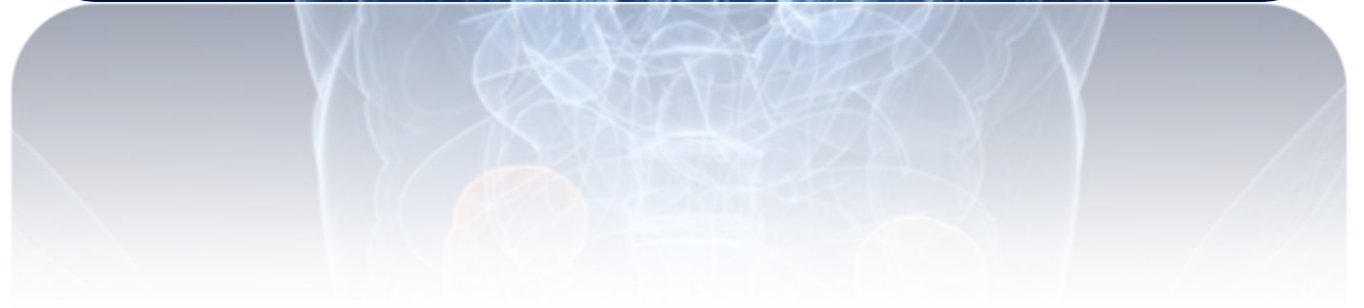


Renal disease in Canada – Understanding the Challenge

CKD Symposium

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Objectives

- Appreciate the prevalence of kidney disease in Canada
- Understand the impact of kidney disease on the lives of patients
- Learn some common caveats with respect to diagnosing patients with CKD and identifying those who will progress
- Test your CKD knowledge



CKD in Canada

- Between 10-15% of adults have CKD, which translates to about 2.9 million Canadians (vs. 40,000 on dialysis or with a kidney transplant)
- Most patients with abnormal kidney function will die without reaching end stage kidney disease
 - Risk of progression depends on cause of kidney disease, GFR, age, and level of proteinuria
- Renal replacement therapy is associated with significant mortality and loss of quality of life
- By identifying CKD earlier, interventions that improve CV outcomes and delay progression of CKD can be initiated in a timely manner

The majority of CKD is early stage CKD or proteinuria

Stage	Description	GFR (ml/min/1.73 m ²)	Prevalence 1 Extrapolated directly from US	Prevalence 2 Extrapolated US data, adjusted Cdn dialysis prevalence
1	Kidney Damage with Normal or ↑ GFR	>90	792,000	478,500
2	Kidney Damage with Mild ↓ GFR	60-89	720,000	435,000
3	Moderate ↓ GFR	30-59	1,032,000	623,500
4	Severe ↓ GFR	15-29	48,000	29,000
5	Kidney Failure	<15 or (or dialysis)	(24,000)	14,500

Criteria for Stage 1-2 CKD

Markers of kidney damage (one or more)

- Albuminuria (ACR \geq 3 mg/mmol)
- Urine sediment abnormalities
- Electrolyte and other abnormalities due to tubular disorders
- Pathological abnormalities detected by histology or inferred
- Structural abnormalities detected by imaging
- Kidney transplantation

Lifetime risk of developing CKD

CKD	Lifetime Risk
Stage 3a or higher	60-70%
Stage 3b or higher	30-40%
Stage 4 CKD	10-20%
ESRD	2-9%

Current kidney care patients by health authority

Health Authority (HA)	Registered CKD	Hemodialysis	Home hemodialysis	Peritoneal dialysis	HA total
IH	2086	265	30	150	2531
FHA	2563	708	26	312	3609
VCHA	3297	656	60	225	4212
VIHA	3589	351	11	104	4055
NHA	505	94	23	40	662
BC total	12190	2074	150	837	15225



Prognosis of patients who reach end stage kidney disease

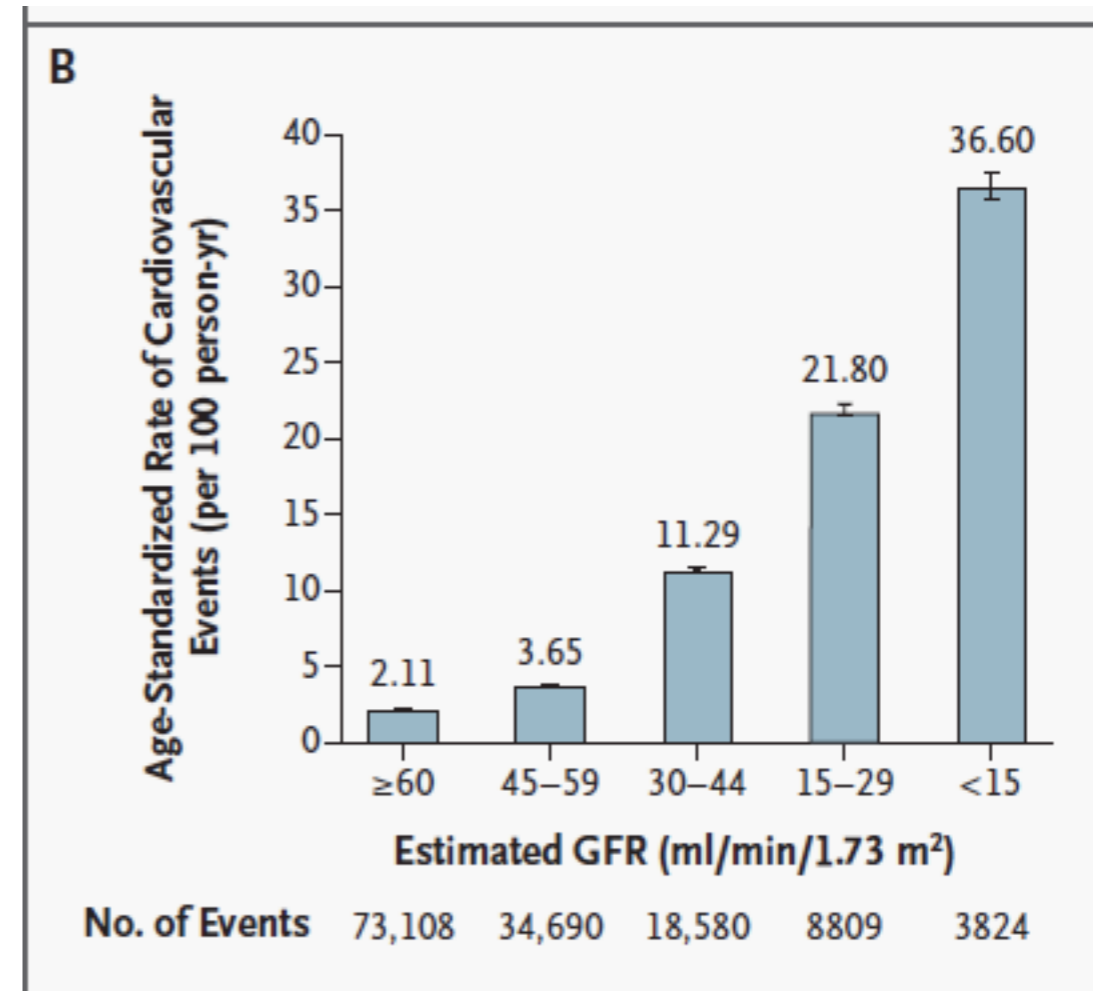
- The average life expectancy of a patient on dialysis is 5 years (2 years if >75 yrs old)
- The average life expectancy of a patient who starts dialysis in their late 20's is about 20 years
- A transplant increases a 30 yr old dialysis patients life expectancy by 20 yrs beyond projected life expectancy with dialysis

And for those eligible for a kidney transplant

- If a patient identifies a live donor, transplant can occur before dialysis starts
- If not, the average wait is 5 years and depends on blood type
 - Type A – 2 years
 - Type O – 5 years
 - Type B – 9 years
- 50% of deceased donor kidney transplants are still working at 15 years (60% for live donor kidneys)

What are the outcomes/implications of CKD diagnosis?

- Associated with increased age standardized risk of
 - mortality
 - cardiovascular disease
- Risk of Acute Kidney Injury (transient or sustained)
- Risk of infections, cognitive impairment, bone loss and adverse drug reactions
- In minority — risk of progressive CKD, associated complications, and need for RRT



The Patient with early stage CKD is 5 to 10 times more likely to die from a cardiovascular event than progress to ESRD

Foley RN et al. Chronic kidney disease and the risk for cardiovascular disease, renal replacement, and death in the United States Medicare population, 1998 to 1999. J Am Soc Nephrol 2005; 16:489-95

Primary care questions when treating CKD

Confidence in	Primary Care Providers
Treating hypertension alone	87%
Treating hypertension in setting of CKD	59%
Treating hypertension in setting of CKD and diabetes	61%
Identifying significant proteinuria	59%
Using proteinuria results to manage CKD	42%

The last decade has promoted discussions, perspectives and areas of confusion...

- **Over diagnosis**
 - Prevalence too high
 - Age and CKD a function of eGFR
- **Terminology**
 - Disease or risk factor?
 - Lack of cause
- **Questionable estimating equations**
 - Imprecise and biased
 - Not validated in all populations
- **Proteinuria measurements**

Use of eGFR when > 60 mL/min

- DL is a 52 yr old man with well controlled hypertension. His eGFR has “fallen” from 89 mL/min --> 72 mL/min --> 65 mL/min over 2 years. His urinalysis is unremarkable, his ACR is < 2 . Your next course of action is to:

1. Refer him to a nephrologist as you are concerned about his rapid decline of renal function

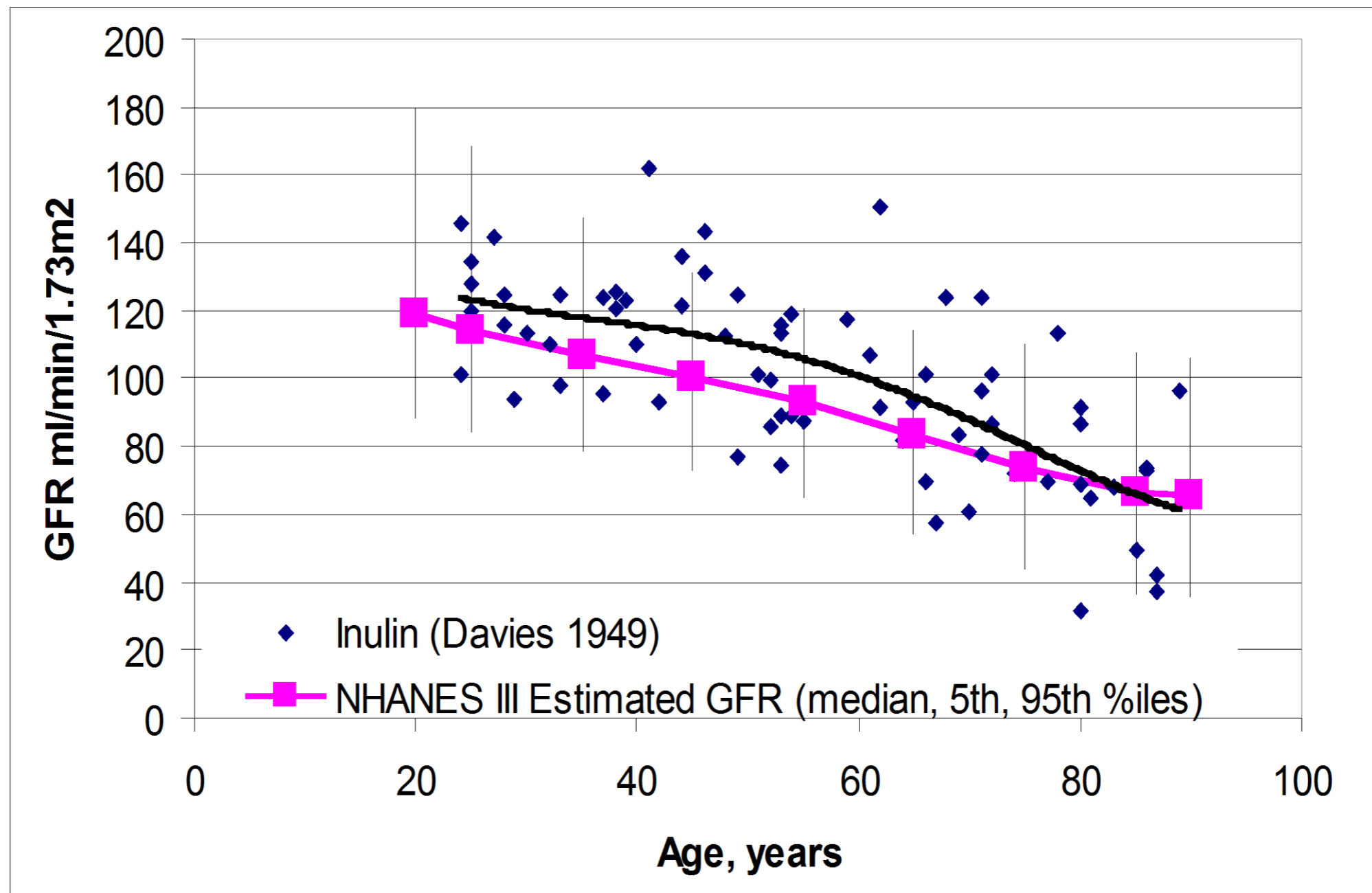
2. Continue to follow but reassure patient, realizing that GFR estimates are much less accurate at higher levels of GFR

Decreased accuracy of GFR estimates at higher levels of eGFR

- Several possible explanations
 - inter-laboratory variation in calibration of serum creatinine assays (not in BC)
 - greater biologic and measurement variability of GFR at higher values
 - limitations of generalizing an equation developed in one population to another population

Serial GFR measurements are meant to follow CKD—they are not as accurate in patients without kidney disease!

Age and eGFR



True or False?

eGFR measurements can be used as a reliable estimate of kidney function in elderly patients

False

Caveats and practical interpretations of eGFR

- Age caveats
 - Age >75 — accuracy questionable and may **underestimate** true kidney function. Values 45-60 mL/min may be normal variation in the absence of other conditions
 - Age >85 — equation very problematic and risk of progression much less.
 - **Caution persists with medications, dye, and risk of AKI with severe illness**

Considering age — a way to contextualize

- 77 year old man with eGFR 45-48 mL/min on 2 repeated occasions over a 4 month period
 - urine ACR normal or minimally elevated
 - other lab parameters (hemoglobin, calcium, phosphate, potassium) are normal
- This person is unlikely to have significant CKD and is at low risk for progression and should not be referred.

Identifying those who will progress - consider the following patients



- Risk of progression to ESRD
- GFR 10 mL/min
- 0% over 1 year
- 2.8% over 5 years



- Risk of progression to ESRD
- GFR 30 mL/min
- 5.3% over 1 year
- 16.6% over 5 years

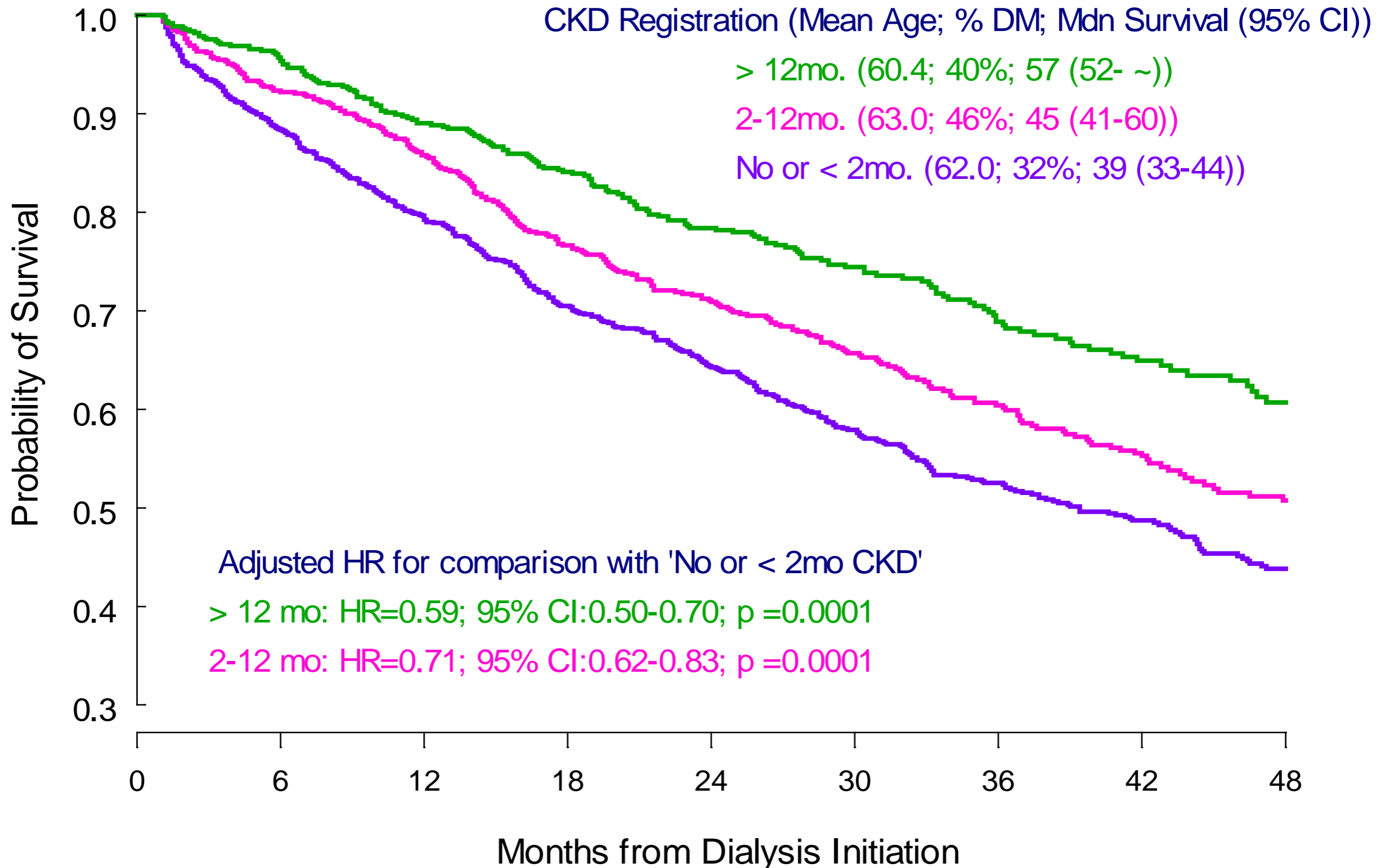


- Risk of progression to ESRD
- GFR 30 mL/min
- 25% over 1 year
- 61.4% over 5 years

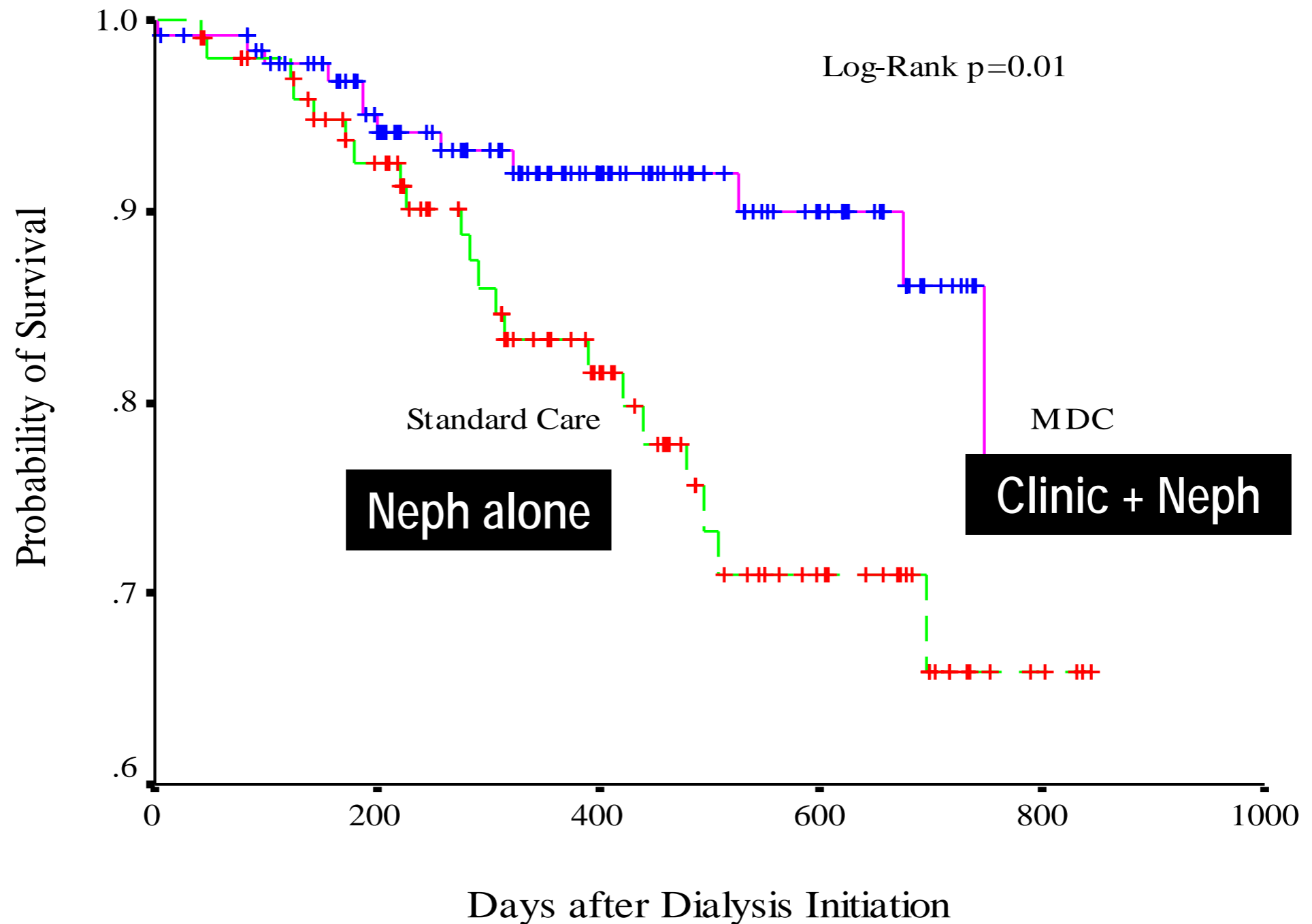
Benefits of multidisciplinary team management for those at high risk of CKD progression

Early Intervention = Longer Survival Rates

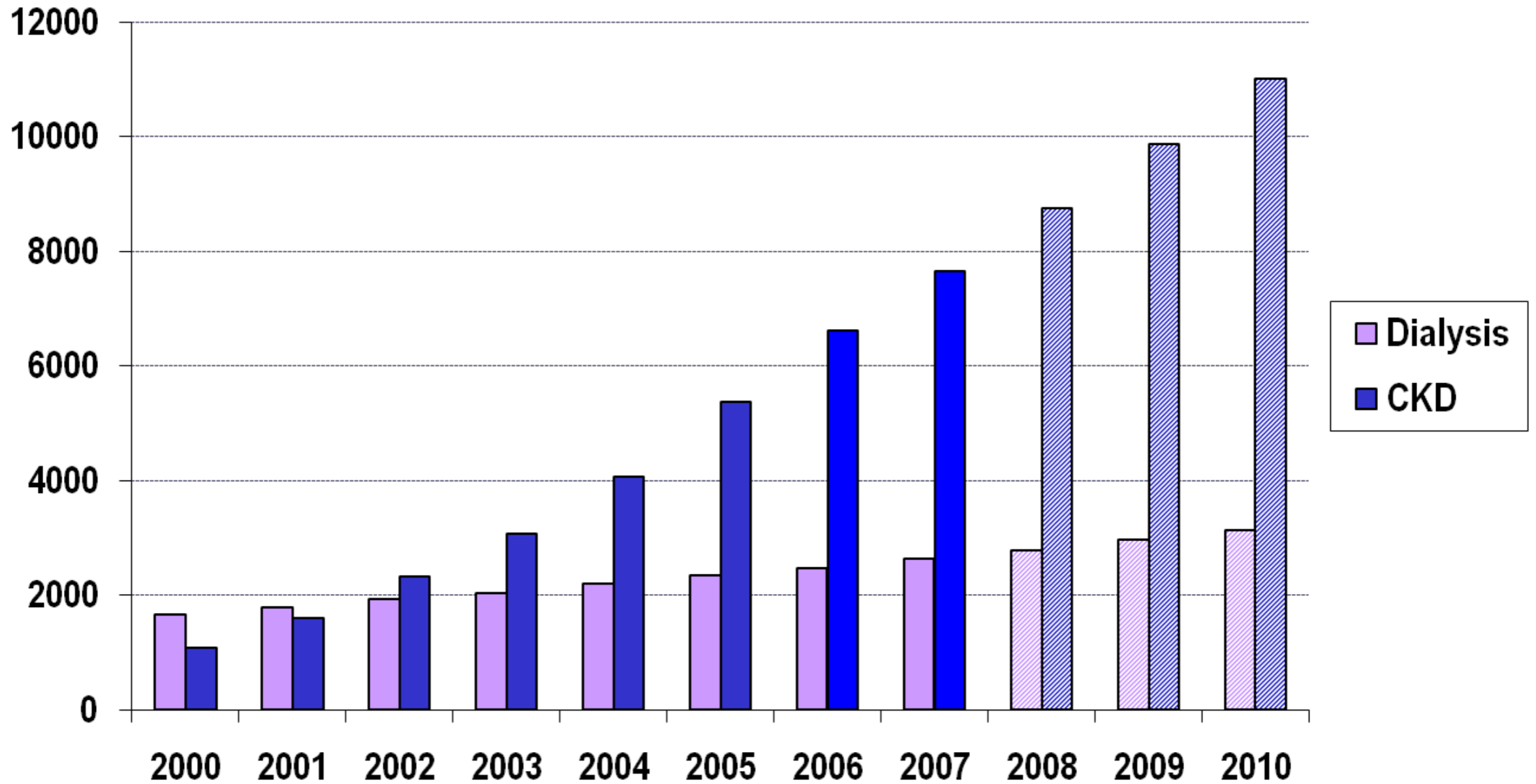
(as measured by CKD registration)



Survival advantage: Clinic + Nephrologist vs. Nephrologist alone



Despite exponential growth of CKD, dialysis growth remains relatively constant



Summary

- CKD is common, but most patients will not progress to end stage kidney disease
- End stage kidney disease is associated with a very poor prognosis
- CKD and albuminuria are both important predictors of cardiovascular and renal outcomes
- Patients with risk of progressive CKD should be followed in multidisciplinary CKD clinics



Q1 Which of the following patients should be screened for chronic kidney disease?

- a. 80 year old healthy male
- b. 24 year old female with hypertension
- c. 63 year old female with lower back pain
- d. 75 year old female with osteoarthritis
- e. 42 year old male with glaucoma

Q2 Which tests should be requested to screen for CKD?

- a. Serum creatinine (eGFR will be calculated using serum creatinine)
- b. Urine albumin to creatinine ratio
- c. Serum sodium
- d. Serum glucose
- e. Serum creatinine (eGFR) and urine albumin to creatinine ratio

Q3 What is the major risk to patients with CKD?

- a. Cardiovascular disease
- b. Asthma/COPD
- c. Diabetes
- d. Back pain
- e. Dementia

Q4 Which one of the following management strategies improves renal prognosis in CKD?

- a. Decreasing proteinuria
- b. Normalizing hemoglobin
- c. Folic acid supplementation
- d. Vitamin C supplementation
- e. Avoiding ACE inhibitors and ARB's

Q5 Which patients are at high risk for progressing to end-stage kidney disease?

- a. 75 year-old female with urine ACR of 1.8 mg/mmol (normal < 2) and stable eGFR of 45 mL/min over 3 years
- b. 50 year-old non-diabetic male with urine ACR of 90 mg/mmol and eGFR 102 mL/min
- c. 65 year-old male with diabetes and urine ACR of 2 mg/mmol and eGFR of 100 mL/min
- d. 60 year-old female with diabetes and urine ACR of 14 mg/mmol and eGFR of 100 mL/min
- e. 85 year-old non-diabetic female with eGFR of 55 mL/min and urine ACR of 20 mg/mmoL

Q6 Which of the following patients should be referred to Nephrology?

- a. 75 year-old female with hypertension (well controlled) and one simple cyst on each kidney and eGFR of 55 mL/min and urine ACR 13 mg/mmol
- b. 60 year-old non-diabetic male with eGFR of 50 mL/min and urine ACR of 2.3 mg/mmol
- c. 45 year-old non-diabetic female with eGFR of 100 mL/min and urine ACR of 120 mg/mmol
- d. 24 year-old non-diabetic male with eGFR of 75 mL/min and urine ACR of 1 mg/mmol
- e. 80 year-old female with eGFR of 50 mL/min and fall in eGFR of 10% from 2 years ago and urine ACR of 1 mg/mmol

Questions?

