

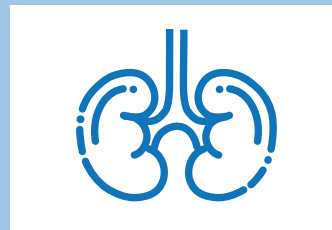
# TYPE 2 DIABETES AND DIABETIC KIDNEY DISEASE



It is predicted that **5 million** people in the UK will have type 2 diabetes (T2DM) by 2025<sup>1</sup>



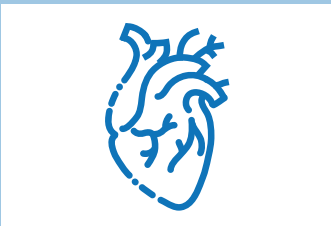
Chronic Kidney Disease (CKD) refers to kidney disease of any aetiology, including non-diabetes related causes



Diabetic nephropathy or diabetic kidney disease (DKD) is characterised by gradually increasing urine albumin excretion over many years<sup>2</sup>



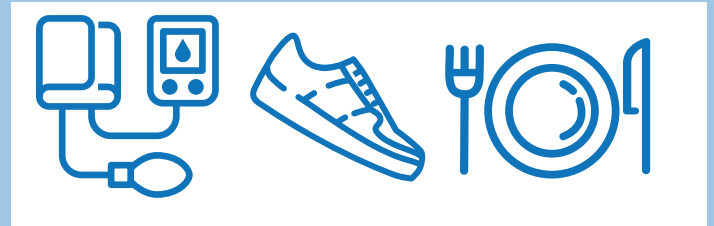
**50%** of people with diabetes will develop chronic kidney disease, between **20 to 40%** of these people have diabetic kidney disease<sup>3</sup>



Patients with DKD have **exceptionally high rates** of cardiovascular morbidity and mortality and are more likely to die from CVD than progress to ESRD<sup>4</sup>



Kidney failure in people with T2DM in the UK costs an estimated **£379 million** (2010-11). This cost is expected to rise to **£635 million** by 2036-6<sup>5</sup>

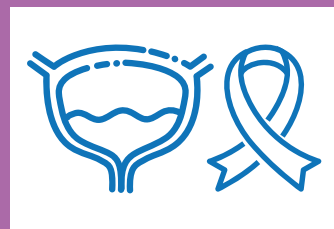


The care of people with T2DM and DKD encompasses:

- Glycaemic, blood pressure and lipid management
- Lifestyle and physical activity, smoking cessation, the renal and diabetes diet, regular foot assessment, and aspirin to reduce cardiovascular risk<sup>6</sup>



The diagnosis of stages of DKD are assessed using 2 methods: **eGFR** and **urinary albumin creatinine ratio (UACR)**



The measurement of UACR can add to the evidence base when considering if the individual has developed kidney disease as a result of their T2DM or not



UACR detects damage earlier than eGFR. Albuminuria occurs gradually over many years, in conjunction with slowly rising blood pressure and declining eGFR.



**38%** of patients with T2DM haven't had a UACR test within the last year<sup>7,8</sup>

# CLASSIFICATION

Prognosis of CKD by GFR and albuminuria categories<sup>8</sup>:

GFR categories (mL/min/1.72 m <sup>2</sup> ) Description and range	GFR categories		Persistent albuminuria categories - Description and range		
	G1	G2	A1	A2	A3
G1	Normal or high	≥90	Normal to mildly increased <30 mg/g <3 mg/mmol	Moderately increased 30-300 mg/g 3-30 mg/mmol	Severely increased >300 mg/g >30 mg/mmol
G2	Mildly decreased	60-89	Low risk	Increased risk	High risk
G3a	Mildly to moderately decreased	45- 59	Low risk	Increased risk	High risk
G3b	Moderately to severely decreased	30- 44	Increased risk	High risk	Very high risk
G4	Severely decreased	15-29	High risk	Very high risk	Very high risk
G5	Kidney failure	<15	Very high risk	Very high risk	Very high risk

**⚠ When reviewing this table consider: An individual with G1-A3 has the same same risk as G3b-A1 so eGFR alone will not detect kidney damage early therefore it is vital that eGFR and UACR are completed.**

## IMPORTANT ISSUES RELATING TO TESTS

### eGFR

- Blood test as part of U&Es
- Report depends on assay (Result should show actual number not just > 60 mL/min)
- Person needs to be well hydrated
- Advise low protein meal night before test

### UACR

- ⬆ Early morning urine sample - **if no sample is brought a random can be used for the initial assessment. If sample shows a raised UACR repeat as for early morning**
- Before any activity (including sex)
- No indication of infection (Check prior to sending to lab)

## THE SIGNIFICANCE OF UACR AND EGFR:

- ⬆ Increased UACR is associated with increased adverse outcomes
- ⬇ Decreased eGFR is associated with an increased risk of adverse outcomes
- ⬆⬇ Increased UACR and decreased eGFR multiplies the risk of adverse outcomes
- ⌚ The UACR should be tested annually and more often depending on latest eGFR and UACR

## ⚠ CAUTION!

The eGFR equation is only an estimate & is **not** accurate for use in:

- Children
- Acute renal failure
- Pregnancy
- Malnourished patients - For adults 90% of GFRs estimated by change to Modification of Diet in Renal Disease are accurate to within 30% of true value<sup>9,10</sup>
- Muscle wasting disease states - (N.B. reduced muscle mass will lead to overestimation and increased muscle mass to underestimation of the GFR)
- Oedematous states
- Amputees

## POTENTIAL CAUSES OF CHRONIC KIDNEY DISEASE<sup>11</sup>

➤ Type 1 or type 2 diabetes
➤ Recurrent urine infection
➤ Hypertension
➤ Interstitial nephritis
➤ Glomerulonephritis
➤ Autosomal dominant polycystic kidney disease (ADPKD)
➤ Prolonged obstruction of the urinary tract, from conditions such as enlarged prostate, kidney stones and some cancers
➤ Vesicoureteral reflux, where urine is forced backed into the kidneys when the bladder contracts
➤ Prolonged use of specific medications including non steroidal anti-inflammatory agents (NSAIDs) calcineurin inhibitors, lithium and, NSAIDs

## REFERENCES

1. Diabetes UK (2020) Facts and Figures <https://www.diabetes.org.uk/professionals/position-statements-reports/statistics> (accessed 26/11/25)
2. Marshall S and Flyvberg A in Holt et al (2024) Textbook of diabetes 6th Ed Chapter 39 Wiley; London
3. Yang et al (2019) A differential diagnosis model for diabetic nephropathy and non-diabetic renal disease in patients with type 2 diabetes. Diabetes metabolic Syndrome, 121963-1972.
4. Morales, J, Handelsman, Y. Cardiovascular Outcomes in Patients With Diabetes and Kidney Disease: JACC Review Topic of the Week. JACC. 2023 Jul, 82 (2) 161-170 <https://doi.org/10.1016/j.jacc.2023.04.052>
5. Hex N, Bartlett C, Wright D, Taylor M, Varley D. Estimating the current and future costs of Type 1 and Type 2 diabetes in the UK, including direct health costs and indirect societal and productivity costs. Diabet Med. 2012 Jul;29(7):855-62. doi: 10.1111/j.1464-5491.2012.03698.x. PMID: 22537247.
6. Chronic kidney disease: assessment and management. NICE guideline Reference number: NG203 Published: 25 August 2021 Last updated: 24 November 2021 (accessed 26/11/25)
7. National Diabetes Audit. RReport 1: Care Processes and Treatment Targets 2019 - 20. Full Report (accessed 26/11/25). <https://digital.nhs.uk/data-and-information/publications/statistical/national-diabetes-audit/report-1-care-processes-and-treatment-targets-2019---20>
8. KDIGO-2024-CKD-Guideline.pdfKDIGO – KIDNEY DISEASE | IMPROVING GLOBAL OUTCOMES <https://kdigo.org/wp-content/uploads/2024/03> (accessed 25/11/25)
9. About eGFRUK Kidney Association. <https://kdigo.org/guidelines/ckd-evaluation-and-management> (accessed 25/11/25)
10. [https://www.kidney.org/professionals/KDOQI/gfr\\_calculatorPed](https://www.kidney.org/professionals/KDOQI/gfr_calculatorPed) (accessed 25/11/25)
11. Chronic kidney disease - Symptoms and causes. Mayo Clinic [https://www.mayoclinic.org/diseases-conditions/chronic-kidney-disease/symptoms-causes/syc-20354521?ved=2ahUKEwille3ls6SRAXW-VEEAHWatEJQQFnoECACQAQ&usq=AovVaw3aKCr8\\_FyAeXtU-ubV3wI](https://www.mayoclinic.org/diseases-conditions/chronic-kidney-disease/symptoms-causes/syc-20354521?ved=2ahUKEwille3ls6SRAXW-VEEAHWatEJQQFnoECACQAQ&usq=AovVaw3aKCr8_FyAeXtU-ubV3wI)