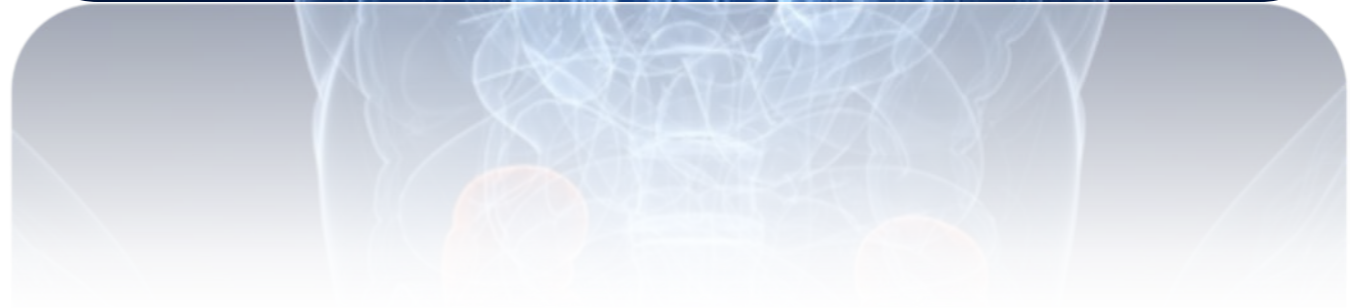


Renal disease in Canada – Understanding the Challenge

CKD Symposium
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No disclosures

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
 - updated CKD guidelines
- Test your CKD knowledge





CKD in Canada

- Approximately **1 in 10** adults in Canada have CKD
- **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

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

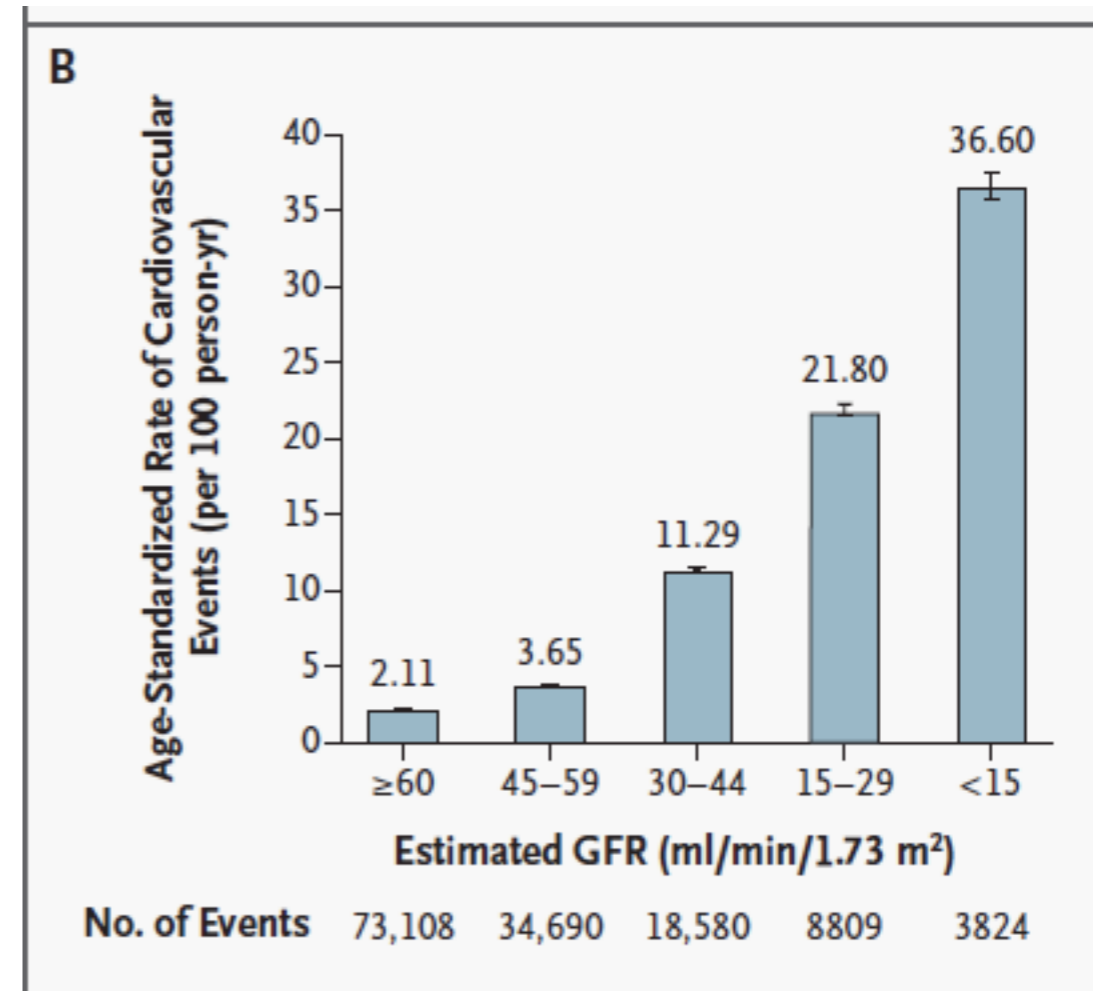
- The **average life expectancy** of a patient on dialysis is 5 years (2 years if >75 yrs old)
- The average life expectancy of a patient who starts dialysis in their late 20's is about 20 years
- A transplant increases a 30 yr old dialysis patient's life expectancy by 20 yrs beyond projected life expectancy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

Identifying those who will progress – consider the following patients



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

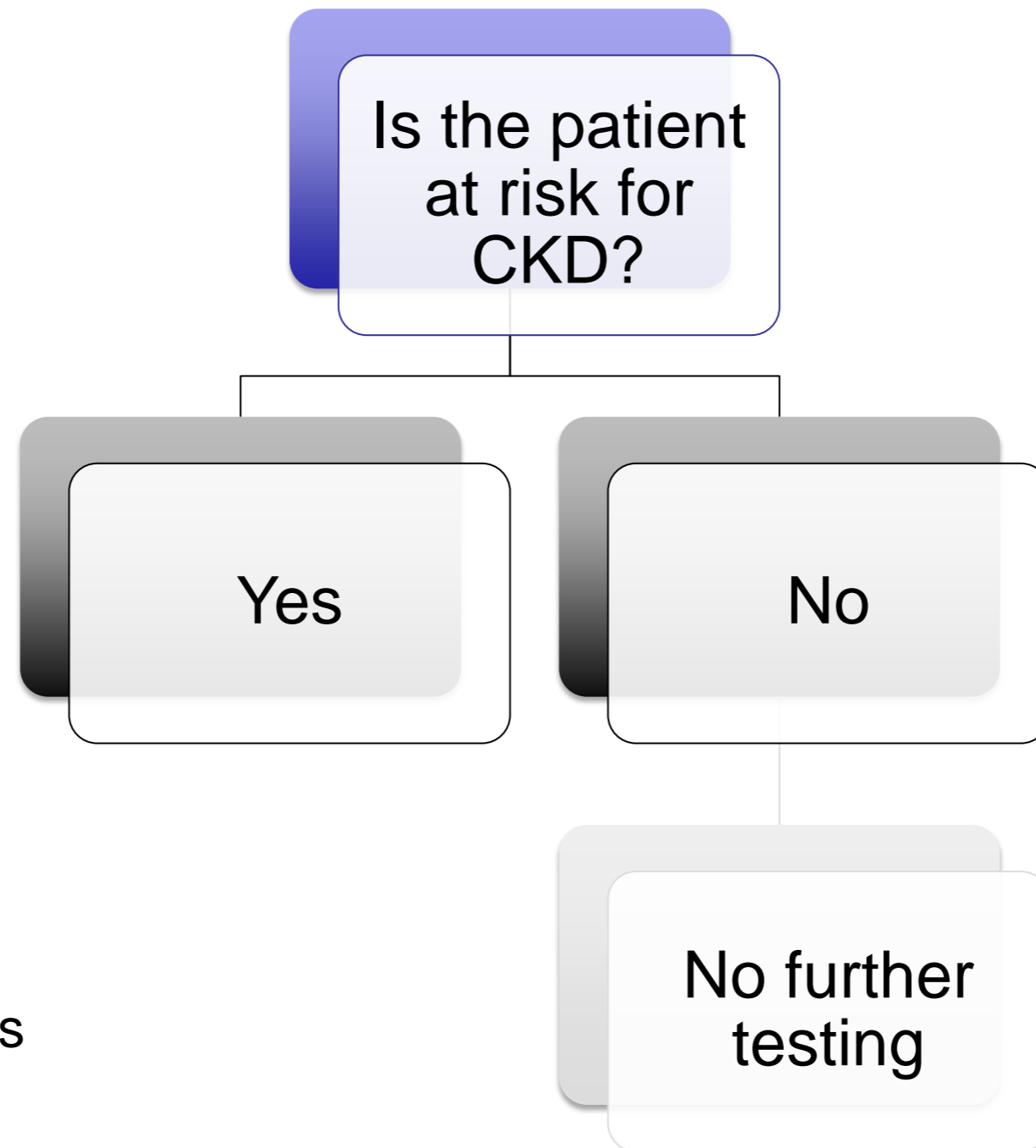


- Risk of progression to ESKD
- GFR 30 mL/min
- 5.3% over 1 year
- 16.6% over 5 years



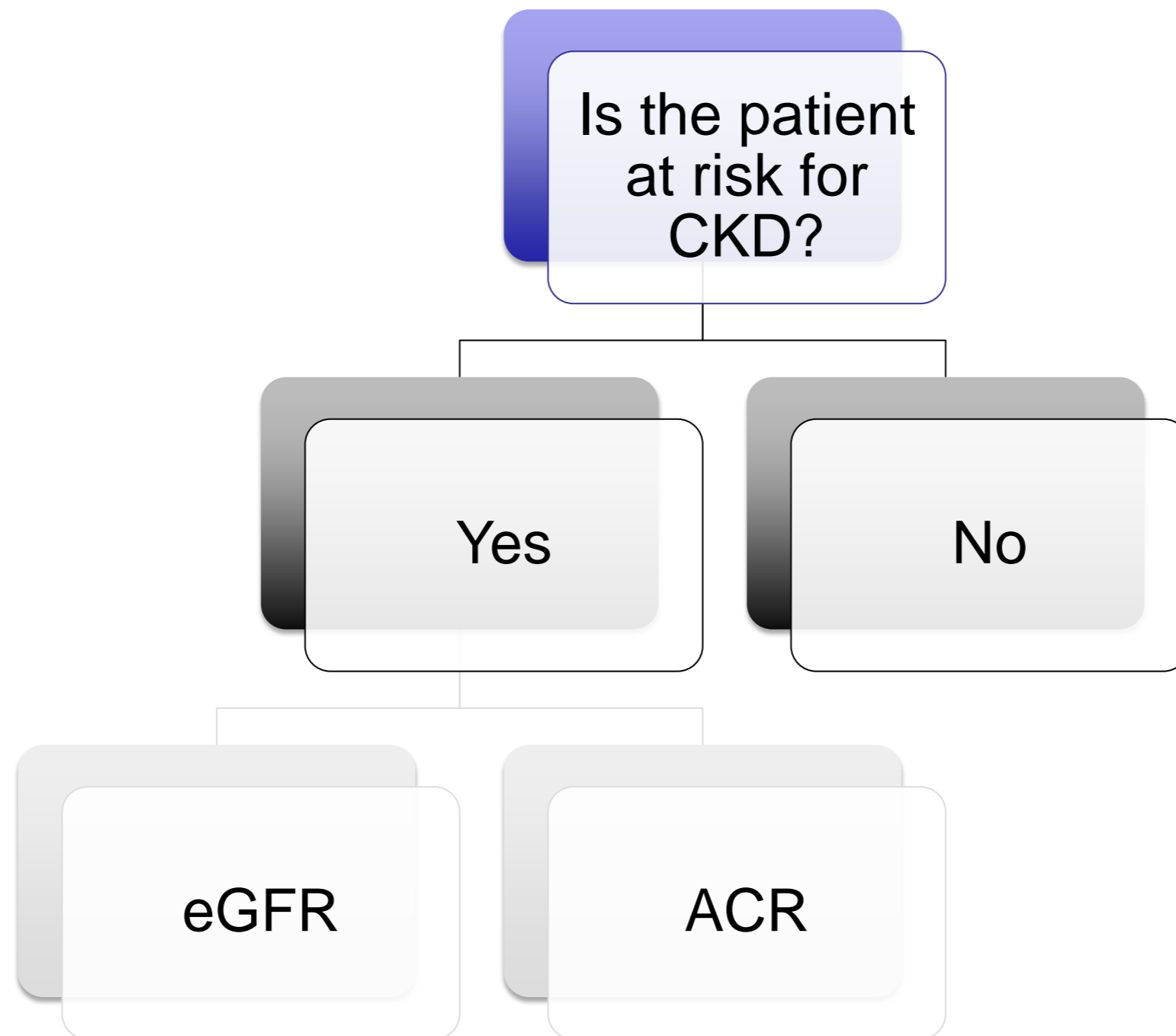
- Risk of progression to ESKD
- GFR 30 mL/min
- 25% over 1 year
- 61.4% over 5 years

CKD guidelines 101 – Who to test?



HTN
DM
FHx
Vascular Disease
Specific Ethnic groups

CKD guidelines 101 – Screening tests to use



normal > 60 mL/min
if new, repeat to exclude AKI

normal < 3 mmol/L
if abnormal, repeat (need 2 of 3)

CKD guidelines 101 – Diagnosis of CKD

Normal Results
eGFR > 60 mL/min
and
ACR < 3 mg/mmol
Patient does not have CKD

Retest q1 year if Diabetes
and q1-2 years for all
others

CKD guidelines 101 – Diagnosis of CKD

Abnormal Results
eGFR < 60 mL/min
or
ACR > 3 mg/mmol
Patient has CKD

Use of eGFR when > 60 mL/min

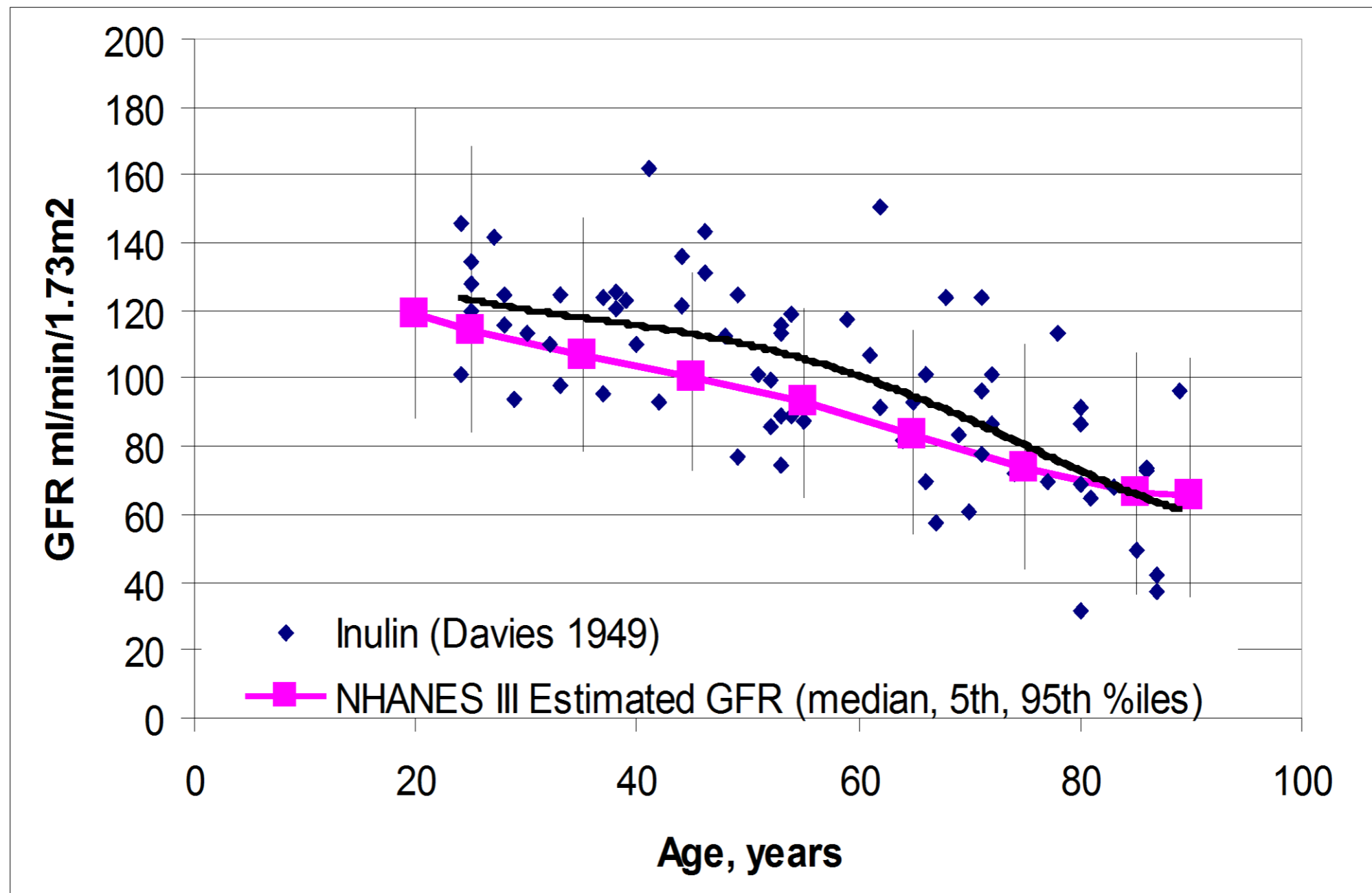
- DL is a 52 yr old man with well controlled hypertension. His eGFR has “fallen” from 89 mL/min --> 72 mL/min --> 65 mL/min over 2 years. His urinalysis is unremarkable, his ACR is < 2 . Your next course of action is to:
 1. Refer him to a nephrologist as you are concerned about his rapid decline of 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

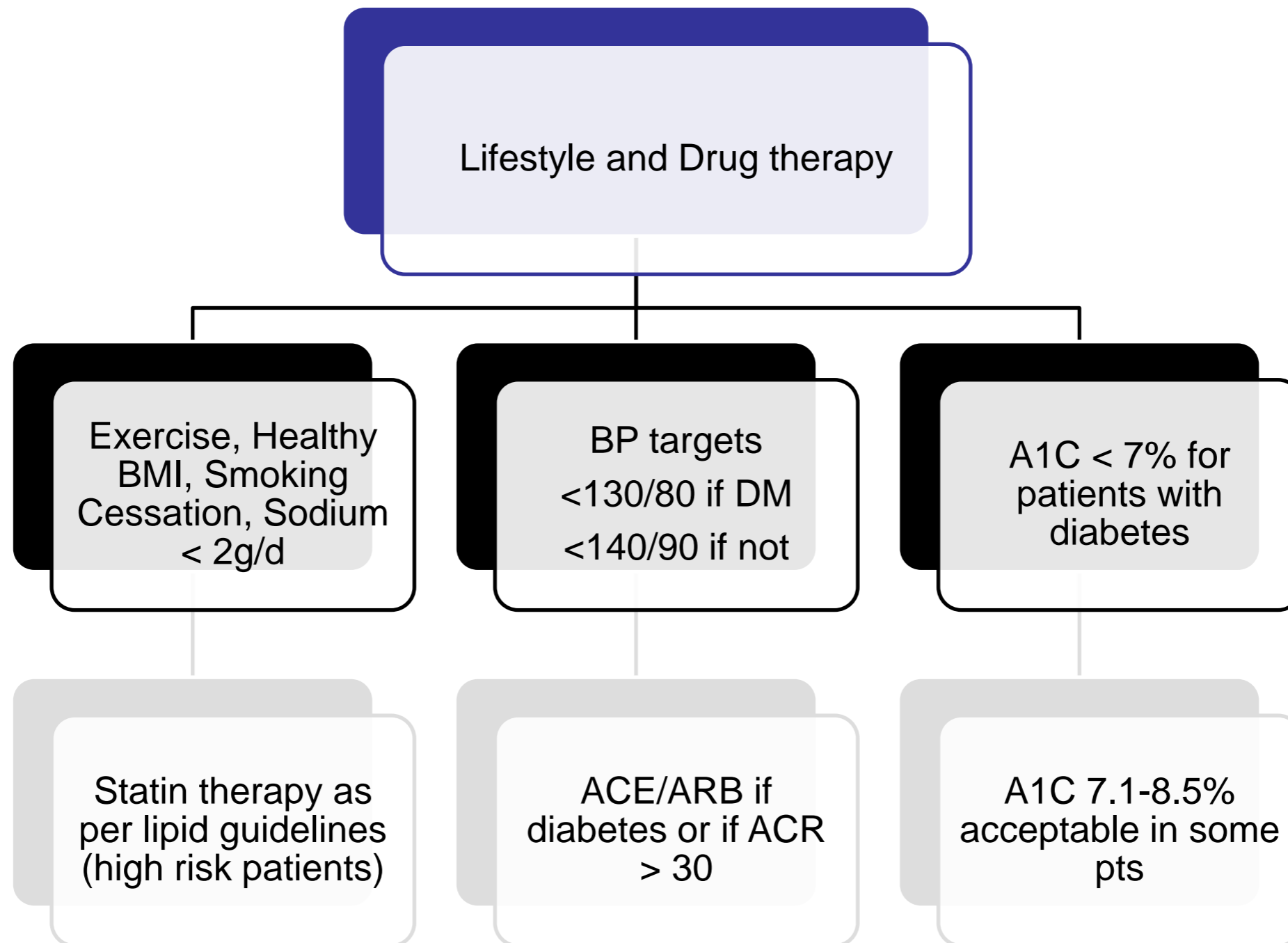
Caveats and practical interpretations of eGFR

- 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.

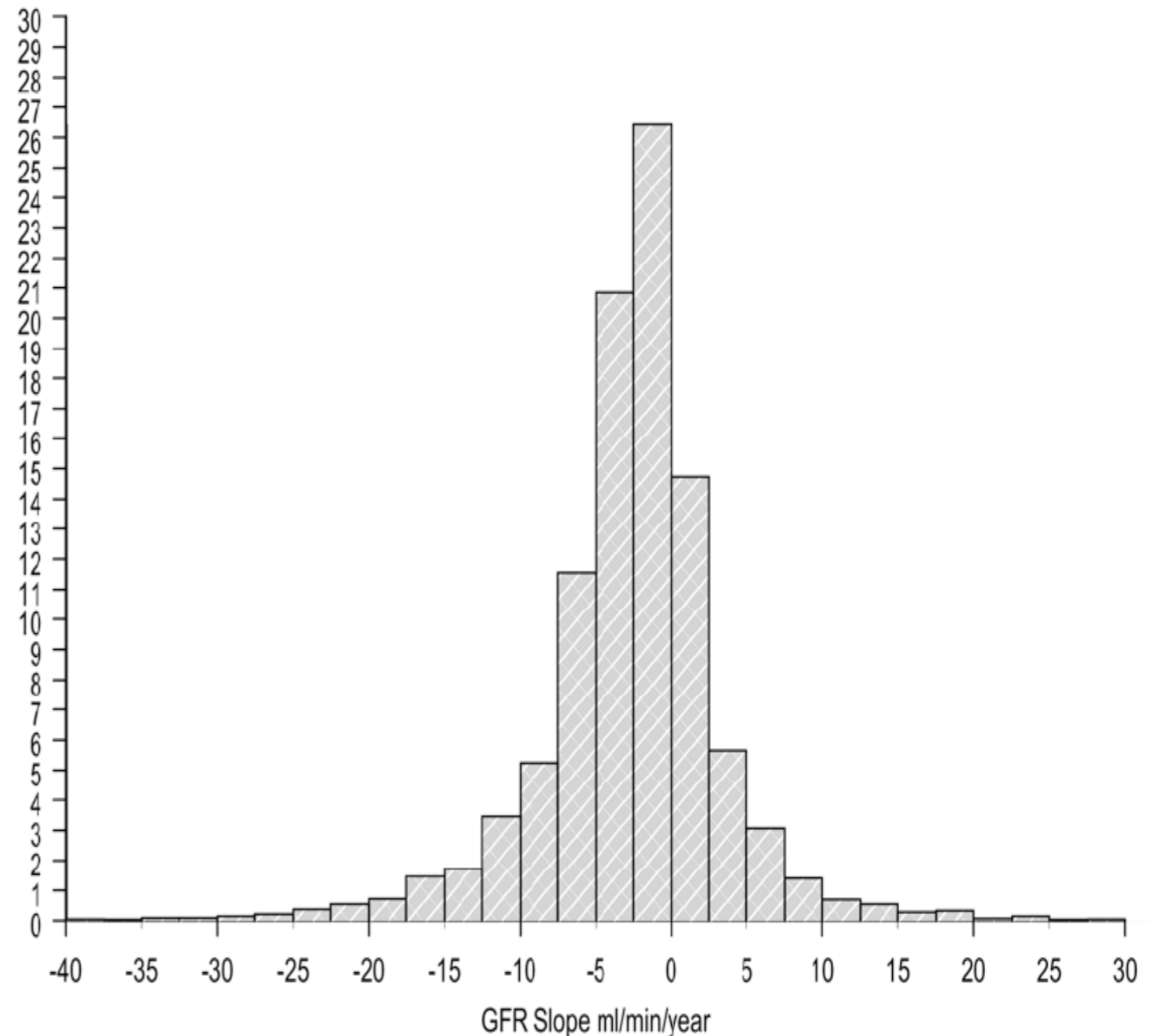
CKD guidelines 101 – Treatment of CKD



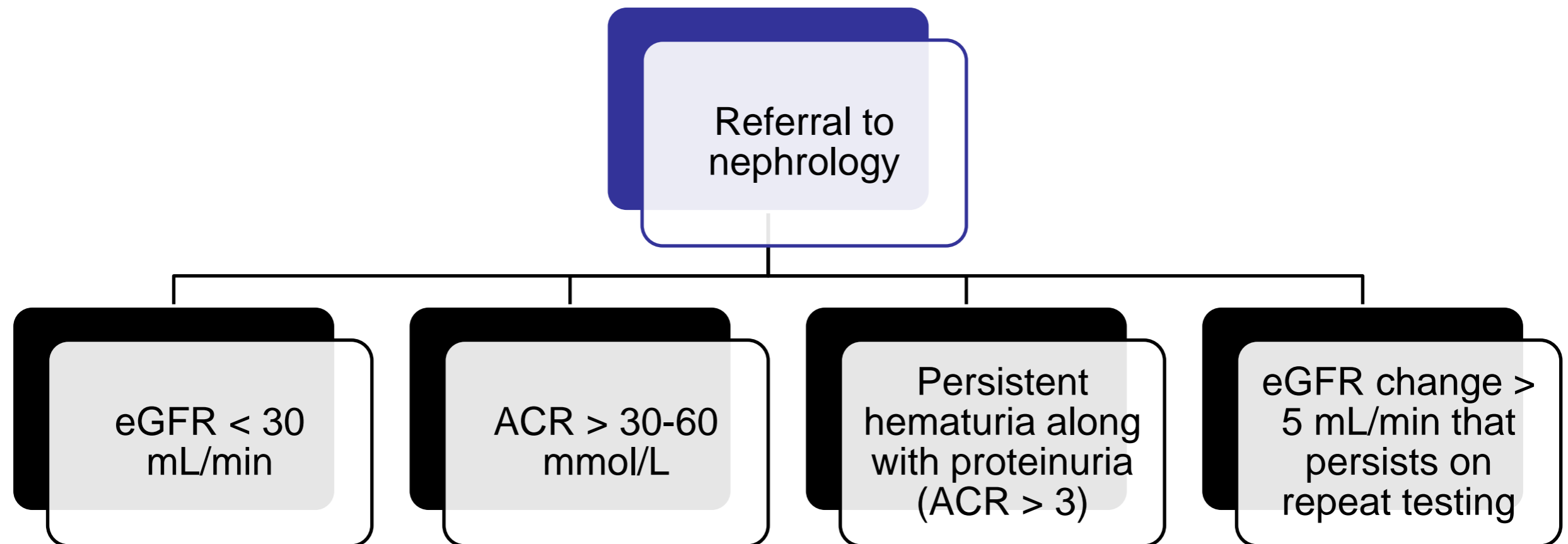
Variability and Risk Factors for Kidney Disease Progression and Death Following Attainment of Stage 4 CKD in a Referred Cohort

Adeera Levin, MD, FRCPC, Ognjenka Djurdjev, MSc, Monica Beaulieu, MD, FRCPC, and Lee Er, MSc

- mean rate of change in eGFR -2.65 mL/min/yr
- 28% had no progression
- 46% had moderate progression (1-5 mL/min)
- 26% had rapid progression (>5mL/min)




CKD guidelines 101 – Referral for CKD



Also consider if:
CKD and refractory HTN
Abnormalities in K
Recurrent/refractory stones
Hereditary kidney disease

Referral Decision Making by eGFR and Albuminuria

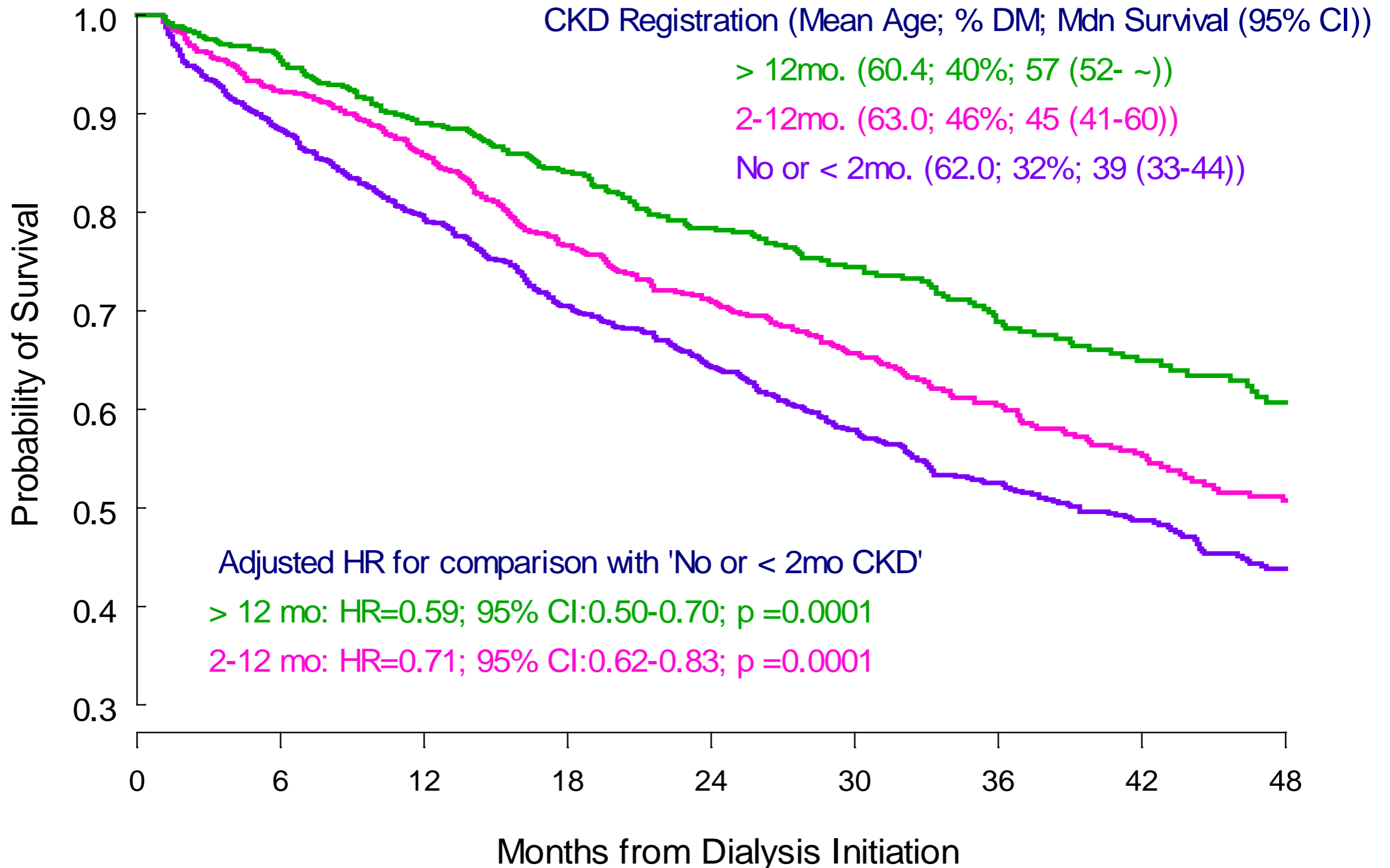
			Urine ACR categories		
			Description and range		
			A1	A2	A3
			Normal to mildly increased	Moderately increased	Severely increased
			<3mg/mmol	3-30mg/mmol	>30mg/mmol
G1	Normal or high	≥90		Monitor	Refer*
G2	Mildly decreased	60-89		Monitor	Refer*
G3a	Mildly to moderately decreased	45-59	Monitor	Monitor	Refer
G3b	Moderately to severely decreased	30-44	Monitor	Monitor**	Refer
G4	Severely decreased	15-29	Refer*	Refer*	Refer
G5	Kidney failure	<15	Refer	Refer	Refer



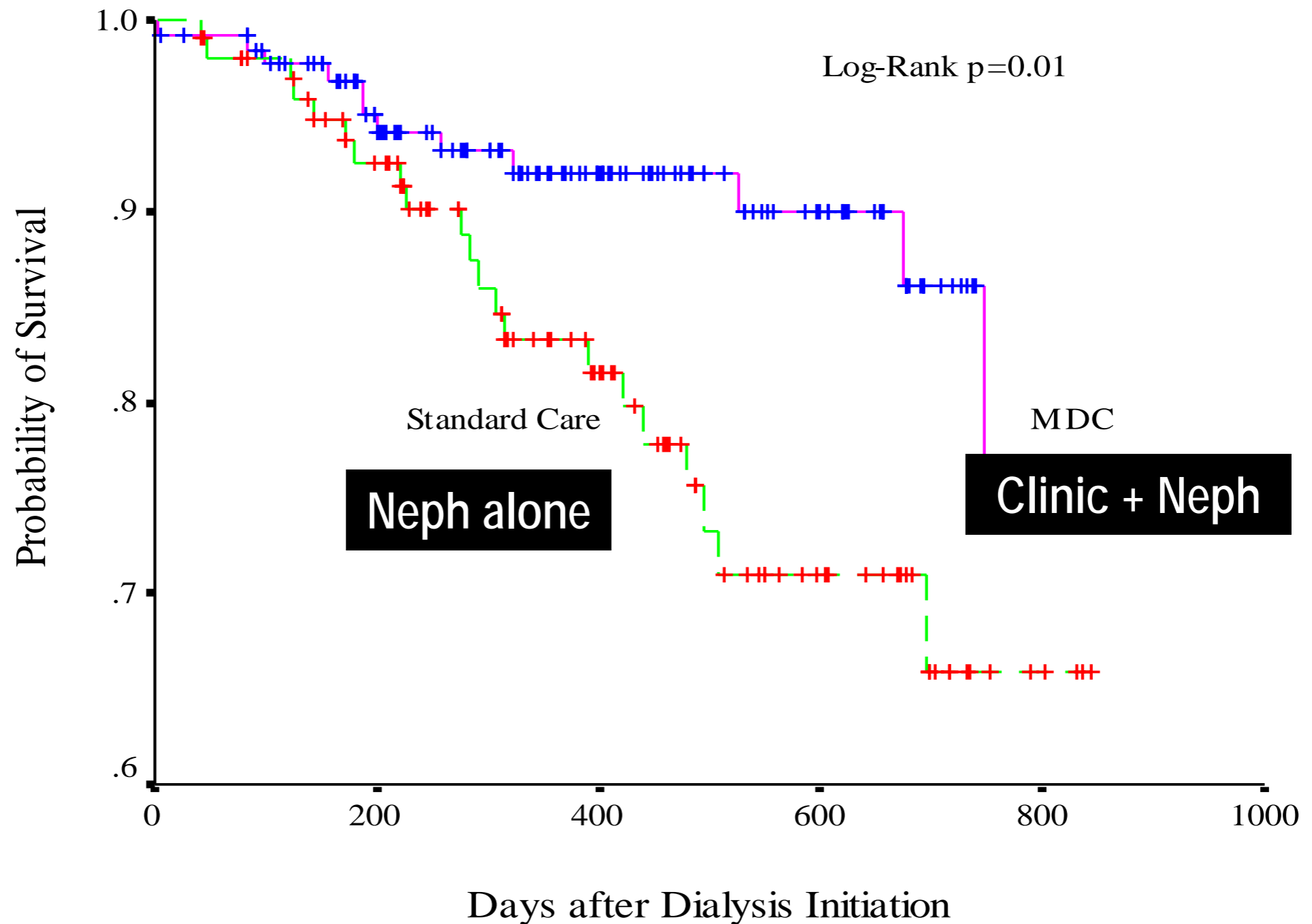
**Benefits of multidisciplinary team
management for those at high risk of CKD
progression**

Early Intervention = Longer Survival Rates

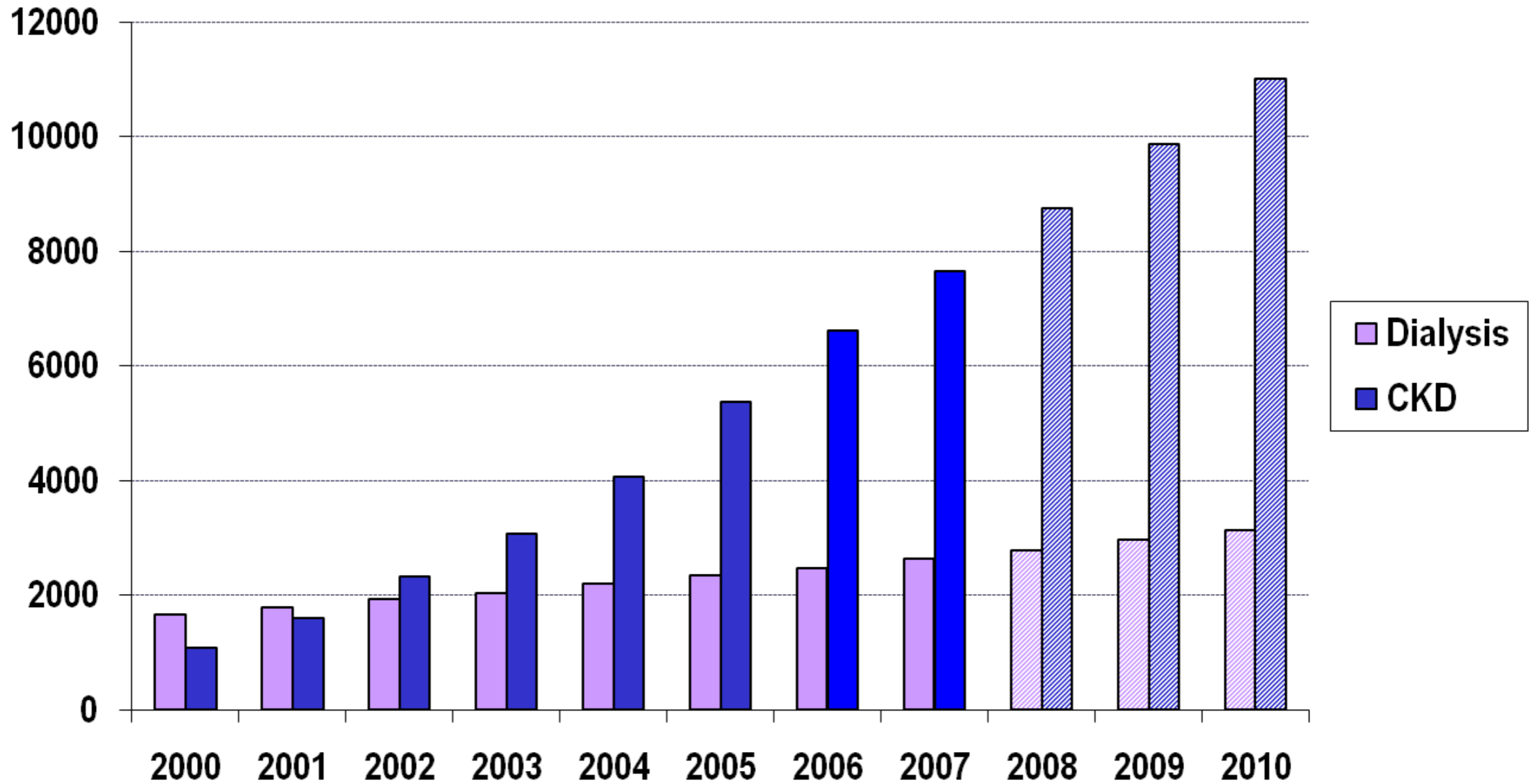
(as measured by CKD registration)



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
- **Most patients with CKD** will be managed in the primary care setting
- eGFR and Albuminuria are both important predictors of cardiovascular and renal outcomes
- End stage kidney disease is associated with a very poor prognosis



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

Screening is recommended for pts with hypertension, diabetes, heart failure, atherosclerotic disease, family history or high risk ethnicity (first nations, Asians, South Asians, African)

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

The combination of these tests will ensure both kidney damage and kidney function is assessed

Q3 What is the major risk to patients with CKD?

a. Cardiovascular disease

b. Asthma/COPD

c. Diabetes

d. Back pain

e. Dementia

Most patients with CKD die of cardiovascular disease

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

Proteinuric patients are at high risk of progression of CKD

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

Proteinuria > 1gm/day or ACR > 30 mg/mmol is associated with high risk of progression of CKD

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?

