Getting the timing right – use of KFRE in Advanced Kidney Care

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Declarations of Interest in Relation to AKC and KFRE

- University Hospitals of Leicester NHS Trust had a consulting agreement with Roche Diagnostics regarding KFRE implementation
- I own Kidney Failure Risk Ltd which has previously owned and run the kidneyfailurerisk.co.uk website. The website was originally funded by AstraZeneca UK.
- **I am not a clinician with any current specific AKC work in my job plan – i.e. clinically I am sure you all know far more about AKC planning than me!**

Outline of Talk

- What is KFRE?
- When should you consider KFRE for AKC
- Implementation Progress

KFRE Description

- KFRE is a well validated risk prediction tool:
- for individuals with chronic kidney disease (CKD) Stages 3A to 5 (eGFR <60 ml/min/1.73m^2)
- to predict kidney replacement therapy (KRT) - the need for dialysis or a kidney transplant
- in the next two or five years

KFRE Variables for Calculation

- The NICE-recommended KFRE bases its prediction on the 4 variables:
  - *Age*
  - *Gender*
  - *Estimated glomerular filtration rate (CKD-EPI eGFR 2009)*
  - *Urine albumin creatinine ratio (ACR)*

KFRE Variables for Calculation

- Also an 8 variable version that adds ABC-P to prediction@
  - *Albumin*
  - *Bicarbonate*
  - *Calcium*
  - *Phosphate*

The Kidney Failure Risk Equation

- KFRE was developed in multi-national CKD cohorts by Tangri *et al* including CKD Prognosis Consortium data
  - *"North American" and "Non-North American" versions*
- NICE recommended the use of the 4-variable KFRE, re-calibrated for UK primary care (Major RW *et al*, PLOS Medicine 2019)
  - *Cohort of >35,000 individuals with CKD in primary care from East Midlands*
  - *429 KRT cases in 5 years of follow-up*
  - *Excellent statistical performance for identifying cases of KRT ("statistical discrimination")*
  - *Some adjustment of risk predictions required in UK ("statistical re-calibration")*

Tangri N et al. A predictive model for progression of chronic kidney disease to kidney failure. Jama. 2011 Apr 20;305(15):1553-9.
Tangri N et al. Multinational assessment of accuracy of equations for predicting risk of kidney failure: a meta-analysis. Jama. 2016 Jan 12;315(2):164-74.
Major RW et al. The kidney failure risk equation for prediction of end stage renal disease in UK primary care: an external validation and clinical impact projection cohort study. PLoS medicine. 2019 Nov 6;16(11):e1002955.

How can I easily calculate KFRE?

- Due to the re-calibration for the UK, caution should be taken when using online KFRE calculators as they may use non-UK versions of the algorithm

- Website:

www.kidneyfailurerisk.co.uk

KDIGO CKD Guidelines 2024

- **Practice Point 2.2.2:** A 2-year kidney failure risk of >10% can be used to determine the timing of multidisciplinary care in addition to eGFR-based criteria and other clinical considerations.

- **Practice Point 2.2.3:** A 2-year kidney failure risk threshold of >40% can be used to determine the modality education, timing of preparation for kidney replacement therapy (KRT) including vascular access planning or referral for transplantation, in addition to eGFR-based criteria and other clinical considerations.

https://kdigo.org/wp-content/uploads/2024/03/KDIGO-2024-CKD-Guideline.pdf

2 Year 10% - AKC

No diabetes

Hyperkalemia

eGFR	A1	A2	A3
>90	1.5% (0.4, 4.6)	1.1% (0.3, 3.2)	1.4% (0.4, 4.4)
75–89	1.7% (0.5, 5.1)	1.6% (0.5, 4.8)	1.5% (0.5, 4.7)
60–74	2.3% (0.7, 7.0)	2.0% (0.6, 6.0)	2.3% (0.7, 7.0)
45–59	**4.5% (1.4, 12.8)**	3.5% (1.1, 10.3)	5.2% (1.6, 14.6)
30–44	9.5% (3.0, 24.8)	10.5% (3.3, 26.9)	11.3% (3.6, 28.5)
15–29	16.1% (5.3, 37.5)	19.0% (6.4, 42.5)	23.7% (8.3, 49.4)

Figure 30 | Meta-analyzed adjusted prevalence of hyperkalemia (2

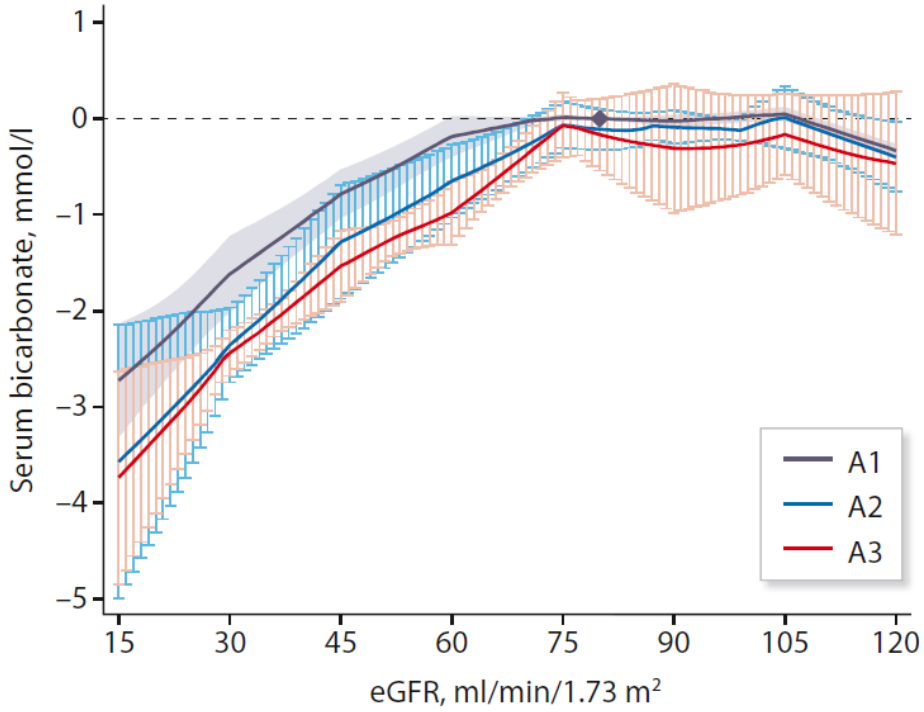


Figure 28 | Association between estimated glomerular filtration rate (eGFR) with serum bicarbonate concentration in general population and high-risk cohorts from the Chronic Kidney Disease Prognosis Consortium, by level of albuminuria (A1–A3).

https://kdigo.org/wp-content/uploads/2024/03/KDIGO-2024-CKD-Guideline.pdf

2 Year 10% - AKC

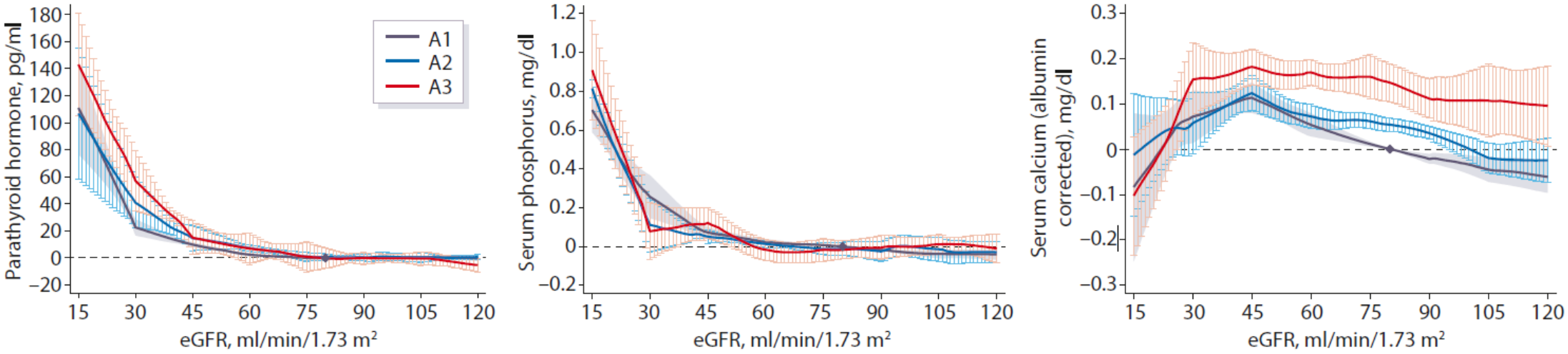


Figure 35 | Association between estimated glomerular filtration rate (eGFR) with serum concentrations of parathyroid hormone, phosphate, and serum calcium in general population and high-risk cohorts from the Chronic Kidney Disease Prognosis Consortium, by level of albuminuria (A1–A3). The *y* axis represents the meta-analyzed absolute difference from the mean adjusted value at an eGFR of 80 ml/

https://kdigo.org/wp-content/uploads/2024/03/KDIGO-2024-CKD-Guideline.pdf

2 Year 10% - AKC

- Mixed methods - Alberta, Canada
- Interviews identified for patients and providers
  - “targeted care”
  - “access to resources outside the multidisciplinary clinics”
  - “self-efficacy”
  - “patient reassurance”
  - “reduced stress””
- For providers also:
  - “anticipated concerns” and “job satisfaction.”
- Patient concern:
  - “discharged from multi-disciplinary care”

https://link.springer.com/article/10.1186/s12882-019-1269-2

Potential Outcomes

Refer for fistula		

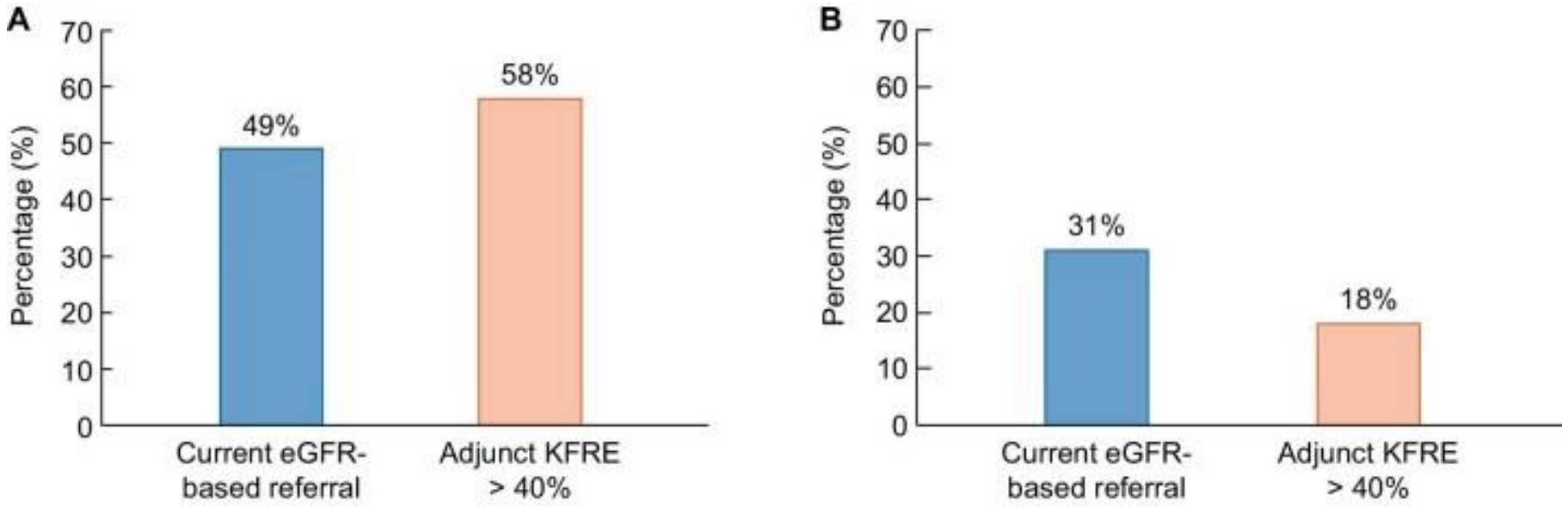
UKKA Vascular Access for Haemodialysis

- "All relevant evidence published up until the end of December 2020"
- "Where the window of opportunity begins is likely to vary…..using a single GFR threshold for vascular access planning may not be appropriate for all."
- "A range of GFR values by which services may wish to consider starting vascular access planning may account for the variation to a better degree, yet should only be used as a guide."
- "A KFRE-based threshold of……>40% over 2 years has been described as superior to…..in generating the highest number of optimal dialysis starts with a mature access in observational work"

https://link.springer.com/article/10.1186/s12882-025-04374-y

When should you consider KFRE for AKC?

- Kidney Failure Risk Equation in vascular access planning: a population-based study supporting value in decision making. Clin Kidney J. 2024 Jan 11;17(2):sfae008. doi: 10.1093/ckj/sfae008



Utility of KFRE as an adjunct variable in VA planning. (A) Patient started HD on AVF/G within 2 years from the modality selection date. (B) An AVF/G was created but patient did not start HD within 2 years from the modality selection date.

When should you consider KFRE for AKC?

- Clinical impact of the Kidney Failure Risk Equation for vascular access planning. Nephrol Dial Transplant. 2024 Mar 14:gfae064. doi: 10.1093/ndt/gfae064

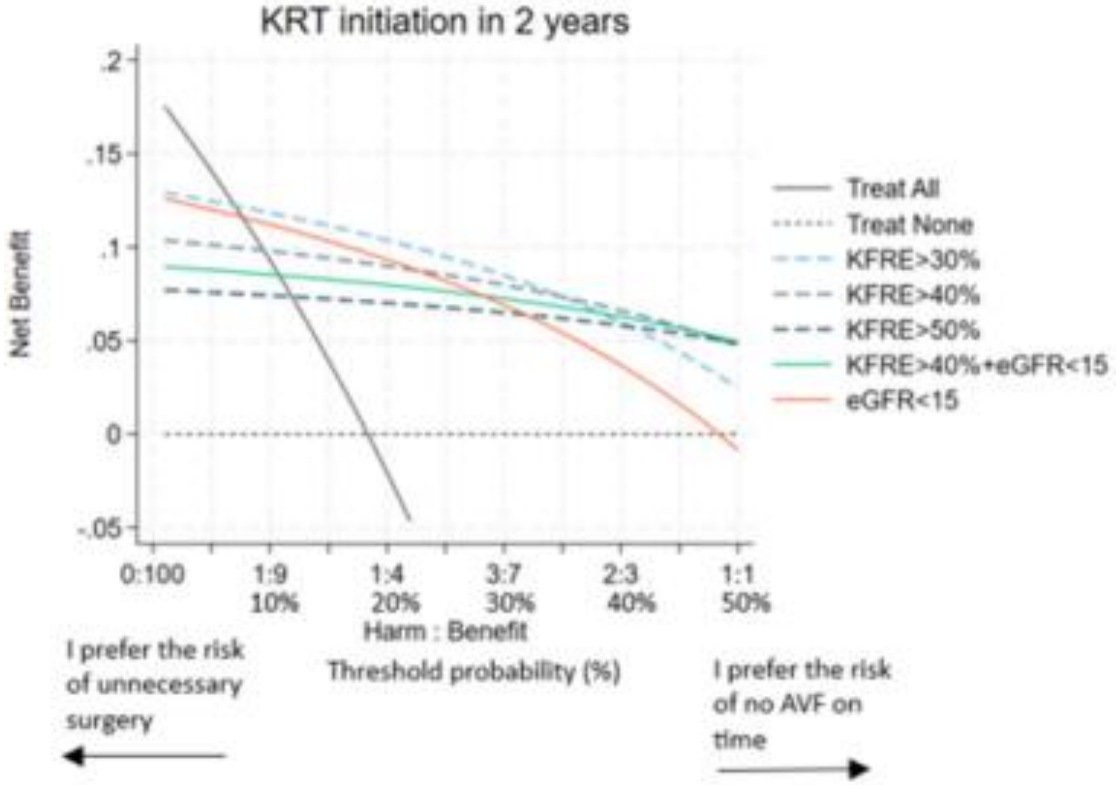


Figure 2 B. Decision curve analysis for the utility of the 2-year kidney failure risk equation (KFRE) versus eGFR below 15 ml/min/1.73m^2

Leicester Data - Summary of results – eGFR vs KFRE

	eGFR	KFRE 2 Year		
	15	30%	40%	50%
n	1494	877	624	387
Deaths (%)	23.5	16.9	13.9	12.4
KRT Cases (%)	35.0	49.3	63.0	72.1
Referrals per KRT case	2.9	2.0	1.6	1.4
Time to KRT, Days				
Median	278	311	267	232
25th Percentile	160	189	159	126
10th Percentile	74	98	65	62

Brief Summary of Leicester Retrospective Data

- Compared to a 15 ml/min/1.73m^2 threshold, a KFRE of more than 40% threshold would **potentially** lead to:
  - a reduction in referrals
  - a lower number of referrals per KRT case
  - a lower proportion of deaths prior to commencing KRT
  - a similar time to allow for AVF creation and maturation

A Clinical Example

- GP referral - 28M, Type 1DM, HTN, diabetic maculopathy, works as builder
- **eGFR 25, uACR 553 mg/mmol:** New Pt OPA (12 week wait), then Gen Neph (further 12 weeks), AKC (eGFR 18)
- **KFRE2 42%:** Initial phone call with consultant, fast track to AKC clinic (2-4 weeks), plan for ESKD, Reached ESKD in ~20 months from presentation – listed for SPK, commenced KRT (PD)

Another Clinical Example

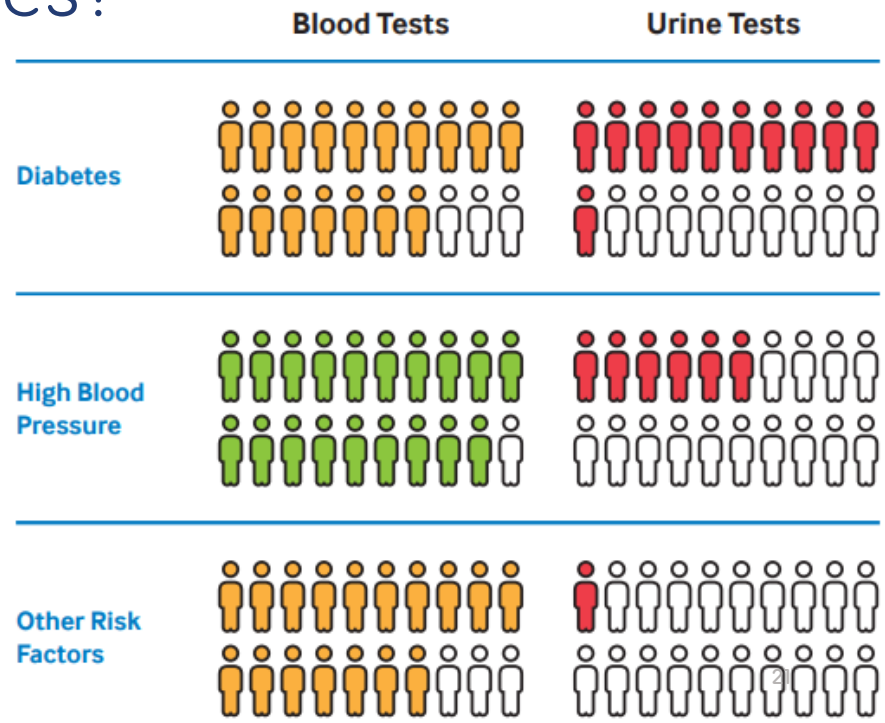
- 75M, obstructive uropathy, hypertension, farmer

- **eGFR 14, uACR 0.3 mg/mmol:** AKC care, AVF formed and functioning
- No associated AKC complications
- **KFRE2 2.2%**

- **Three years on, eGFR 15.....**
- Did he need an AVF?
- Would we be brave enough to d/c from AKC OP?

Specific Questions for AKC KFRE

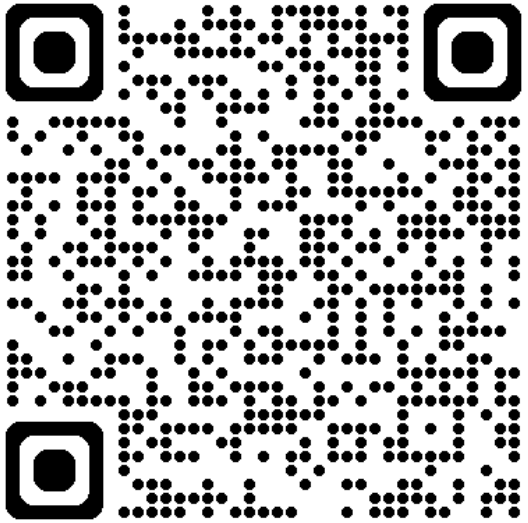
- Do we still measure uACR in AKC? If you wanted to implement KFRE will you be able to systemically increase measurement rate?
- How do we interpret in context of AKI episodes?
- Is 40% threshold right for **your centre?**



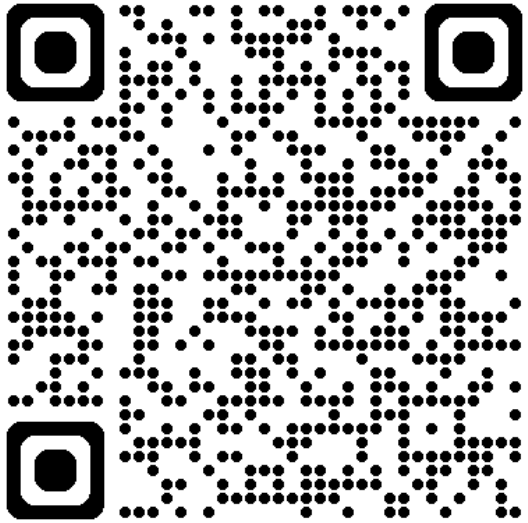
42% of people in England with CKD 3a-5 had an ACR recorded in 2023
National CKD Audit - https://www.lshtm.ac.uk/files/ckd_audit_report.pdf

Counselling regarding risk with Patients

NICE NG197: “Shared decision making”



Youtube video: KFRE



UK KFRE Implementation Group

- Sub-group of CKD SIG
- Primary and secondary care working group co-ordinated by UK Kidney Association and with patient representation
- Support for implementation locally and nationally
- Work focused on primary-secondary care interface at present, but very happy to hear ideas around AKC
- **If you are interested in support for your implementation or wish to join the group please contact fay.passey@ukkidney.org**

KDIGO Summary

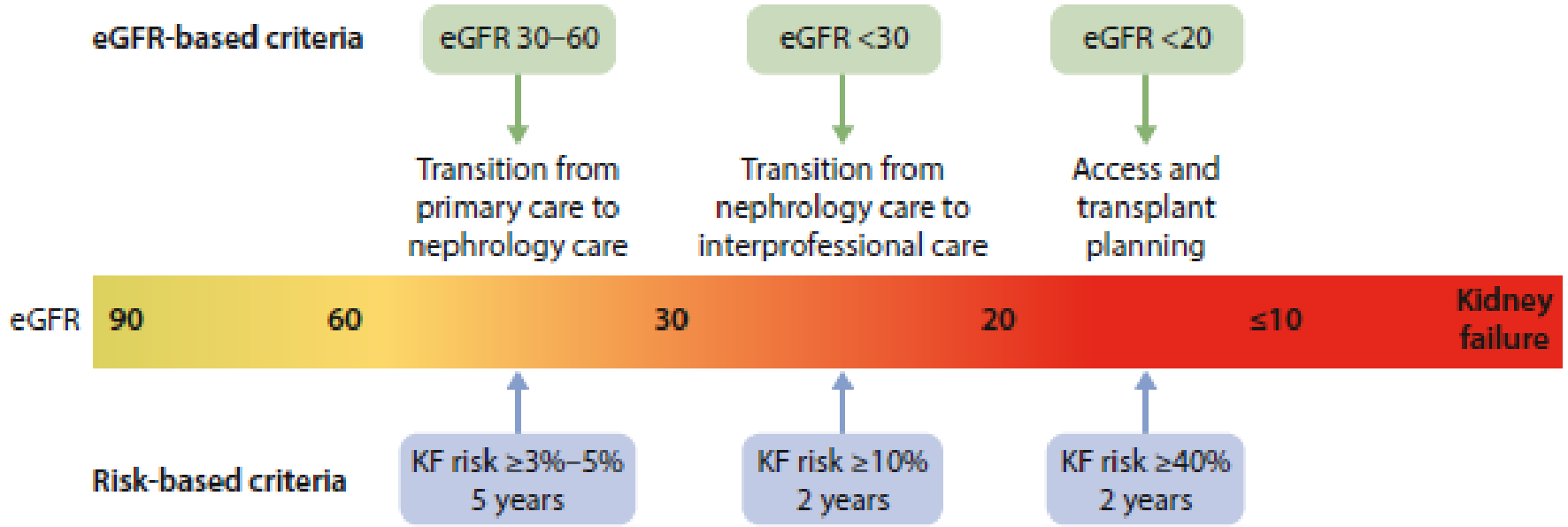


Figure 15 | Transition from an estimated glomerular filtration rate (eGFR)-based to a risk-based approach to chronic kidney disease care. KF, kidney failure.

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Further References

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