

Promoting kidney health in people with type 2 diabetes: part 1

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ABSTRACT

The incidence of chronic kidney disease is increasing internationally with risk factors for the condition being the same as those for type 2 diabetes. It is important therefore for nurses to use primary, secondary and tertiary prevention to minimise the incidence of chronic kidney disease when caring for individuals with type 2 diabetes. This article is the first of a two-part series on the interrelationship between these long-term conditions. This article, part 1, addresses the significance of primary prevention in promoting kidney health in adults living with type 2 diabetes, while part 2 will discuss the use of secondary and tertiary prevention relevant to these long-term conditions.

Key words: Health promotion ■ Primary prevention ■ Type 2 diabetes ■ Chronic kidney disease ■ Cardiovascular disease ■ Education

This article will examine the strong interconnection between chronic kidney disease (CKD) and type 2 diabetes and the importance of promoting kidney health. First, it will describe CKD and type 2 diabetes along with their prevalence. It will then discuss the importance of primary preventive measures and provide examples to assist nurses and other multidisciplinary team members in primary or community care as well as those in secondary or hospital care settings to promote kidney health with adults living with type 2 diabetes. Diabetes is known to be independently associated with CKD as well as cardiovascular disease (CVD) so is known as a triple threat (Banerjee and Panas, 2017).

It is important to be mindful of the interrelationship between these long-term conditions. Promoting kidney health is relevant to not only diabetic health but also heart health. Nurses should take every opportunity to work with individuals to educate and empower them to make informed and active choices surrounding their health outcomes and life goals while living daily with these long-term conditions (Murphy and Byrne, 2022a; 2022b).

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Definitions and prevalence of chronic kidney disease and type 2 diabetes

CKD is described as abnormalities in kidney function or structure, present in individuals for >3 months in or those with an estimated glomerular filtration rate (eGFR) of <60 ml/min/1.73m² on at least two occasions, 90 days apart (with or without markers of kidney damage) (Kidney Disease: Improving Global Outcomes CKD Work Group (KDIGO), 2013; National Institute for Health and Care Excellence (NICE), 2021; United Kingdom Kidney Association (UKKA), 2022).

Individuals with CKD can be categorised according to the cause, the eGFR or the level of kidney function along with the quantity of protein present in urine.

This information outlines the foundation of CKD staging, which is beneficial for organising follow-up and management. The higher the stage (G1 to >G5) and the greater the amount of protein identified in the urine albumin-to-creatinine ratio (ACR) (stages of albuminuria): A1 to >A3, the more 'severe' the CKD (*Figure 1*) (KDIGO, 2013; NICE, 2021; UKKA, 2022).

The individual at stage G5 has what is commonly known as kidney failure or end-stage kidney disease. This is where they require kidney replacement therapy, which can be haemodialysis, peritoneal dialysis or kidney transplant, to survive. There is also the option of conservative management.

NICE (2021) adapted the international KDIGO (2013) clinical practice guidelines for the evaluation and management of CKD; instead of using a modified traffic light system from green to red, they classified the risk of adverse outcomes in adults according to their eGFR and ACR category. An increased ACR on its own is associated with increased risk of adverse outcomes, as is a lower GFR; together, they magnify the risk of adverse outcomes (NICE, 2021).

CKD is the 12th leading cause of death and substantially impacts on morbidity and mortality; it has an international incidence of 9.1% (Bikbov et al, 2020). The incidence of CKD and use of kidney replacement therapy continue to grow (Bikbov et al, 2020). This increase has grown partially due to the upsurge in obesity and type 2 diabetes, which are risk factors associated with CKD and CVD. CKD is more predominant in older people, women, ethnic minorities and those with hypertension, CVD and diabetes (Kovesdy, 2022). People from Black African, African Caribbean and South Asian (Indian, Pakistani, Bangladeshi) backgrounds are at a higher risk of developing type 2 diabetes from a younger age (Diabetes UK, 2023a).

Glomerular filtration rate (ml/min/1.73m ²) categories Description and range			Albuminuria categories Description and range		
			A1	A2	A3
			Normal to mildly increased	Moderately increased	Severely increased
			<30mg/g <3mg/mmol	30–299mg/g 3–29mg/mmol	≥300mg/g ≥30mg/mmol
G1	Normal or high	≥90			
G2	Mildly decreased	60–90			
G3a	Mildly to moderately decreased	45–59			
G3b	Moderately to severely decreased	30–44			
G4	Severely decreased	15–29			
G5	Kidney failure	<15			

Green=low risk (if no other markers of kidney disease, no CKD); yellow=moderately increased risk; orange=high risk; red=very high risk; GFR=glomerular filtration rate

Source: Kidney Disease: Improving Global Outcomes CKD Work Group, 2013

Figure 1. Prognosis of chronic kidney disease by glomerular filtration rate and albuminuria categories

Table 1. Functional and structural criteria for kidney diseases and disorders				
	Acute kidney injury	Acute kidney disease	Chronic kidney disease	Non-kidney disease
Duration	Within 7 days	<3 months	>3 months	
Functional criteria	Increase in SCr by 50% within 7 days or Increase in SCr by 0.3mg/dl (26.5µmol/l) within 2 days or Oliguria for >6 hours	Acute kidney injury or GFR <60ml/min/1.73m ² or Decrease in GFR by>35% or Increase in SCR by >50%	GFR <60ml/min/1.73m ²	GFR >60ml/min/1.73m ²
and/or		and/or	and/or	and
Structural criteria	Not defined	Marker of kidney damage (albuminuria, haematuria or pyuria are most common)	Marker of kidney damage (albuminuria is most common)	No kidney damage

GFR: glomerular filtration rate; SCr=serum creatinine

Source: Lameire et al, 2021

It is important to recognise kidney disease as a broad spectrum of conditions and classifications depending upon presentation, including acute kidney injury, acute kidney disease, CKD and non-kidney disease (a recognised functional

and structural criteria for kidney diseases and disorders) (Table) (Lameire et al, 2021).

The International Diabetes Federation (IDF) (2021) has estimated that more than half a billion people (aged 20–79 years) are living with diabetes worldwide. This equates to more than 10.5% of the adult population globally with this long-term condition. This figure is anticipated to reach 643 million by 2030, and 783 million by 2045 (IDF, 2021). In the UK, the number of individuals living with diabetes has surpassed five million (Diabetes UK, 2023b).

Diabetes mellitus, more simply called diabetes, is a significant long-term condition that arises from the body’s inability to produce any or sufficient of the hormone insulin or is unable to essentially use the insulin made. It is likely that there are 240 million adults with undiagnosed diabetes globally. Most of these individuals (>90%) are living in low- and middle-income countries. There were approximately 6.7 million people (age range 20–79 years) worldwide in 2021 estimated to have died because of diabetes or its complications. Type 2 diabetes is the more common and accounts for over 90% of all diabetes globally (IDF, 2021).

Type 2 diabetes can impact kidney function, with individuals experiencing a combination of complications including diabetic kidney disease (also known as diabetic nephropathy), renovascular disease and urinary tract infections (Murphy and Apuzzo, 2021). Diabetic kidney disease is typically diagnosed in individuals with enduring diabetes (>10 years) with albuminuria and/or decreased eGFR but no other signs or symptoms of the other main causes of kidney damage (Leehey and Moinuddin, 2023).

Type 2 diabetes contributes to both microvascular disease (eg retinopathy, nephropathy, neuropathy, foot ulcers and amputations) and macrovascular disease (eg CVD and cardiovascular events including myocardial infarction, stroke, ischaemia, arrhythmia and heart failure). Individuals with diabetes and CKD are also at increased risk of acute diabetes-associated complications (hypoglycaemia and diabetic ketoacidosis) and premature mortality. Nearly 50% of individuals with type 2 diabetes will develop diabetic kidney disease, which is the main cause of CKD or end-stage kidney disease. CVD is one of the foremost causes of morbidity and mortality in individuals with type 2 diabetes and CKD (de Boer et al, 2022; Forst et al, 2022; Hahr and Molitch, 2022; Rossing et al, 2022).

Primary prevention

Primary prevention refers to measures assumed by individuals to avoid onset of illness or injury before development of the disease and related health impacts (Karunathilake and Ganegoda, 2018). There are common risk factors for CKD and type 2 diabetes such as CVD, age, smoking, ethnicity, being overweight or obese and social deprivation.

This means that preventive measures are relevant and appropriate, especially primary prevention (Ameh et al, 2020), along with the promotion of kidney, diabetic and heart health. Nurses play a key role in these preventive strategies, which are directed at influencing predisposed behavioural patterns including promotion of healthy lifestyle choices involving

avoidance of smoking and alcohol, dietary salt restriction for prevention of hypertension and adopting healthy eating to minimise risks of obesity and increased physical activity (Ameh et al, 2020; Apuzzo and Murphy, 2021).

Smoking

Smokers with diabetes have increased risks of CVD, premature mortality, microvascular complications and poor glycaemic control than non-smokers with diabetes (Campagna et al, 2019; Brown, 2021).

All guidelines endorse smoking cessation (NICE, 2021; 2022; 2023; Davies et al, 2022; de Boer et al, 2022). The use of pharmacological support such as nicotine replacement therapy should be led by the individual. The use of e-cigarettes remains contentious with regards to CVD risk (Stewart et al, 2017). Farsalinos et al (2014) reported that nearly 42% of respondents ($n=574$) who had diabetes and regularly used e-cigarette said diabetes control had improved after they changed from conventional cigarettes to e-cigarettes. However, further studies are needed to validate these initial results.

The 5As framework (ask, advise, assess, assist and arrange) involves: ask individuals about tobacco use; advise smokers to quit tobacco use, such as through an NHS stop smoking service; assess a smoker's readiness to quit; assist smokers to quit; and arrange follow-up (Brown, 2021; Visseren et al, 2021; Bays et al, 2022). The 5Rs (relevance, risks, rewards, roadblocks and repetition) are a short motivational intervention and can also be used if there is more time with the individual concerned and if they remain unsure about attempting to quit. Relevance is how pertinent stopping smoking is to them, risks concern the potential dangers of sustaining smoking, rewards are about the benefits of stopping smoking, and roadblocks concern difficulties expected. The final R, repetition, is where the individual is 'asked again if they are ready to quit' (World Health Organization, 2014; Brown, 2021).

Nurses should advise individuals about self-help tools that could assist them with smoking cessation, including online resources and mobile phone-based interventions (Formanek et al, 2018); examples include Quit Smoking from the Health Service Executive in Ireland (<https://www2.hse.ie/living-well/quit-smoking/>) and the Quit Smoking App (Nicorette).

Alcohol

NICE (2023) sets out information on recommended alcohol limits and the possible influence of alcohol on diabetes and its management. There is no 'best' alcoholic drink for people with diabetes, but they should be advised so that they can opt for the types of drinks that are best for them. Low-sugar beers and ciders should be avoided as these can contain more alcohol, as should low-alcohol wine, which can contain more sugar. There can be extensive calories in different types of alcoholic drinks, which can cause weight gain (Diabetes UK, 2022; NICE, 2022; 2023).

People with type 2 diabetes should be advised to preferably eat a carbohydrate-type snack before and after drinking alcohol. They should be educated that alcohol can aggravate or extend the hypoglycaemic impact of insulin and other diabetic medications such as sulphonylureas. The signs of hypoglycaemia

can become less noticeable, and protracted hypoglycaemia could present for several hours following alcohol consumption. Nurses need to remind people living with diabetes to stay hydrated after drinking alcohol and during the following day, especially if their blood glucose levels are low.

Symptoms of hypoglycaemia are similar to those of a hangover, so blood glucose levels need to be monitored and any episodes of hypoglycaemia managed immediately. Sick-day guidance should be used if necessary.

Individuals should wear or carry some type of identification such as a Medic Alert bracelet, necklace or watch (available from www.medicalert.org.uk) as there can be confusion between hypoglycaemia and alcohol intoxication (Diabetes UK, 2022; NICE, 2022; 2023).

Nutrition

Good nutrition is relevant in promoting kidney and heart health and remains an essential component in overall diabetes management (Bays et al, 2022; ElSayed et al, 2023a). A healthful nutrition plan is best developed in a collaborative process of shared decision-making between the individual concerned and specialist dietitians and nurses using evidenced-based dietary patterns.

Nurses need to consider an individual's social background, access to and cost of healthy foods, cultural background, health literacy and numeracy, and willingness and ability to make behavioural changes. Nurses must also review the individual's nutritional goals as dictated by their current health status including hyperglycaemia, hypertension, dyslipidaemia and obesity (Evangelidis et al, 2019; Sikand and Severson, 2020; Bays et al, 2022; ElSayed et al, 2023a).

The adoption of a Mediterranean diet has shown larger reductions in weight and HbA1c levels, delayed requirements for diabetes medication and benefits for cardiovascular health. Individuals should be encouraged to eat healthy foods and reduce those known to be detrimental (Visseren et al, 2021; Davies et al, 2022). Dietary guidelines recommend the consumption of vegetables, fruits, whole grains, fat-free or low-fat dairy products, healthy fats to reduce cholesterol and protect the heart such as monounsaturated and polyunsaturated fats, including fish, poultry, lean meats, nuts, seeds, legumes and fibre. Consumption of saturated fats, ultra-processed foods and trans fats should be lowered, along with a reduction in sodium intake and avoiding foods high in cholesterol (Bays et al, 2022).

Dietary advice for CKD can be overwhelming and complex as well as restrictive in terms of sodium, protein, potassium and phosphate. The diet should be tailored and based on the individual's clinical presentation, eGFR, ACR and the applicable stage of CKD (Evangelidis et al, 2019).

Clinical practice guidelines on undernutrition in CKD recommends those at stages G4–G5 should be screened to recognise those at risk of this. There should be a clear nutritional pathway for timely interventions including referral to specialist renal dietitians for people who are diagnosed as undernourished. Unintentional weight loss should be monitored in those with advanced CKD, which is common as kidney disease progresses (Ali et al, 2019; Wright et al 2019).

Weight management

The consensus report on hypoglycaemia management in type 2 diabetes by the American Diabetic Association (ADA) and the European Association for the Study of Diabetes (EASD) identifies that weight loss is of equal importance to glycaemic control, CVD, heart failure and CKD. Losing weight should strengthen type 2 diabetes care (Davies et al, 2022).

Weight loss should benefit kidney health; as already noted, obesity and type 2 diabetes are among the main causes of CKD (Bays et al, 2022; Obesity Medicine Association, 2023). Even moderate weight loss (about 3–7% of baseline weight) improves glycaemia and other intermediary cardiovascular risk factors (Davies et al, 2022).

The diabetes remission extended clinical trial (DiRECT) highlighted that type 2 diabetes remission is possible for some individuals through diet-generated weight loss and it is feasible to remain in remission with an average loss of 6.1 kg over 5 years. Participants in the intervention group found greater improvements in blood pressure and blood glucose levels, and had less requirements for medications than the control group (Diabetes UK, 2023c).

It is difficult for individuals who are overweight and obese (including those with abdominal obesity) to lose weight and maintain the relevant weight loss. Since obesity is a multifactorial disease, a multifactorial approach should be used, including nutrition, physical activity and smoking cessation, as applicable, along with optimal control of blood glucose levels, blood pressure and blood lipids. Further multifactorial methods include motivational interviewing, behaviour modification, pharmacotherapy and, potentially, bariatric surgery (Bays et al, 2022; Obesity Medicine Association, 2023).

Fluid intake

People with diabetes have an increased risk of dehydration as hyperglycaemia reduces hydration in the body (Diabetes.co.uk, 2019). Severe dehydration could also cause acute kidney injury. Individuals who present with a history of diarrhoea, vomiting, use of diuretics or hypernatraemia should prompt nurses to consider a diagnosis of dehydration during a clinical assessment.

Good sick-day guidance should be used, for example omitting medications such as sodium glucose co-transporter-2 inhibitors in individuals who are unwell (Herrington et al 2021). Drinking fruit juices or other sugary fluids or fizzy drinks should be avoided in those with diabetes who are dehydrated and where this is accompanied by hyperglycaemia (Diabetes.co.uk, 2019; Diabetes UK, 2020).

Daily fluid intake will vary depending upon the individual's clinical situation. Those who are experiencing advanced stages of CKD and near dialysis dependency would be on a stricter reduced fluid intake depending upon their eGFR, ACR, clinical presentation and assessment. This would also apply to those with heart failure who need tailored fluid restriction, again based on clinical presentation and assessment.

People with acute kidney injury could later go on to develop CKD. This could potentially be avoided if those who are predisposed to acute kidney injury, such as older people and

those with diabetes, heart failure or pre-existing kidney problems, were identified and managed in a timely manner (Murphy and Byrne, 2022a; 2022b).

Physical activity and exercise

There is an inverted relationship between moderate-to-vigorous physical activity and all-cause mortality, cardiovascular morbidity, and prevalence of type 2 diabetes (Visseren et al, 2021); activity also improves glycaemic control (Davies et al, 2022). Clinical practice guidelines for exercise and lifestyle in CKD recommend that some physical activity is better than none.

People should strive to accumulate 150 minutes of moderate-intensity aerobic activity weekly, building up gradually from their current levels. The benefits of physical activity or exercise include improvements in blood pressure, physical function and ability, and a better health-related quality of life. It could enhance mental wellbeing, including reducing symptoms of anxiety and depression (Baker et al, 2022).

The ADA/EASD consensus report (Davies et al, 2022) and ADA standards of care in diabetes 2023 (ElSayed et al, 2023b) highlight the importance of physical activity, which should be a crucial part of type 2 diabetes management. The 5S framework (stepping, sitting/breaking up prolonged sitting, sweating, strengthening and sleep) addresses the relevance of 24-hour physical behaviour to cardiometabolic health in individuals living with type 2 diabetes. Stepping involves any increase in steps; as few as 500 per day can result in a small reduction in cardiovascular morbidity. Sitting should be limited, so lengthy periods of sitting should be broken every 30 minutes with short consistent sessions of slow walking or basic resistance exercise, which can enhance glucose metabolism. Sweating with moderate to vigorous physical activity should be encouraged ideally for ≥ 150 minutes per week but even as little as 30 minutes a week improves metabolic profiles. Strengthening with resistance exercises improves insulin sensitivity and glucose levels. It is vital that individuals aim for constant, uninterrupted sleep, including on weekends, as disruption to sleep negatively influences HbA1c levels (Davies et al, 2022).

Strict pharmacotherapy evaluation

Drugs prescribed to individuals living with type 2 diabetes are relevant if any of them are nephrotoxic and could damage the kidneys and kidney health. Careful evaluation of an individual's pharmacotherapy is needed when prescribing nephrotoxic drugs in both primary and secondary care.

Before any drug is prescribed, the dosage should be evaluated according to its pharmacodynamic and pharmacokinetic characteristics and issues such as age, eGFR and liver function should be taken into account to avoid drug toxicity (Table 2). There needs to be continual evaluation to offset any potential damage to kidneys should a nephrotoxic drug become necessary. Duration and doses could be minimised and therapeutic levels monitored if feasible and beneficial, along with reviews of concurrent drugs being administered to identify any interactions from a nephrotoxic perspective (Musso et al, 2020; NICE, 2019).

There are a number of blood glucose-lowering therapies

that are contraindicated in people with diabetic kidney disease with diabetes-associated complications. There should also be caution when using groupings of drugs identified to manage diabetes in adults who have CKD. This would be in addition to the existing guidance for prescribing in renal impairment consistent with the lowest eGFR for a specified drug (Association of British Clinical Diabetologists and Renal Association, 2021).

Conclusion

This article has discussed the relevance of primary prevention in promoting kidney health in individuals living with type 2 diabetes. It has also addressed the importance of cardiovascular concerns and the strong interrelationship that this has with type 2 diabetes along with CKD.

National and international best practice guidelines emphasise the importance of promoting healthy lifestyles, including smoking cessation, alcohol reduction, maintaining a healthy diet, weight management, physical activity and exercise along with strict pharmacotherapy evaluation. These are all relevant to promoting kidney health along with diabetic health and heart health.

Part two of this series will develop further the concept of promoting kidney health using secondary and tertiary preventive measures in those living with type 2 diabetes. **BJN**

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Ali S, Dave N, Virani SS, Navaneethan SD. Primary and secondary prevention of cardiovascular disease in patients with chronic kidney disease. *Curr Atheroscler Rep.* 2019;21(9):32. <https://doi.org/10.1007/s11883-019-0794-6>

Ameih OI, Ekrikpo UE, Kengne AP. Preventing CKD in low- and middle-income countries: a call for urgent action. *Kidney Int Rep.* 2020;5(3):255–262. <https://doi.org/10.1016/j.ekir.2019.12.013>

Apuzzo L, Murphy F. Cardiovascular risk in chronic kidney disease. In: Drahn A (ed). *Chronic kidney disease (stages 1–3). A guide for nurses.* Hergiswil, Switzerland: European Dialysis and Transplant; 2021

Association of British Clinical Diabetologists, Renal Association. ABCD and Renal Association clinical practice guidelines for management of hyperglycaemia in adults with diabetic kidney disease (DKD) 2021. <https://tinyurl.com/2twff7b2> (accessed 2 October 2023)

Baker LA, March DS, Wilkinson TJ et al. Clinical practice guideline exercise and lifestyle in chronic kidney disease. *BMC Nephrol.* 2022;23(1):75. <https://doi.org/10.1186/s12882-021-02618-1>

Banerjee S, Panas R. Diabetes and cardiorenal syndrome: understanding the 'triple threat'. *Hellenic J Cardiol.* 2017;58(5):342–347. <https://doi.org/10.1016/j.hjc.2017.01.003>

Bays HE, Kulkarni A, German C et al. Ten things to know about ten cardiovascular disease risk factors—2022. *Am J Prev Cardiol.* 2022; 10:100342. <https://doi.org/10.1016/j.ajpc.2022.100342>

Bikbov B, Purcell CA, Levey AS et al; GBD Chronic Kidney Disease Collaboration. Global, regional, and national burden of chronic kidney disease, 1990–2017: a systematic analysis for the Global Burden of Disease Study 2017. *Lancet.* 2020;395(10225):709–733. [https://doi.org/10.1016/S0140-6736\(20\)30045-3](https://doi.org/10.1016/S0140-6736(20)30045-3)

Brown P. How to help people with diabetes stop smoking. *Diabetes & Primary Care.* 2021;23(1):13–14. <https://tinyurl.com/3tcwzxtt> (accessed 25 September 2023)

Campagna D, Alamo A, Di Pino A et al. Smoking and diabetes: dangerous liaisons and confusing relationships. *Diabetol Metab Syndr.* 2019;11(1):85. <https://doi.org/10.1186/s13098-019-0482-2>

Davies MJ, Aroda VR, Collins BS, et al. Management of hyperglycemia in type 2 diabetes, 2022. A consensus report by the American Diabetes Association (ADA) and the European Association for the Study of Diabetes (EASD). *Diabetes Care.* 2022;45(11):2753–2786. <https://doi.org/10.2337/dci22-0034>

de Boer IH, Khunti K, Sadusky T et al. Diabetes management in chronic kidney disease: a consensus report by the American Diabetes Association (ADA) and Kidney Disease: Improving Global Outcomes (KDIGO).

Table 2. Examples of commonly prescribed medications that can be nephrotoxic to the kidneys

Non-steroidal anti-inflammatory drugs	<ul style="list-style-type: none"> ■ Ibuprofen ■ Naproxen ■ Diclofenac
Diuretics	<ul style="list-style-type: none"> ■ Furosemide ■ Potassium-sparing/thiazide diuretic
Antibiotics	<ul style="list-style-type: none"> ■ Aminoglycosides antibiotics (gentamicin, amikacin, tobramycin, neomycin and streptomycin)
Anti-hypertensives	<ul style="list-style-type: none"> ■ Angiotensin-converting enzyme inhibitors ■ Angiotensin receptor blockers
Chemotherapeutic	<ul style="list-style-type: none"> ■ Cisplatin ■ Methotrexate
Immunotherapy	<ul style="list-style-type: none"> ■ Bevacizumab ■ Ramucirumab
Proton-pump inhibitors	<ul style="list-style-type: none"> ■ Omeprazole
Calcineurin Inhibitors	<ul style="list-style-type: none"> ■ Cyclosporin ■ Tacrolimus
Iodinated contrast media	

Source: Ghane ShahrbaF and Assadi, 2015

Diabetes Care. 2022;45(12):3075–3090. <https://doi.org/10.2337/dci22-0027>

Diabetes.co.uk. Dehydration and diabetes. 2019. <https://www.diabetes.co.uk/dehydration-and-diabetes.html> (accessed 25 September 2023).

Diabetes UK. Diabetes when you're unwell. 2020. <https://tinyurl.com/2p8j4vdk> (accessed 25 September 2023)

Diabetes UK. Alcohol and diabetes. 2022. <https://tinyurl.com/54fafpcz> (accessed 25 September 2023)

Diabetes UK. Ethnicity and type 2 diabetes. 2023a. <https://tinyurl.com/2jmc2t7v> (accessed 2 October 2023)

Diabetes UK. Number of people living with diabetes in the UK tops 5 million for the first time. 2023b. <https://tinyurl.com/mrjzwy4y> (accessed 25 September 2023)

Diabetes UK. Weight loss can put type 2 diabetes into remission for at least 5 years, direct study reveals. 2023c. <https://tinyurl.com/5n6pe5uf> (accessed 25 September 2023)

ElSayed NA, Aleppo G, Aroda VR et al; for the American Diabetes Association. 5. Facilitating positive health behaviors and well-being to improve health outcomes: standards of care in diabetes—2023. *Diabetes Care.* 2023a; 46(Suppl 1):S68–S96. <https://doi.org/10.2337/dc23-S005>

ElSayed NA, Aleppo G, Aroda VR et al; for the American Diabetes Association. Summary of revisions: Standards of Care in Diabetes—2023. *Diabetes Care.* 2023b;6(suppl 1):S5–S9. <https://doi.org/10.2337/dc23-Srev>

Evangelidis N, Craig J, Bauman A, Manera K, Saglimbene V, Tong A. Lifestyle behaviour change for preventing the progression of chronic kidney disease: a systematic review. *BMJ Open.* 2019;9(10):e031625. <https://doi.org/10.1136/bmjopen-2019-031625>

Farsalinos KE, Romagna G, Tsiapras D et al. Characteristics, perceived side effects and benefits of electronic cigarette use: a worldwide survey of more than 19,000 consumers. *Int J Environ Res Public Health.* 2014;11(4):4356–4373. <https://doi.org/10.3390/ijerph110404356>

Formanek P, Salisbury-Afshar E, Afshar M. Helping patients with ESRD and earlier stages of CKD to quit smoking. *Am J Kidney Dis.* 2018;72(2):255–266. <https://doi.org/10.1053/j.ajkd.2018.01.057>

Forst T, Mathieu C, Giorgino F et al. New strategies to improve clinical outcomes for diabetic kidney disease. *BMC Med.* 2022;20(1):337. <https://doi.org/10.1186/s12916-022-02539-2>

Ghane ShahrbaF, Assadi F. Drug-induced renal disorders. *J Renal Inj Prev.* 2015;4(3):57–60. <https://doi.org/10.12861/jrip.2015.12>

Hahr AJ, Molitch ME. Management of diabetes mellitus in patients with CKD: core curriculum 2022. *Am J Kidney Dis.* 2022;79(5):728–736. <https://doi.org/10.1053/j.ajkd.2021.05.023>

KEY POINTS

- The role of the nurse is paramount in primary prevention
- Promoting a healthy lifestyle is important to avert or minimise the impact of type 2 diabetes and chronic kidney disease
- Type 2 diabetes, chronic kidney disease and cardiovascular disease are strongly interconnected
- Promoting kidney health is relevant not just to diabetic health but also to heart health

CPD reflective questions

- Consider why individuals with type 2 diabetes are at higher risk of developing chronic kidney disease
- Identify what primary preventive measures you use when promoting kidney health with individuals living with type 2 diabetes
- Reflect upon the challenges that individuals may face trying to adapt to a healthy lifestyle

Herrington WG, Frankel AH, Wonnacott A et al; for the UK Kidney Association. UKKA clinical practice guideline: Sodium-glucose co-transporter-2 (SGLT-2) inhibition in adults with kidney disease. 2021. <https://tinyurl.com/4uzrzuze> (accessed 25 September 2023)

International Diabetes Federation. IDF diabetes atlas. 10th edn. 2021. <https://tinyurl.com/2uxcewa7> (accessed 25 September 2023)

Karunathilake SP, Ganegoda GU. Secondary prevention of cardiovascular diseases and application of technology for early diagnosis. *Biomed Res Int.* 2018;2018:5767864. <https://doi.org/10.1155/2018/5767864>

Kidney Disease: Improving Global Outcomes CKD Work Group. KDIGO 2012 clinical practice guideline for the evaluation and management of chronic kidney disease. *Kidney International.* 2013;3(1):supplement. <https://tinyurl.com/jdpfd6p> (accessed 25 September 2023)

Kovesdy CP. Epidemiology of chronic kidney disease: an update 2022. *Kidney Int Suppl* (2011). 2022;12(1):7–11. <https://doi.org/10.1016/j.kisu.2021.11.003>

Lameire NH, Levin A, Kellum JA et al; Conference Participants. Harmonizing acute and chronic kidney disease definition and classification: report of a Kidney Disease: Improving Global Outcomes (KDIGO) Consensus Conference. *Kidney Int.* 2021;100(3):516–526. <https://doi.org/10.1016/j.kint.2021.06.028>

Leehey DJ, Moinuddin I. Diabetic kidney disease. *BMJ Best Practice.* Updated 20 September 2023. <https://bestpractice.bmj.com/topics/en-gb/530> (accessed 25 September 2023)

Murphy F, Apuzzo L. The impact of diabetes mellitus on chronic kidney disease progression. In: Drahne A (ed). *Chronic kidney disease (stages 1–3). A guide for nurses.* Hergiswil, Switzerland: European Dialysis and Transplant Nurses Association/European Renal Care Association; 2021: 60–67

Murphy F, Byrne G. Promoting kidney health in cardiovascular disease: part one. *British Journal of Cardiac Nursing.* 2022a;17(10):1–12. <https://doi.org/10.12968/bjca.2022.0083>

Murphy F, Byrne G. Promoting kidney health in cardiovascular disease: part two. *Br J Card Nurs.* 2022b;17(12):1–11. <https://doi.org/10.12968/bjca.2022.0111>

Musso CG, Rosell C, Gonzalez-Torres H, Ordonez JD, Aroca-Martinez G. Primary prevention for acute kidney injury in ambulatory patients. *Postgrad Med.* 2020;132(8):746–748. <https://doi.org/10.1080/00325481.2020.1795484>

National Institute for Health and Care Excellence. Prescribing in renal impairment. 2019. <https://bnf.nice.org.uk/medicines-guidance/prescribing-in-renal-impairment> (accessed 25 September 2023)

National Institute for Health and Care Excellence. Chronic kidney disease: assessment and management. NICE guideline NG203. 24 November 2021. <https://www.nice.org.uk/guidance/ng203> (accessed 25 September 2023)

National Institute for Health and Care Excellence. Type 2 diabetes in adults: management. NICE guideline NG28. 29 June 2022. <https://www.nice.org.uk/guidance/ng28> (accessed 25 September 2023)

National Institute for Health and Care Excellence. Diabetes – type 2. Clinical knowledge summary. August 2023. <https://cks.nice.org.uk/topics/diabetes-type-2> (accessed 25 September 2023)

Obesity Medicine Association. Obesity algorithm. Important principles for the effective treatment of patients with obesity. 2023. <https://obesitymedicine.org/obesity-algorithm> (accessed 25 September 2023)

Rossing P, Caramori ML, Chan JCN et al. Executive summary of the KDIGO 2022 Clinical Practice Guideline for Diabetes Management in Chronic Kidney Disease: an update based on rapidly emerging new evidence. *Kidney Int.* 2022;102(5):990–999. <https://doi.org/10.1016/j.kint.2022.06.013>

Sikand G, Severson T. Top 10 dietary strategies for atherosclerotic cardiovascular risk reduction. *American Journal of Preventive Cardiology.* 2020;4:100106. <https://doi.org/10.1016/j.ajpc.2020.100106>

Stewart J, Manmathan G, Wilkinson P. Primary prevention of cardiovascular disease: a review of contemporary guidance and literature. *JRSM Cardiovasc Dis.* 2017;6. <https://doi.org/10.1177/2048004016687211>

United Kingdom Kidney Association. CKD stages. 2022. <https://tinyurl.com/mwrk6w57> (accessed 25 September 2023)

Visseren FL, Mach F, Smulders YM, et al. ESC guidelines on cardiovascular disease prevention in clinical practice: developed by the task force for cardiovascular disease prevention in clinical practice with representatives of the European Society of Cardiology and 12 medical societies with the special contribution of the European Association of Preventive Cardiology (EAPC). *Eur Heart J.* 2021;42(34):3227–3337. <https://doi.org/10.1093/eurheartj/ehab484>

World Health Organization. Toolkit for delivering the 5A's and 5R's brief tobacco interventions in primary care. 2014. <https://apps.who.int/iris/handle/10665/112835> (accessed 25 September 2023)

Wright M, Southcott E, MacLaughlin H, Wineberg S. Clinical practice guideline on undernutrition in chronic kidney disease. *BMC Nephrol.* 2019;20(1):370. <https://doi.org/10.1186/s12882-019-1530-8>

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