position
2	Human error	Air embolism	Neglected to clamp CVC
3	Possible human error, possible disposable defect	Blood loss	Possible failed integrity of cap; possibly did not correctly thread connections
4	Possible human error, possible disposable defect	Blood loss	Improper placement of clamp; failed integrity of cap
5	Human error	Blood loss	Improper machine setup; neglected to use wetness detectors
6	Human error	Blood loss	Improper threading of connections; placement of wetness detector in incorrect position
7	Human error	Blood loss	Did not follow machine setup protocol specific to local home HD program

Abbreviations: CVC, central venous catheter; HD, hemodialysis.

Creating a culture of safety

Box 1. Quality Assurance Framework

Step 1 – Case review to determine cause and contributing circumstances of the adverse event

Step 2 – Technique audit to ensure ongoing patient competence at performing home HD

Step 3 – Specific questions to ask of the program:

1. Is this patient safe to continue home HD?
2. Was the adverse event avoidable? If so, how specifically?
3. Was human error the primary or a contributing factor in the adverse event?
4. Was a device defect the primary factor in the adverse event?
5. Does this event require communication with a device manufacturer (machine or disposable)?
6. Are there specific interventions required for this patient to continue home HD?
7. Is there a specific protocol or procedure that affects other home HD patients and what preventative measures should be implemented programmatically?
8. How should the information or process from question 7 be disseminated to present and future patients?
9. Does this adverse event necessitate review of the home HD recruitment or retention criteria?

Abbreviation: HD, hemodialysis.

Safety events during haemodialysis

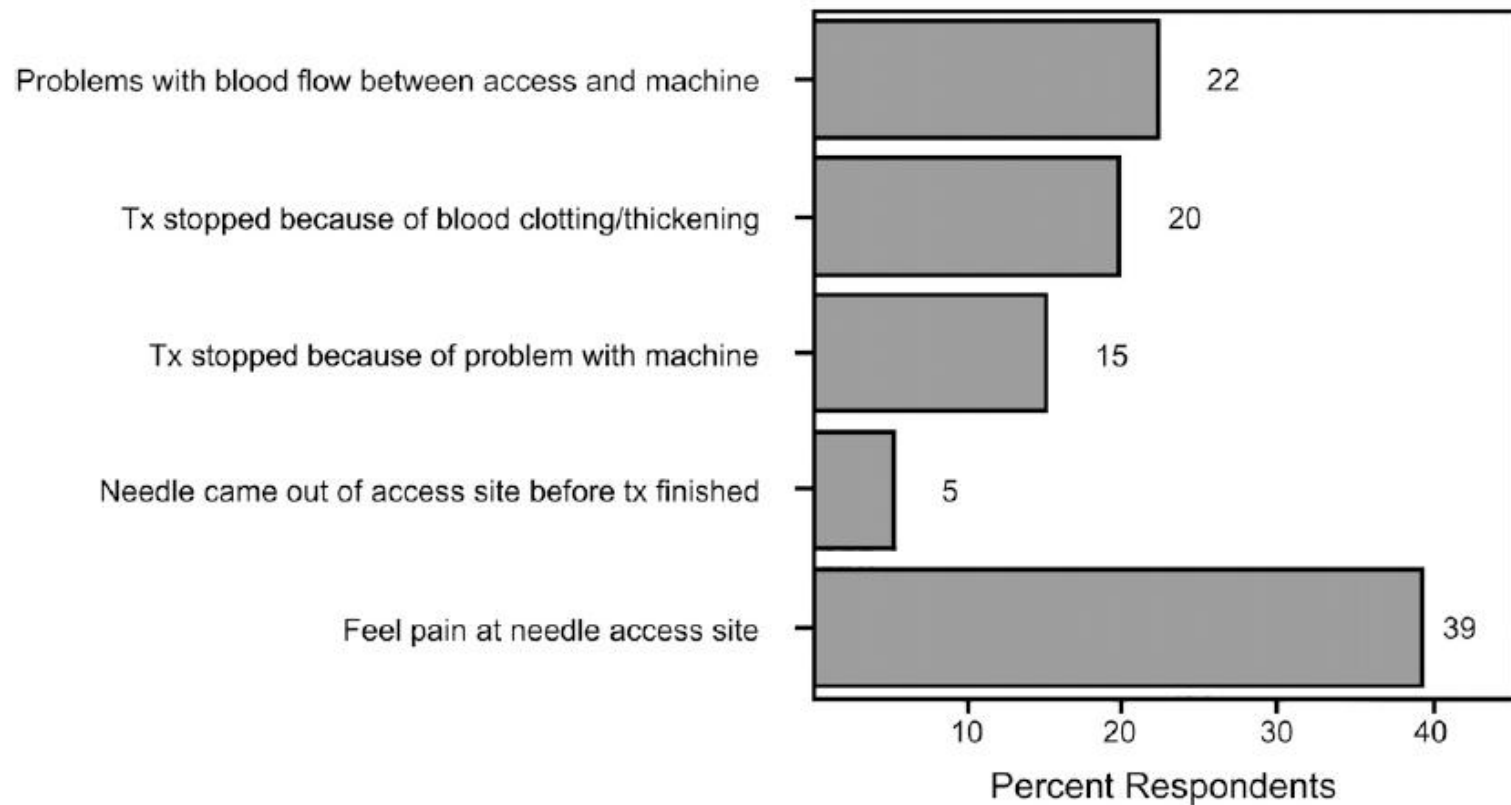


Figure 2. | Occurrence of each event during dialysis in past 3 months as reported by dialysis patients. Used with permission from the RPA Health and Safety Survey.

Safety events during haemodialysis

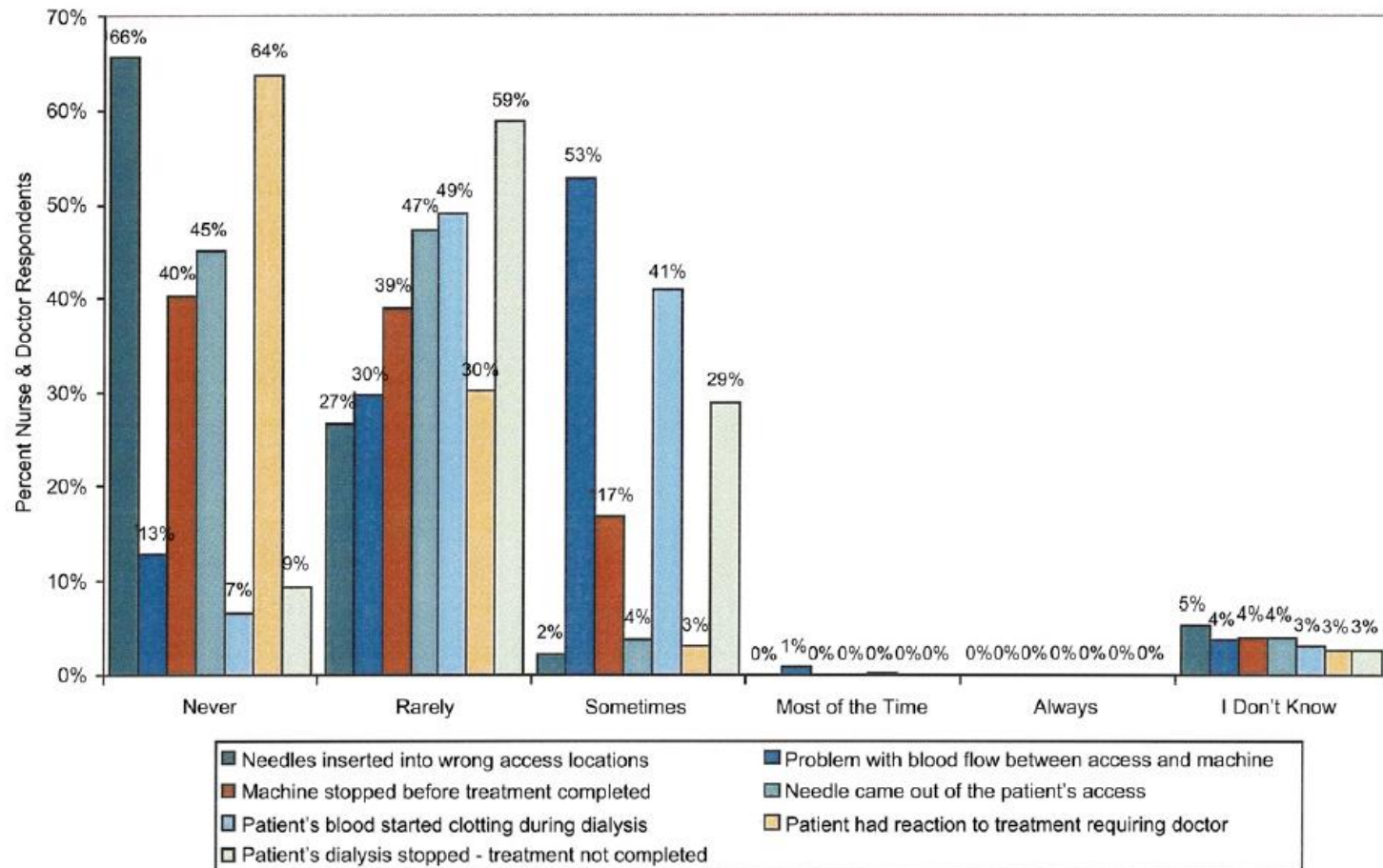


Figure 3. | Percentage of nurse and doctor respondents by frequency of events occurring during dialysis. Used with permission from the RPA Health and Safety Survey.

Safety events during haemodialysis

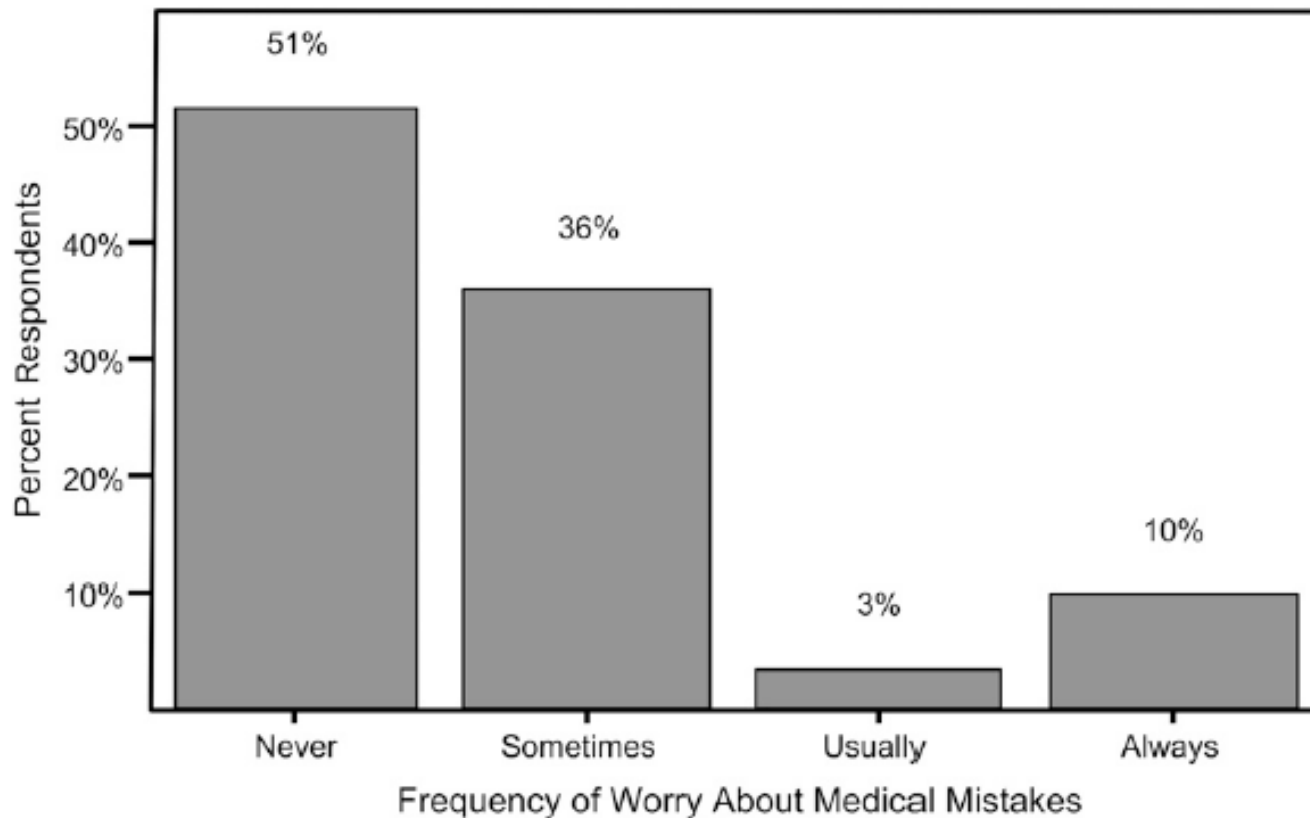


Figure 4. | Percentage of patient respondents by frequency of worry about occurrence of medical mistakes. Used with permission from the RPA Health and Safety Survey.



Dialysis in Australia and New Zealand

- CKD in Australia & NZ
- Pathways and choice of dialysis
- Methods and location of dialysis
- Home therapies
- Safety in dialysis
- Questions



Dialysis in Australia and New Zealand

