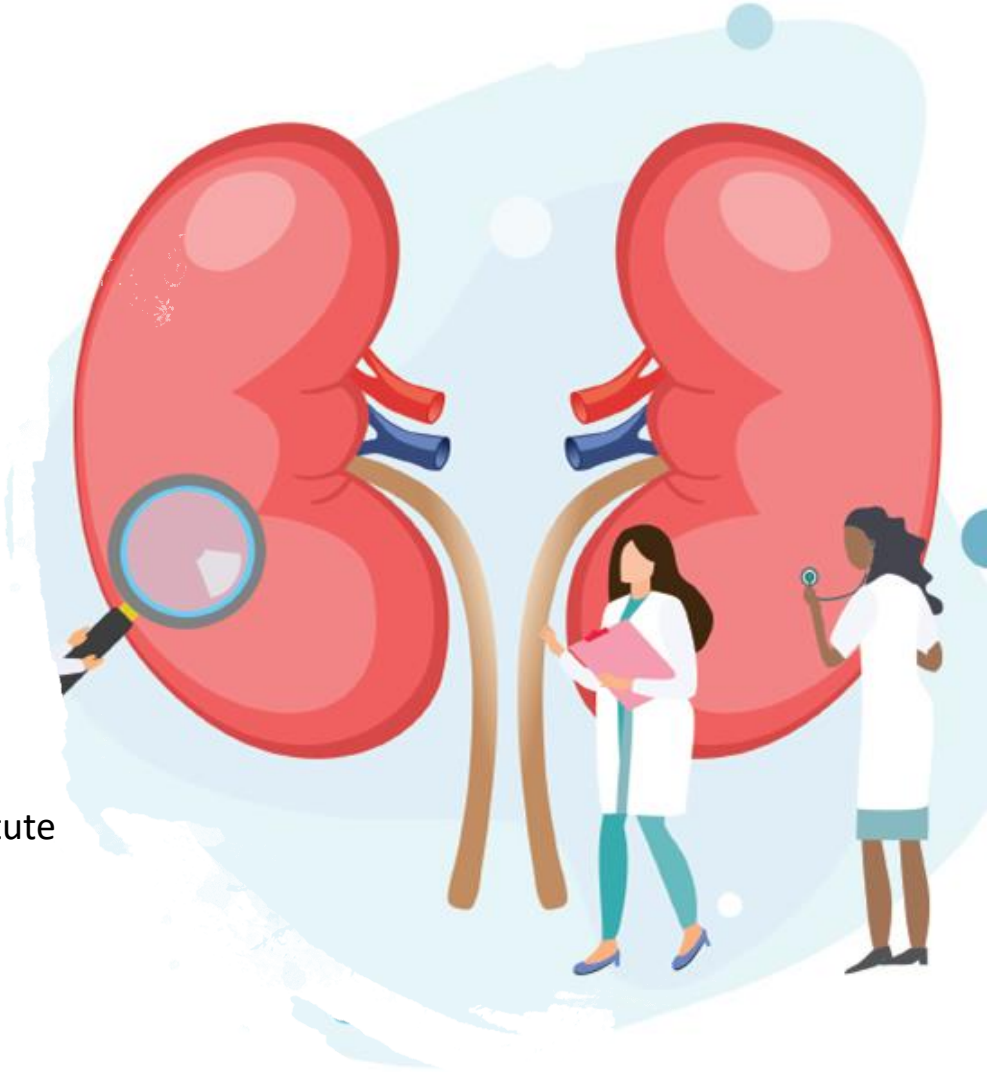
CKD – teaching update



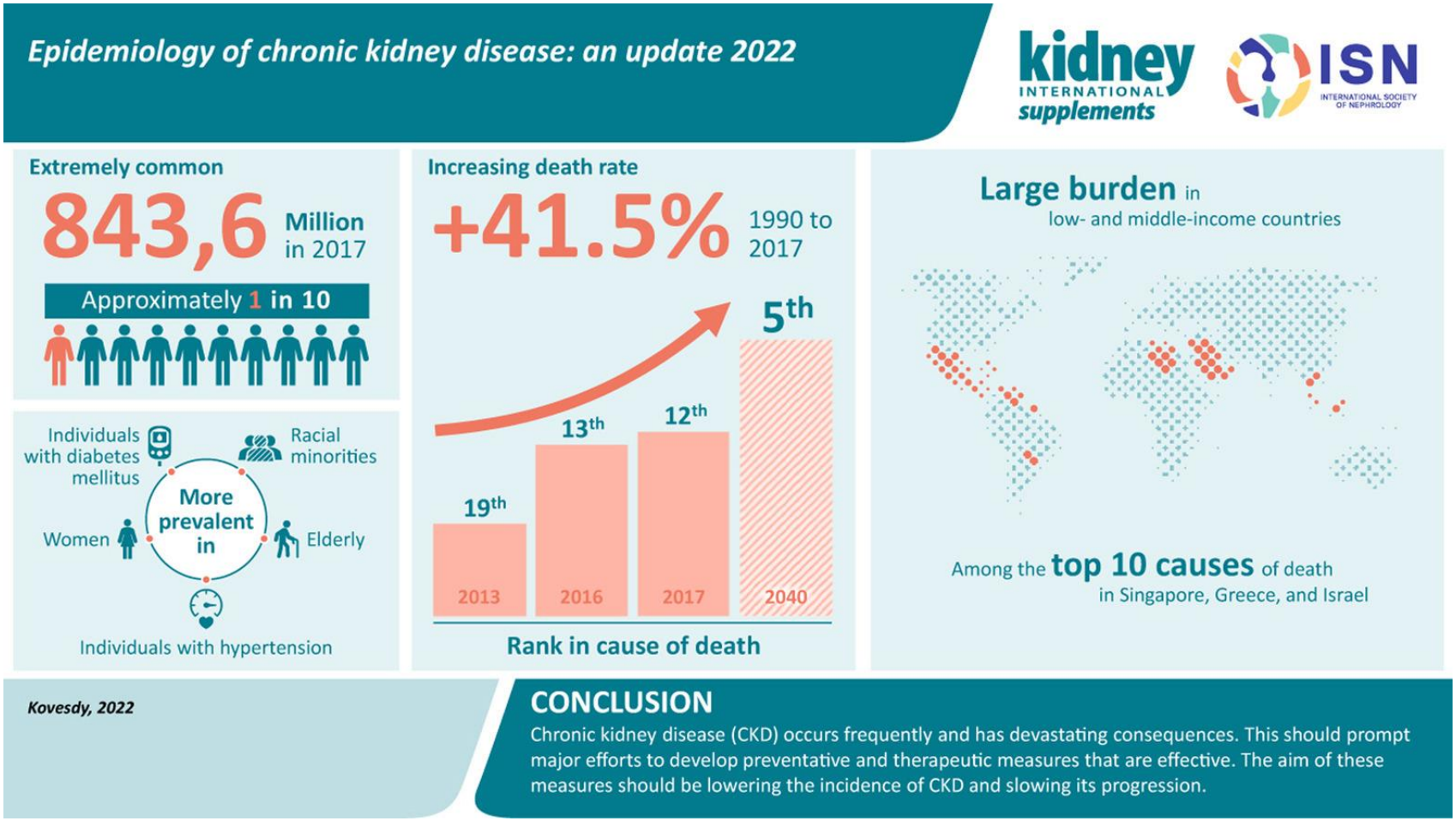
Dr Pann Ei Hnynn Si (MRCP, PhD)
Consultant Nephrologist, Sheffield Kidney Institute
Honorary Clinical Lecturer (SCHARR)
Pann-ei.hnynn-si@nhs.net

SheffieldKidneyInstitute

Outline

- Why is CKD important
- CKD classification and how to approach patient
- KFRE
- CKD Management
- Cases

Why is CKD important?

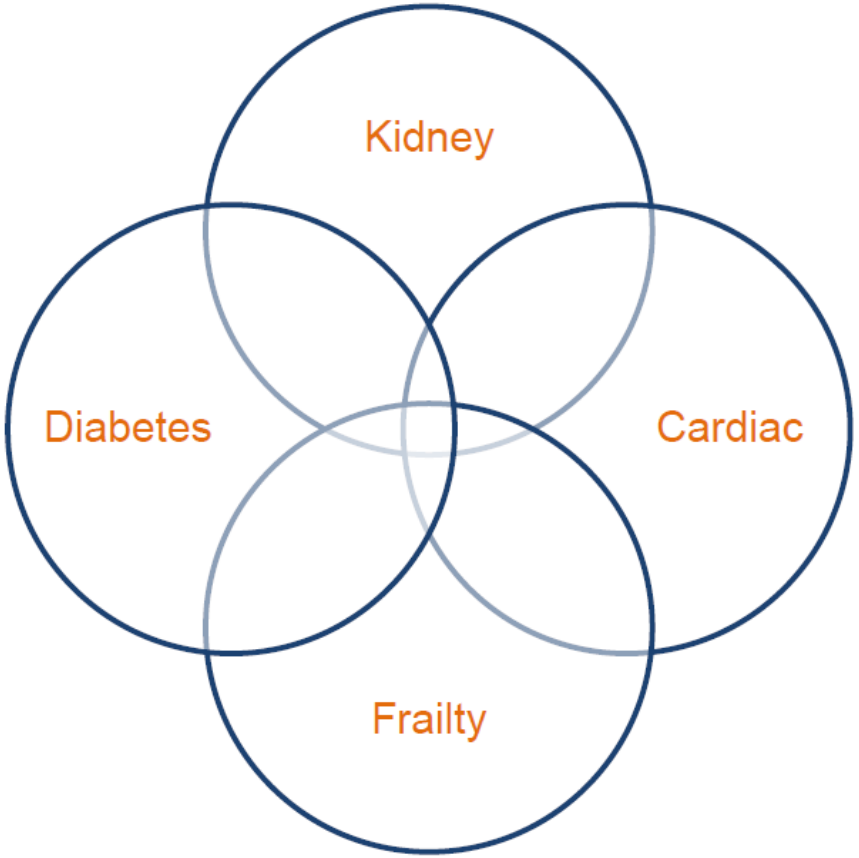


CKD rarely in isolation

6% overall population prevalence with a focus on management, not prevention

Referrals outside of NICE guidelines and low discharge rates back to primary care

80% of patients have three or more significant co-morbid diagnoses



How common is Renal Replacement Therapy in the UK?

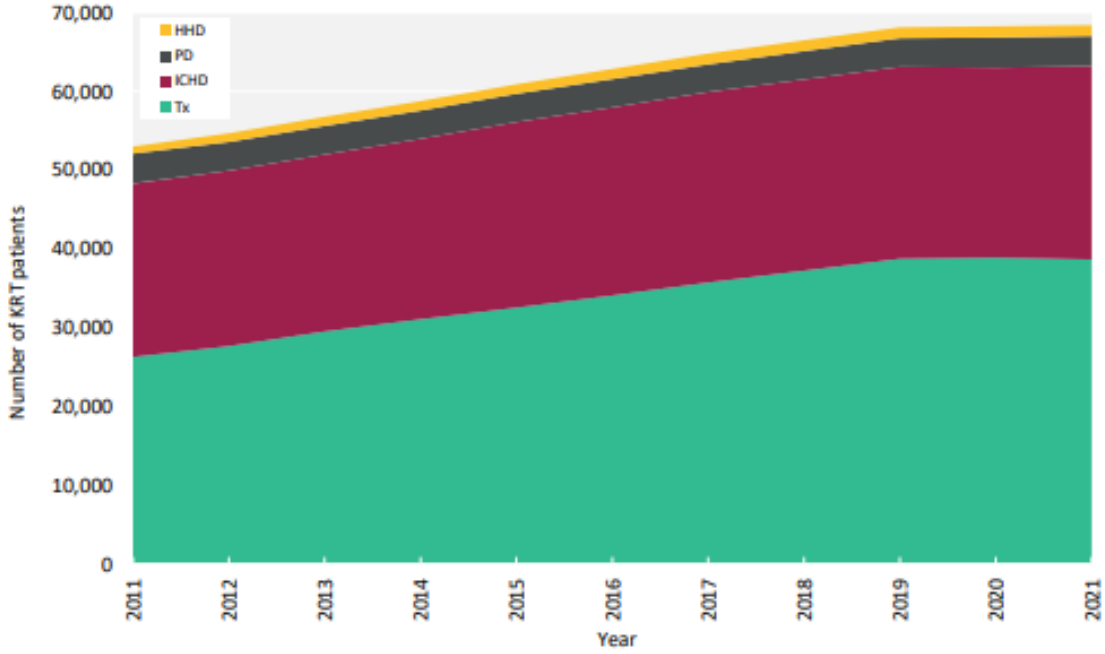
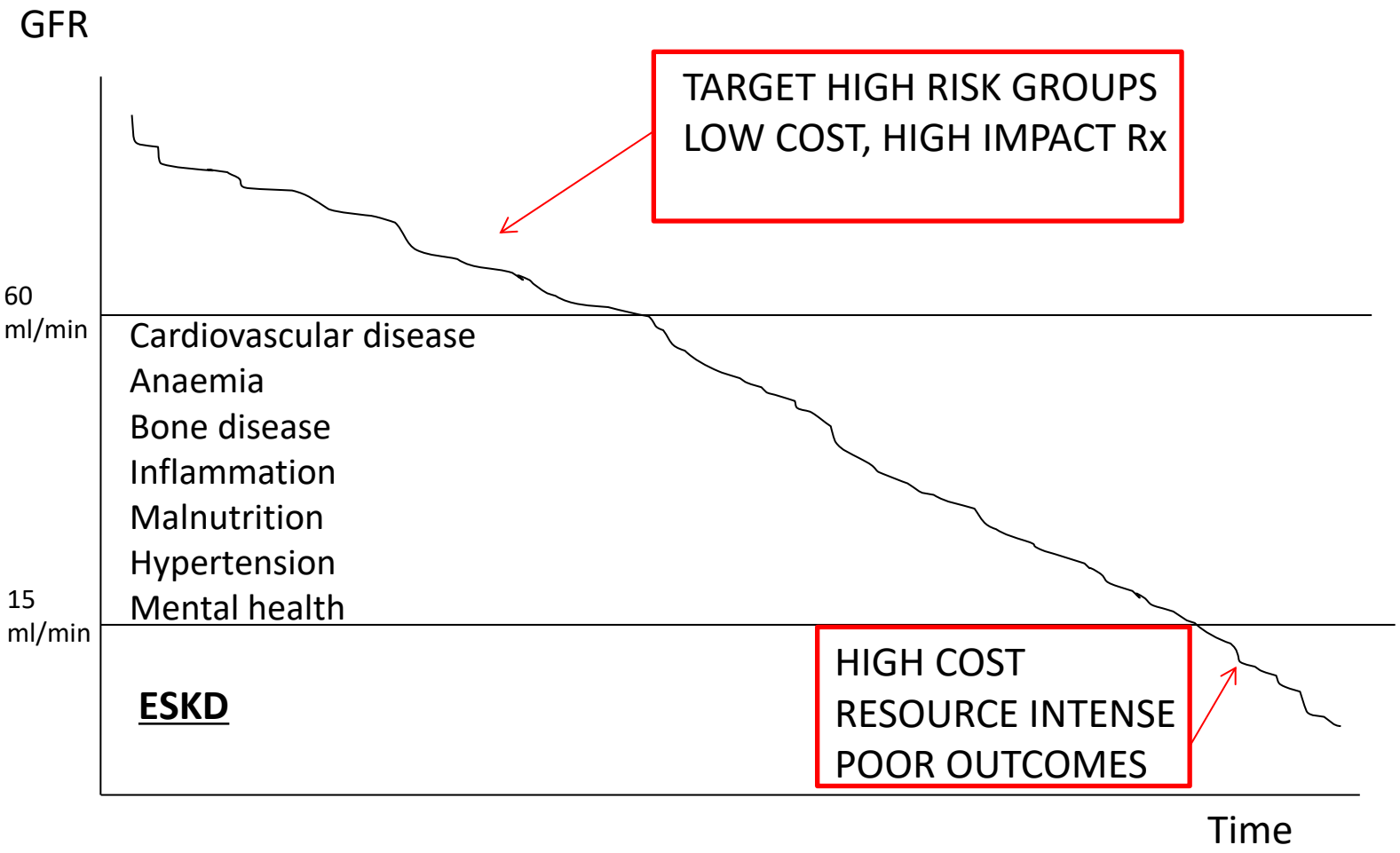
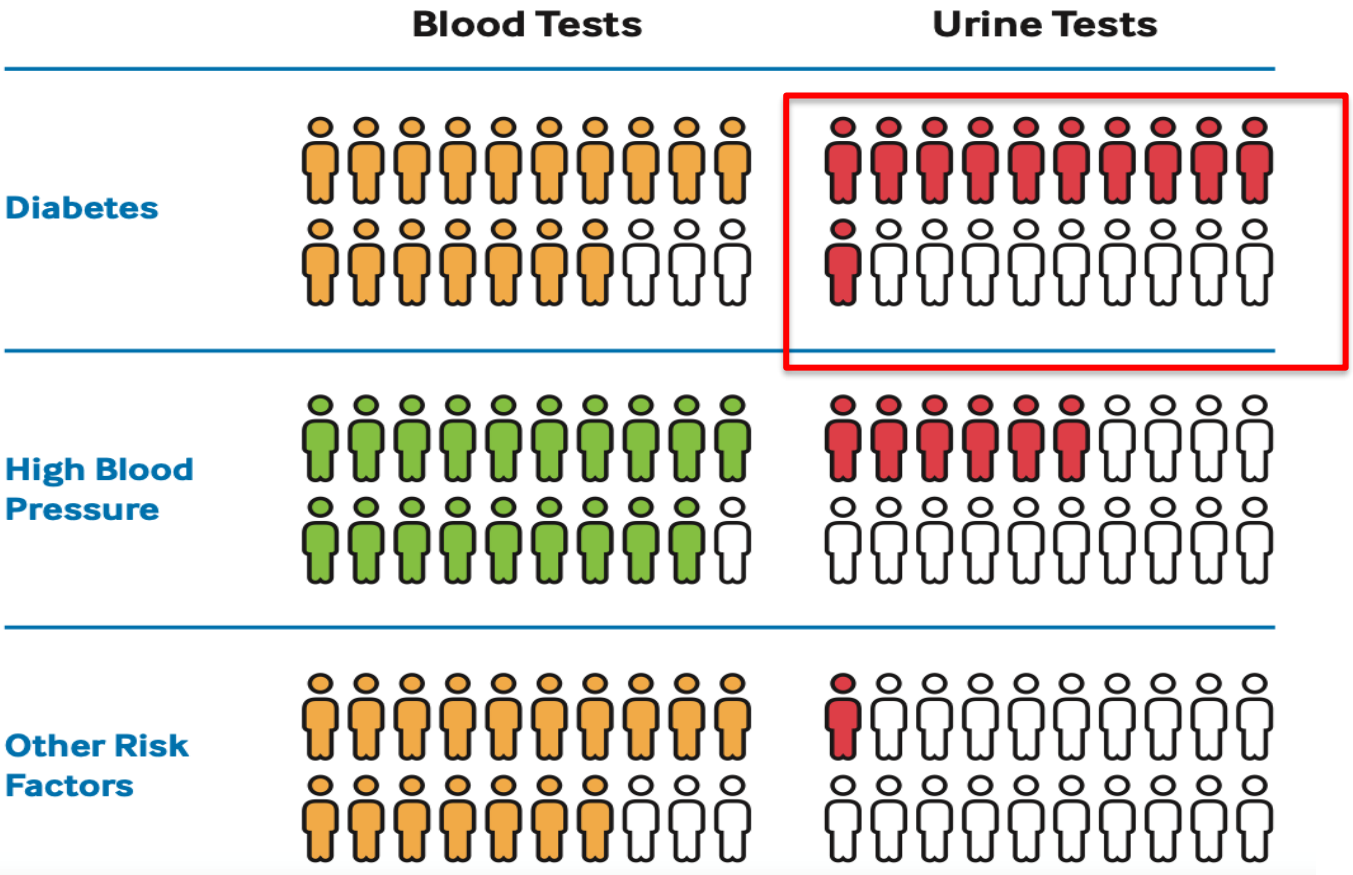


Figure 3.7 Growth in numbers of prevalent adult KRT patients by treatment modality between 2011 and 2021

Why intervene early in CKD?



CKD diagnosis – missed opportunities



Need to embed urine ACR + KFRE in CKD monitoring

National CKD Audit Report 2017

Outline

- Why is CKD important
- CKD classification and how to approach patient
- CKD Management
- Cases

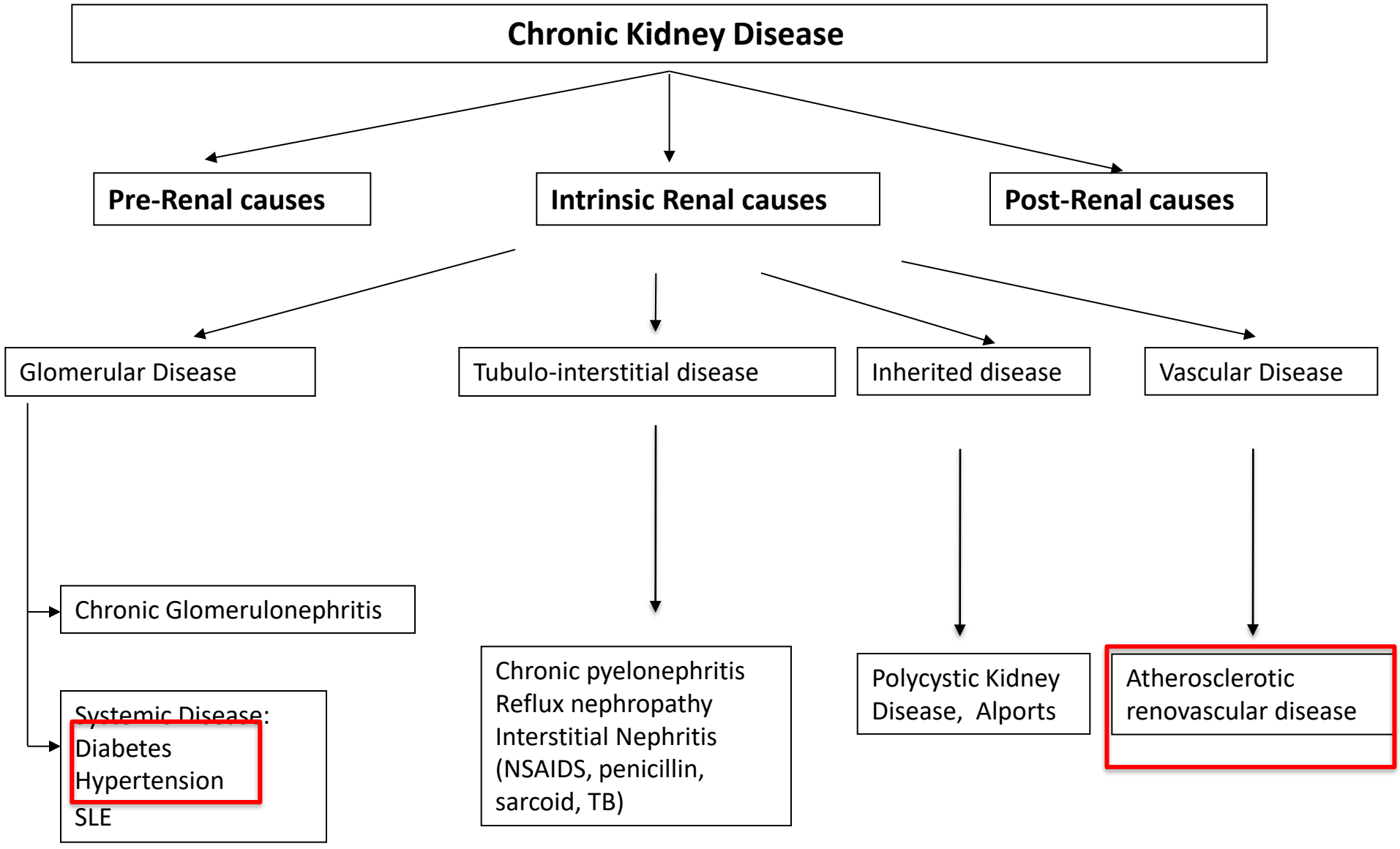
Classification of CKD

Prognosis of CKD by GFR and Albuminuria Categories: KDIGO 2012

GFR categories (ml/min/ 1.73m²) Description and range				Persistent albuminuria categories Description and range		
				A1	A2	A3
				Normal to mildly increased	Moderately increased	Severely increased
				<30 mg/g <3 mg/mmol	30-300 mg/g 3-30 mg/mmol	>300 mg/g >30 mg/mmol
	G1	Normal or high	≥90			
	G2	Mildly decreased	60-89			
	G3a	Mildly to moderately decreased	45-59			
	G3b	Moderately to severely decreased	30-44			
	G4	Severely decreased	15-29			
	G5	Kidney failure	<15			

What predicts progression to ESKD?

- BP
- Proteinuria
- eGFR at presentation
- Age
  - Young more likely to reach ESKD
  - Elderly more likely to die


Chronic Kidney Disease
Pre-Renal causes
Intrinsic Renal causes
Post-Renal causes
Glomerular Disease
Tubulo-interstitial disease
Inherited disease
Vascular Disease
Chronic Glomerulonephritis
Systemic Disease:
Diabetes
Hypertension
SLE
Chronic pyelonephritis
Reflux nephropathy
Interstitial Nephritis
(NSAIDS, penicillin, sarcoid, TB)
Polycystic Kidney Disease, Alports
Atherosclerotic renovascular disease

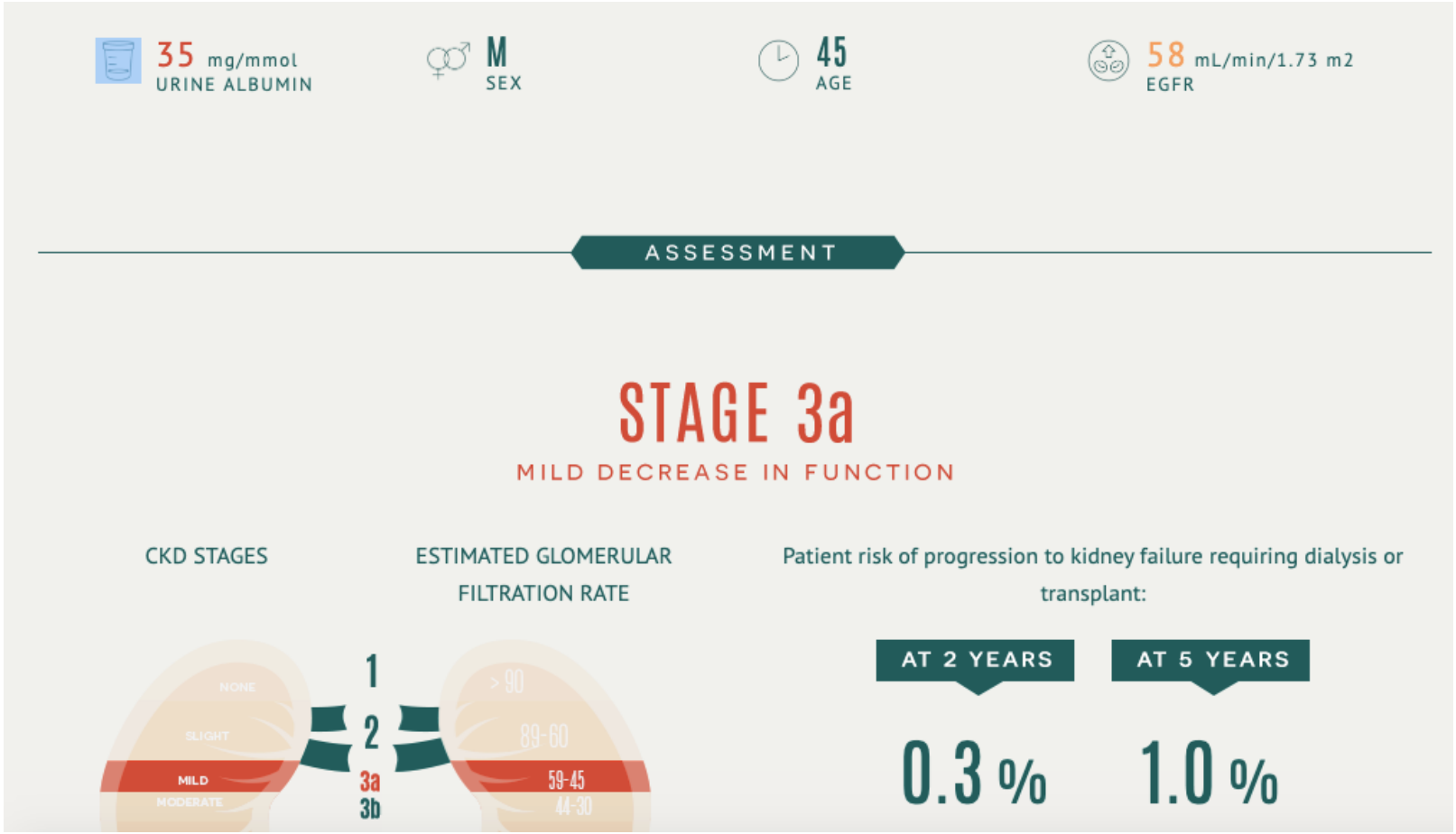
How to screen?

- eGFR
- Urinalysis
- Albumin : Creatinine ratio – ACR*

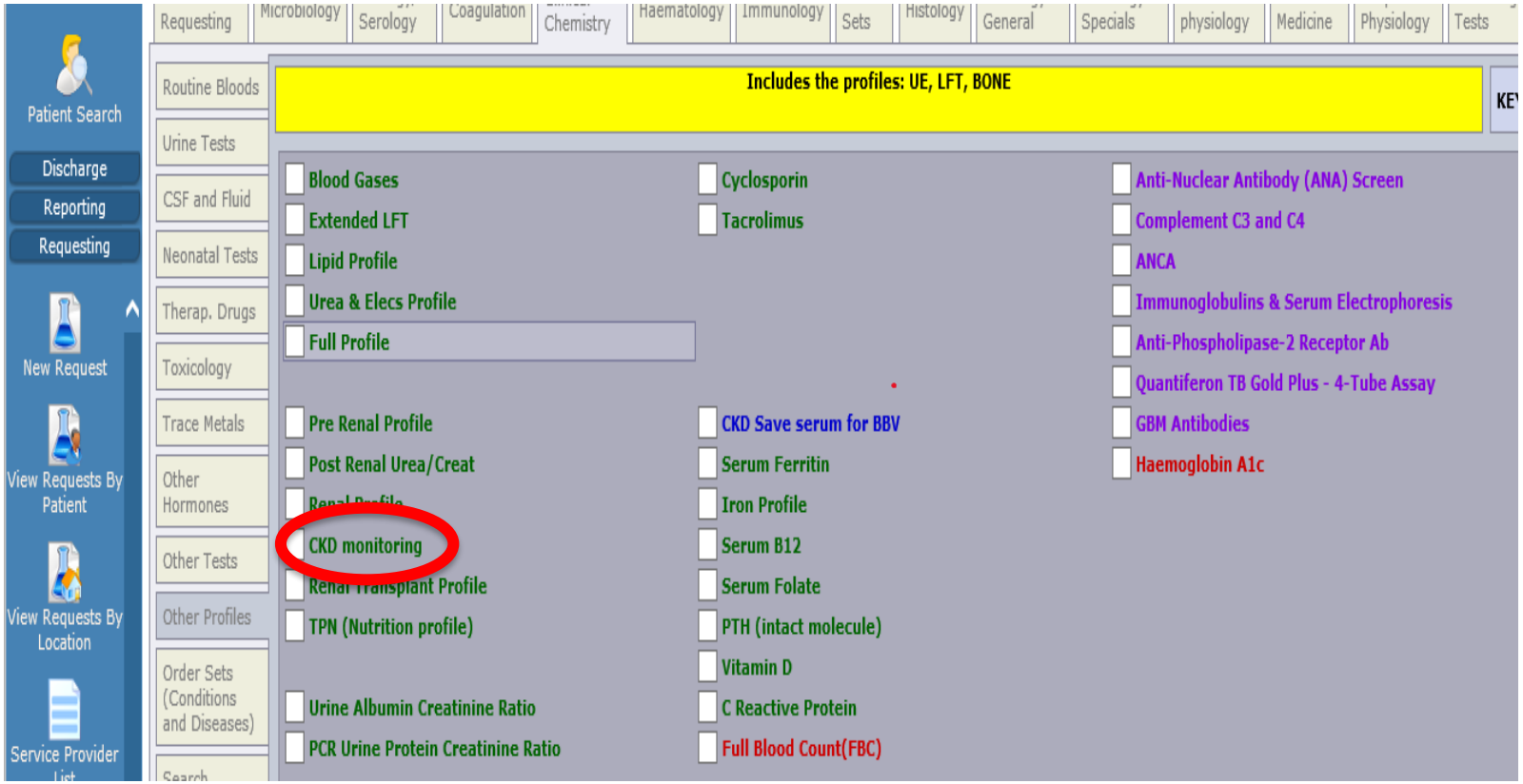
- **Kidney Failure Risk Equation**

- *NB ACR not valid on samples from a catheter, ileal conduit, with infection or pyuria

What is the risk of kidney failure

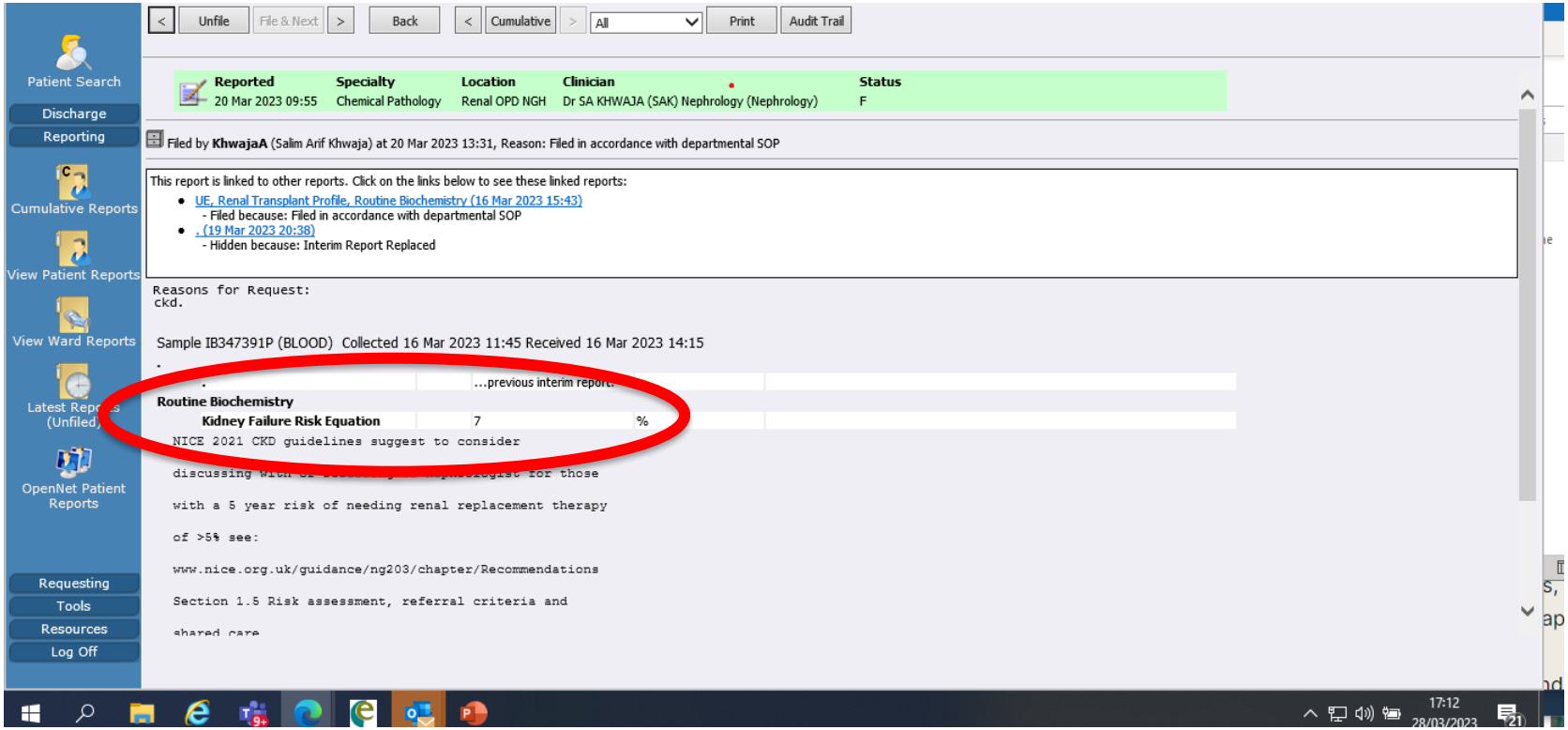


Kidney Failure Risk Equation - ICE requesting



CKD Monitoring tab on ICE – renal profile and urine ACR; automatically reports a KFRE score

Kidney Failure Risk Equation - ICE reporting



CKD Management

4 pillars to save lives for adults with CKD

Pillar 1: RAAS Blockage and rapid titration

Pillar 2: SGLT2i

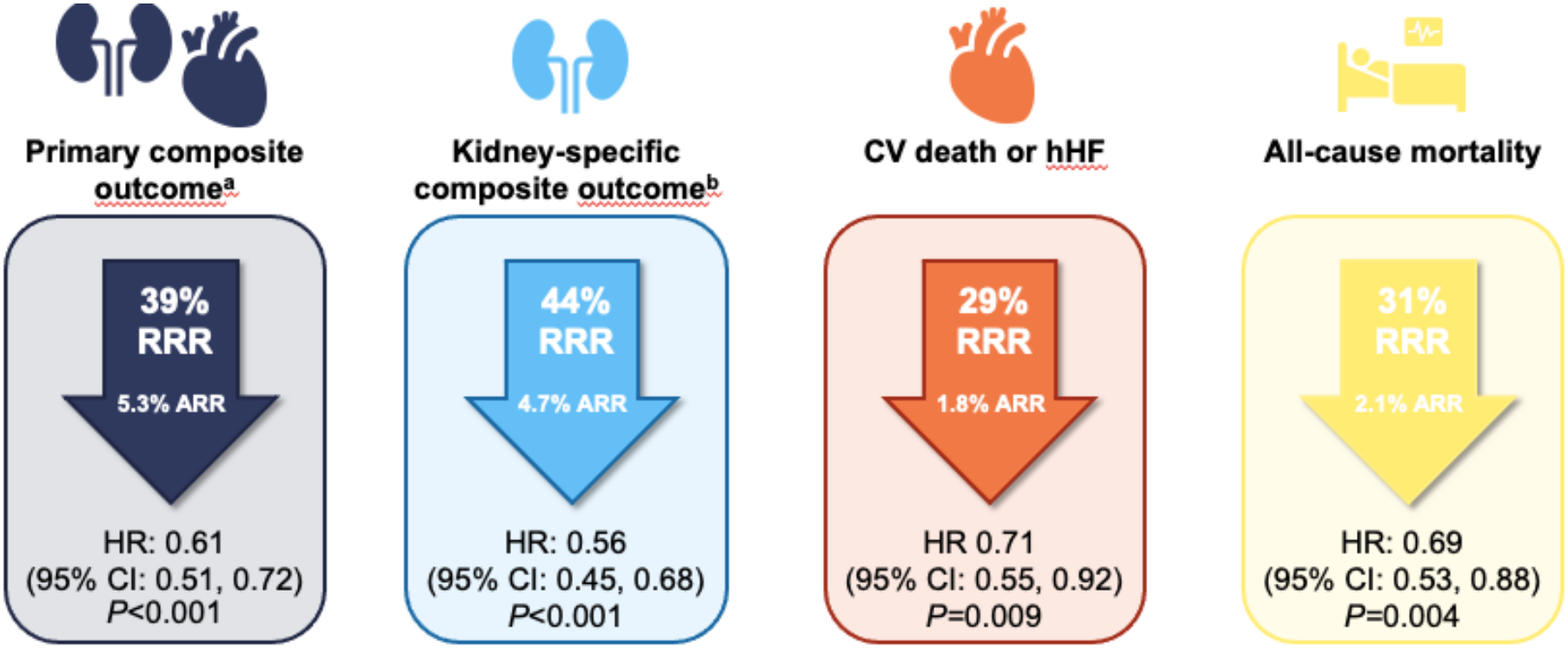
Pillar 3: Optimise BP and other cardiovascular risk factor

- Statin – Atorvastatin 20mg should be offered for primary prevention
- Aspirin
- Weight loss and smoking cessation

Pillar 4: Finerenone

GLP1a

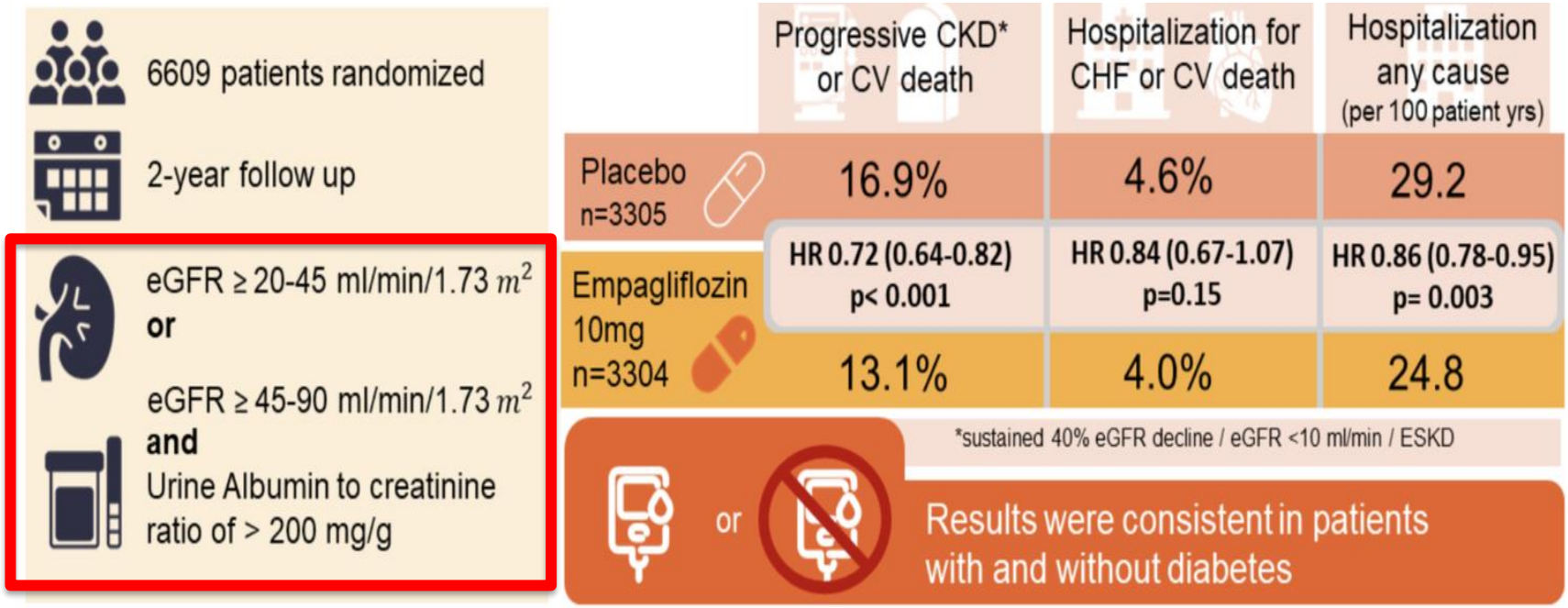
Dapaglifozin and trial outcomes



Age 61+/-12

Heerspink HJL et al. Dapaglifozin in CKD. N Engl J Med 2020;383:1436-46.

Empa-CKD Outcomes



Age 64+/-14

EMPA-Kidney Collaborative Group. N Engl J Med 2022 Nov 4 .

CKD Management –SGLT2is

Dapagliflozin is recommended as an option for treating chronic kidney disease (CKD) in adults. It is recommended only if:

- it is an add-on to optimised standard care including the highest tolerated licensed dose of angiotensin-converting enzyme (ACE) inhibitors or angiotensin-receptor blockers (ARBs), unless these are contraindicated, and
- people have an estimated glomerular filtration rate (eGFR) of 25 ml/min/1.73 m^2 to 75 ml/min/1.73 m^2 at the start of treatment and:
  - have type 2 diabetes or
  - have a urine albumin-to-creatinine ratio (uACR) of 22.6 mg/mmol or more.

Empagliflozin is recommended as an option for treating chronic kidney disease (CKD) in adults, only if:

- it is an add-on to optimised standard care including the highest tolerated licensed dose of angiotensin-converting enzyme (ACE) inhibitors or angiotensin-receptor blockers (ARBs), unless these are contraindicated, and
- people have an estimated glomerular filtration rate of:
  - 20 ml/min/1.73 m^2 to less than 45 ml/min/1.73 m^2 or
  - 45 ml/min/1.73 m^2 to 90 ml/min/1.73 m^2 and either:
    - a urine albumin-to-creatinine ratio of 22.6 mg/mmol or more, or
    - type 2 diabetes.

Low Risk Prescribe SGLT2is	Moderate Risk Prescribe with caution	High Risk Do not prescribe SGLT2is
Monotherapy when metformin is contraindicated or not tolerated	History of PAD	**Diabetes contraindications:** History of DKA
Dual therapy in combination with metformin or other oral agents	Osteoporosis or history of fractures	Rapid progression to insulin (within 1 year of diagnosis)
Triple therapy in combination with other oral agents	Frail/elderly (age> 75 years)	Latent autoimmune diabetes of adulthood (LADA)
Combination with insulin	History of foot ulceration	Ketosis-prone T2DM
Established CVD	CKD stage 3a (eGFR 45–60) or CKD stage 3b (eGFR 30–45) with ACR >30 mg/mmol†	Type 1 Diabetes (diagnosed or suspected)
Prior stroke	Receiving loop diuretics	Genetic diabetes
History of HF	High HbA1c levels (>86 mmol/mol or 10%)	Diabetes due to pancreatic disease
No history of LLA	Systemic steroid therapy	Existing/active diabetic foot ulcers
No history of PAD	Ketogenic diet (<5% carbohydrate content)	Previous LLA
Age < 75 years	BMI <25 kg/m^2	**Non-diabetes contraindications:**
ACR <3 mg/mmol	Recurrent UTIs	Eating disorders
eGFR ≥60 mL/min/1.73 m^2*	Long-term catheter	Cognitive impairment
Overweight or obese (BMI >25 kg/m^2)	Men with benign prostatic hypertrophy	Acute illness
Vulnerable to the effects of hypoglycaemia	Mild to moderate liver impairment (Child-Pugh score A/B)	Alcoholism likely to increase the risk of falls and metabolic disturbances
No liver impairment		Recent major surgery
		Pregnancy, planning pregnancy or breastfeeding
		History of Fournier's gangrene
		Severe hepatic impairment (Child-Pugh score C)

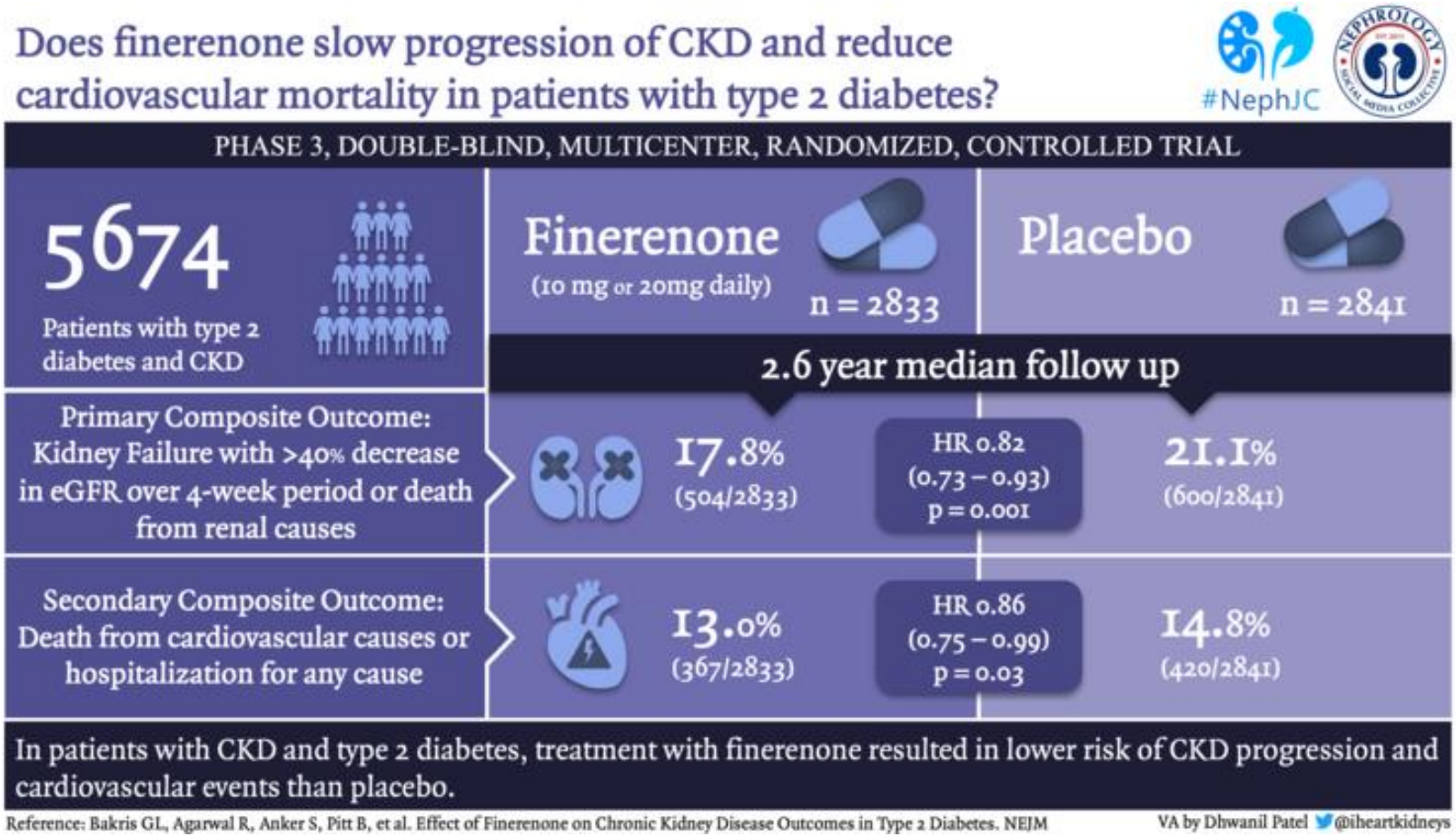
CKD Management – Finerenone

1 Recommendations

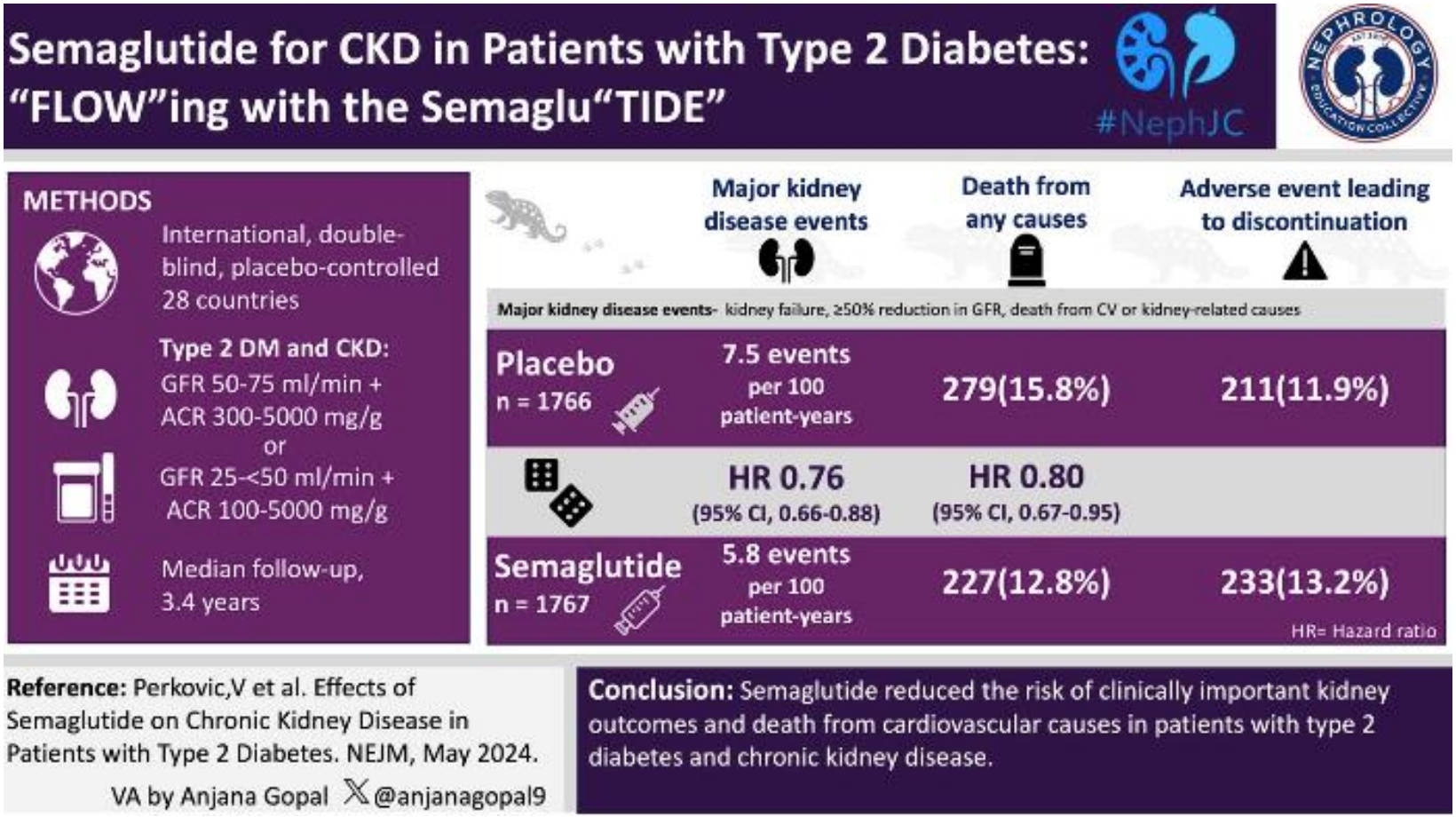
1.1 Finerenone is recommended as an option for treating stage 3 and 4 chronic kidney disease (with albuminuria, that is, an albumin to creatinine ratio that is persistently 3 mg/mmol [30 mg/g] or more) associated with type 2 diabetes in adults. It is recommended only if:

- it is an add-on to optimised standard care; this should include, unless they are unsuitable, the highest tolerated licensed doses of:
  - angiotensin-converting enzyme (ACE) inhibitors or angiotensin-receptor blockers (ARBs) and
  - sodium–glucose cotransporter-2 (SGLT2) inhibitors and
- the person has an estimated glomerular filtration rate (eGFR) of 25 ml/min/1.73 m^2 or more.

CKD Management – Finerenone



CKD Management – Semaglutide



Case Study

- 45 year old type 2 DM with hypertension and obesity
- eGFR 58 mls/min. ACR 35mg/umol. BP 142/78
- On Metformin 1g bd, ramipril 2.5mg, amlodipine 5mg aspirin and atorvastatin
- What are the next steps in management?
  - Optimise Ramipril
  - Add SGLT2i
  - Add finerenone
  - Liaise with diabetes re GLP1Ra

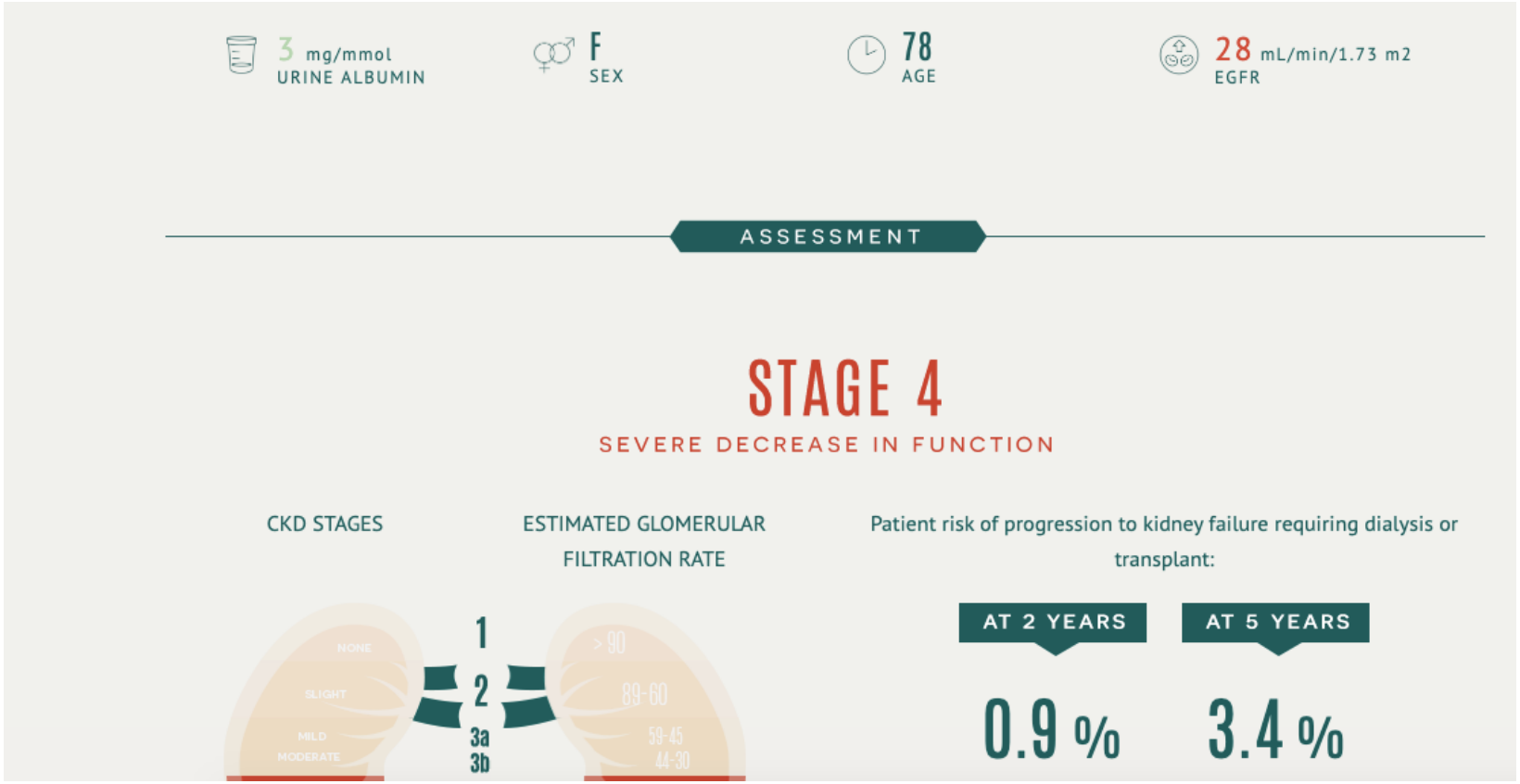
Case Study

- 78 year old female, hypertensive with history of smoking and peripheral vascular disease. Urine dipstick was negative for protein and blood. BP=150/90. Last year eGFR 35mls/min.

- Now 28mls min. In view of progression of kidney disease please can you see. Rx: Aspirin, Simvastatin, Ramipril, Bendroflumethazide

  - What is the likely diagnosis?
  - How would you manage?
  - What is the risk of kidney failure?

What is the risk of kidney failure



Case Study- suggested management

- No nephrological indication for ACEI as no proteinuria and high risk of renovascular disease. Therefore trial stop ACEI
- High risk of cardiovascular death - already on aspirin/statin
- Add Empagliflozin 10mg day
- eGFR<30mlsmin – control BP <140 systolic – switch to loop diuretic

CKD Management –SGLT2is

Dapagliflozin is recommended as an option for treating chronic kidney disease (CKD) in adults. It is recommended only if:

- it is an add-on to optimised standard care including the highest tolerated licensed dose of angiotensin-converting enzyme (ACE) inhibitors or angiotensin-receptor blockers (ARBs), unless these are contraindicated, and
- people have an estimated glomerular filtration rate (eGFR) of 25 ml/min/1.73 m^2 to 75 ml/min/1.73 m^2 at the start of treatment and:
  - have type 2 diabetes or
  - have a urine albumin-to-creatinine ratio (uACR) of 22.6 mg/mmol or more.

Empagliflozin is recommended as an option for treating chronic kidney disease (CKD) in adults, only if:

- it is an add-on to optimised standard care including the highest tolerated licensed dose of angiotensin-converting enzyme (ACE) inhibitors or angiotensin-receptor blockers (ARBs), unless these are contraindicated, and
- people have an estimated glomerular filtration rate (eGFR) at the start of treatment and:
  - 20 ml/min/1.73 m^2 to less than 45 ml/min/1.73 m^2 or
  - 45 ml/min/1.73 m^2 to 90 ml/min/1.73 m^2 and either:
    - a urine albumin-to-creatinine ratio of 22.6 mg/mmol or more, or
    - type 2 diabetes.

CKD – Case study

- 81 year old Type 2 diabetic, hypertensive. female recently moved to your practice. BP= 132/90. Routine bloods show creatinine 180 umol/l with eGFR 26. uACR = 5mg/umol. HbA1C = 52. Frail

- Creatinine = 150 in 2019.

- On Aspirin, atorvastatin, ramipril, Linagliptin
  - What is the risk of kidney failure?
  - Would you do anything else?

CKD – Case study

- Tell the patient she has slowly progressive CKD

- In theory may benefit from an SGLT2i (+/- finereone) – but perfectly acceptable to leave alone as risk of kidney failure alone

Case Study

- 72 yr old female. History of type 2 diabetes, heart failure and diabetic retinopathy.
- eGFR = 35 mls/min. ACR=150.
- BP=158/88.

- Treatment: aspirin, atorvastatin, metformin, ramipril and doxazosin
  - Whats the likely diagnosis and risk of kidney failure?
  - What should you do?

Case Study

- Likely diagnosis – diabetic nephropathy – in view of retinopathy
- High risk of progression to end-stage disease – proteinuria, diabetes, poor BP. Therefore tertiary referral appropriate
- Start SGLT2i – CKD and heart failure
- Ensure Metformin dose correct – lactic acidosis

150 mg/mmol
URINE ALBUMIN

F
SEX

72
AGE

35 mL/min/1.73 m2
EGFR

ASSESSMENT

STAGE 3b

MODERATE DECREASE IN FUNCTION

CKD STAGES

ESTIMATED GLOMERULAR FILTRATION RATE

Patient risk of progression to kidney failure requiring dialysis or transplant:

AT 2 YEARS	AT 5 YEARS
2.9 %	10.0 %

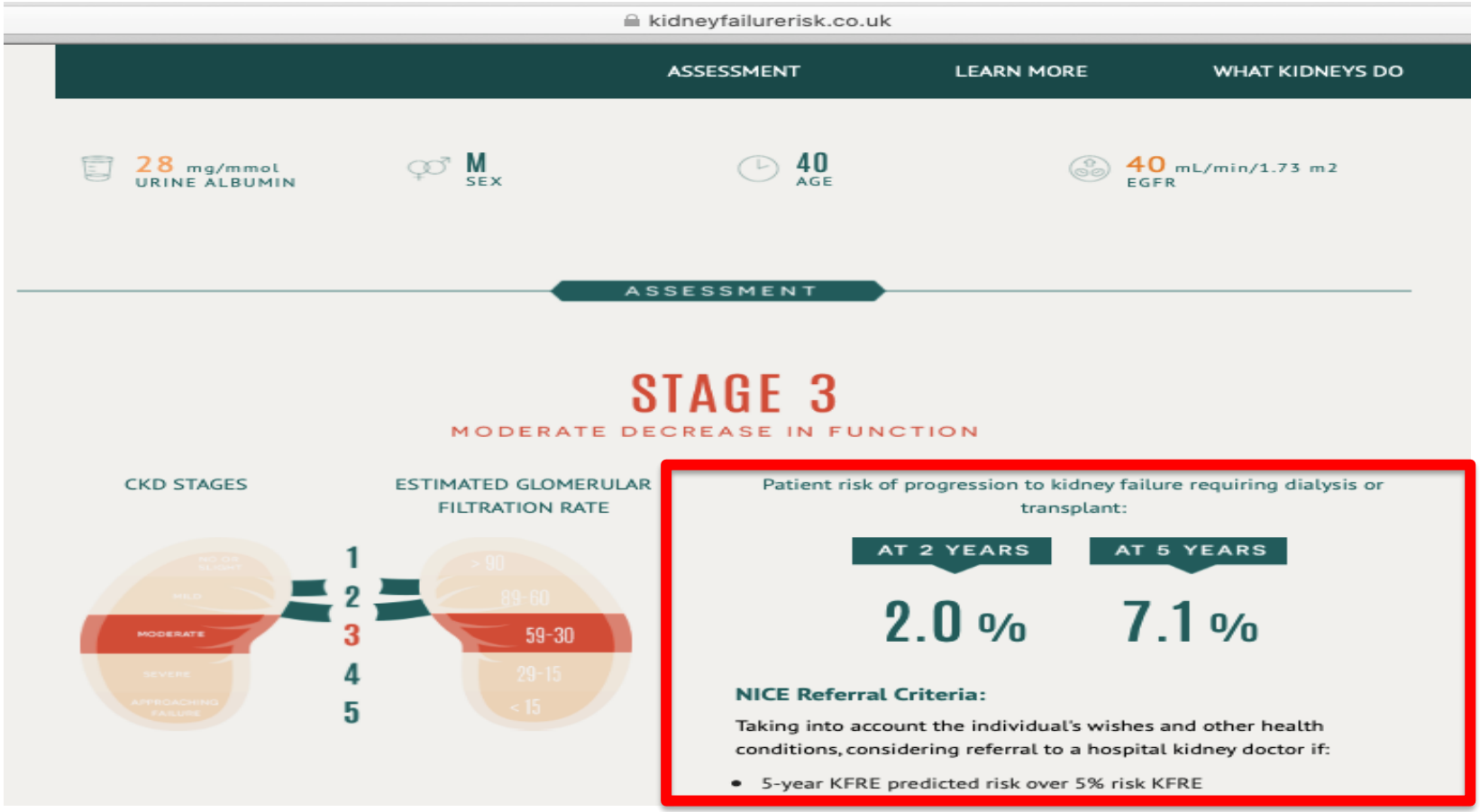
CKD – Case study

- Very well 30 year old male comes to you as part of an insurance medical. On no medication. Urinalysis 1+ haematuria. ACR = 28mg/umol. eGFR = 40mls/min.

- No historical creatinines. BP =130/80

- What would you do next?

Kidney Failure Risk Equation[1]



1. https://kidneyfailurerisk.co.uk/

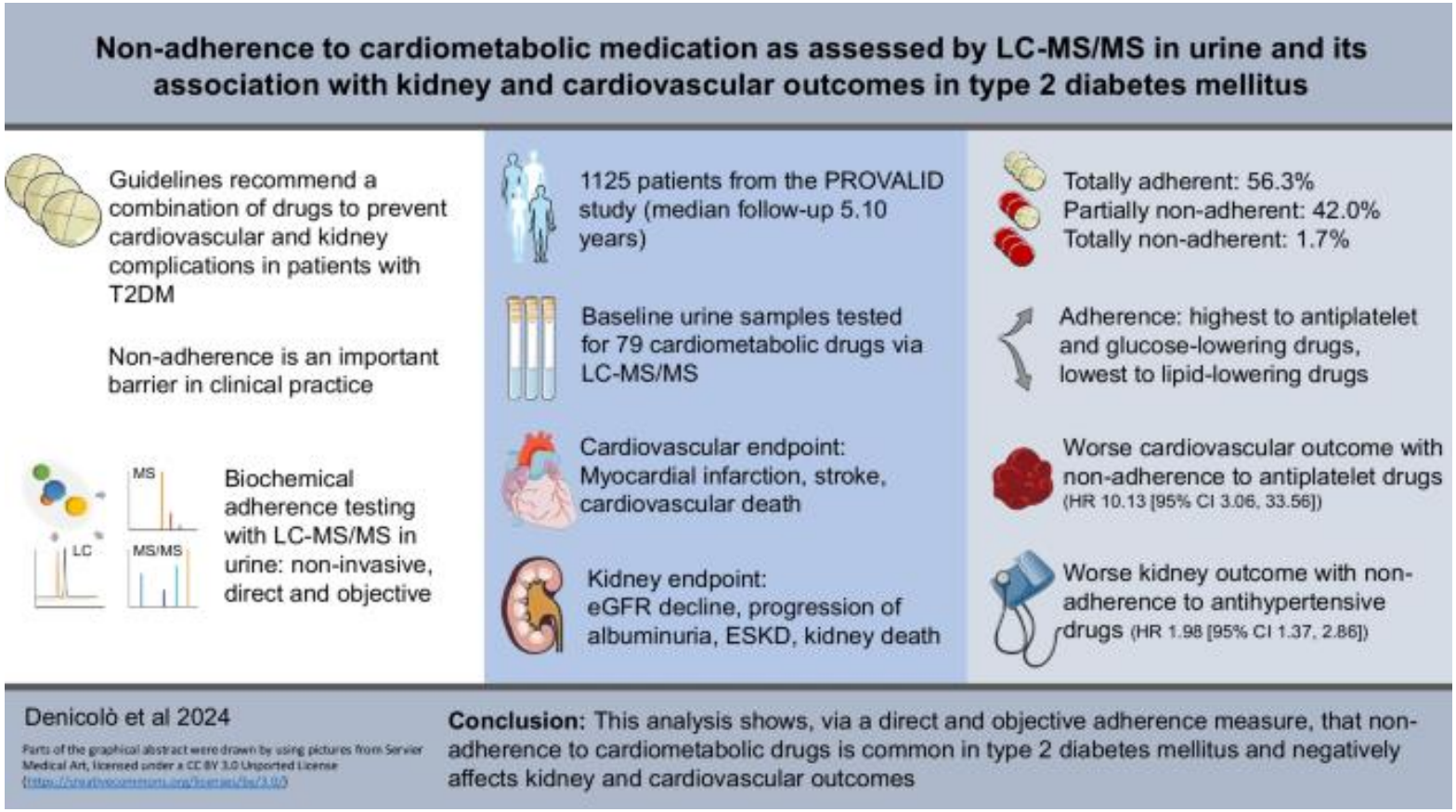
CKD – Case study

- Repeat creatinine and dipstick within 7-10 days.
- Repeat bloods and urine unchanged
- Likely IgA nephropathy – start SGLT2i and refer to nephrology

NICE referral criteria

- Patients with eGFR <30 ml/min , but if >30 ml/min, referral will depend on below criteria.
- 5-year KFRE >5% (5 year risk of needing RRT)
- UACR >70 mg/mmol
- UACR >30 with associated microscopic haematuria
- Sustained decline in eGFR >25% or more within 12 months
- Sustained decline in eGFR >15ml/min within 12 months
- Suspected RAS
- Poorly controlled HTN (>4 anti HTN)
- Suspected genetic cause of CKD

We can't prescribe our way out of CKD



Key messages

- **When monitoring CKD routinely use the 'CKD Monitoring' request on ICE**

- NICE recommend to discuss patients (with eGFR <60mls/min) with nephrology if Kidney Failure Risk (Equation) >5% at 5 years

- SGLT2is are foundational treatments in both diabetic and non-diabetic kidney disease

Key messages

- Finereone for T2DM with an eGFR between 25-60mls/min and ACR >3
- Think GLP1RAs for diabetics with CKD – especially for obese
- If you want to do virtual CKD MDTs , please contact us.