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SPECIAL REPORT

ABCDE to identify and prevent chronic kidney disease: a call to action

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ABSTRACT

Kidney disease is a global health priority affecting >850 million people worldwide. This number is projected to increase over the coming decades given the increasing prevalence of diabetes, hypertension and obesity and the aging population. Chronic kidney disease (CKD) can reduce both life expectancy and quality of life and is intricately linked with cardiac and metabolic health—the cardiovascular-kidney-metabolic multimorbidity syndrome. With early recognition of risk, CKD can be prevented and with timely case finding, early diagnosis and early intervention, its progression can be halted or slowed. The European Renal Association has established the Strong Kidneys Task Force, with the main purpose of creating awareness about the importance of kidney health for individual and population health. In collaboration with the European Kidney Health Alliance and the European Kidney Patients Federation, the ABCDE campaign will empower communities and individuals to remind their healthcare providers to assess their risk of kidney disease. ABCDE asks five simple questions about health status that only the healthcare system can provide: A) Do I have

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Albumin in my urine? B) What is my Blood pressure? C) What is my Cholesterol? D) Do I have Diabetes? E) What is my current kidney function (Estimated glomerular filtration rate)? This advocacy text aims to inform individuals, communities and front line healthcare workers that capturing the risk of kidney, cardiac and metabolic health is simple, makes sense, is logical and will save lives. Although making meaningful change will take time and involve major personal and societal changes, the first step really is as easy as ABCDE!

Keywords: albuminuria, chronic kidney disease, diagnosis, mortality, prevention

INTRODUCTION

Chronic kidney disease (CKD) is a major global health priority affecting >850 million people and the number of affected individuals is projected to increase rapidly over the next few decades [1, 2]. In addition, having CKD has very significant negative implications for both life expectancy and quality of life, especially as part of the increasingly recognized cardiovascular-kidney-metabolic (CKM) multimorbidity syndrome [3, 4]. These facts are increasingly accepted but it is not generally recognized that CKD can largely be prevented and its progression greatly reduced if risks are identified, CKD is diagnosed early and the right measures are instituted [5–7]. Although preventing the progression of CKD to kidney failure and the requirement for dialysis or transplantation is extremely important, any deterioration in kidney function is associated with worse outcomes and therefore preventing or slowing down any progression of CKD is also imperative. CKD poses diagnostic challenges however, not because detection is complicated, but because it is silent in its early stages and with relatively non-specific symptoms becoming apparent only when substantial kidney function has been lost [8, 9].

In recognition of the increasing importance of CKD, the European Renal Association (ERA) has established the Strong Kidneys Task Force, with the goal of raising awareness about kidney health, its relevance for well-being, its significance as a risk multiplier for people with hypertension, diabetes and cardiovascular disease (CVD) and approaches to protect against it. The aim is to empower individuals, their caregivers and their care providers with the information and knowledge needed to promote kidney health across different healthcare systems. The Strong Kidneys Task Force, in collaboration with the European Kidney Health Alliance (EKHA) and the European Kidney Patients Federation (EKPF), will utilize the power of social media to communicate these important messages to as wide an audience as possible. The ABCDE campaign is the first major initiative launched by the Strong Kidneys Task Force. This article should serve as a useful resource for all those seeking further information.

Definition of CKD

CKD is defined as an abnormality of kidney structure or function, present for a minimum of 3 months, that from early on has significant implications for health (Table 1) [10]. CKD is classified based on cause, glomerular filtration rate (GFR) category (G1–G5) and albuminuria category (A1–A3), abbreviated as CGA Table 2 [10]. There are multiple aetiologies of CKD, including genetic, congenital, systemic diseases and others that are primary. There are also multiple systems for grouping different aetiologies, and these are constantly being revised with the acquisition of new data, understanding and diagnostic tools. It is beyond the scope of this article to suggest a specific classification system for CKD causes. However, it is important to highlight that, where possible, it is important to establish the aetiology of the CKD to facilitate personalized care [10].

Table 1: Criteria required for diagnosis of CKD (either of the following must be present for at least 3 months).

Markers of kidney damage (one or more)	Albuminuria (UACR ≥30 mg/g) OR Urine sediment abnormalities OR Persistent haematuria OR Electrolyte and other abnormalities due to tubular disorders OR Abnormalities detected by histology OR Structural abnormalities detected by imaging OR History of kidney transplantation OR
Decreased GFR	GFR <60 ml/min/1.73 m^2 (GFR categories G3a–G5)

Adapted from Kidney Disease: Improving Global Outcomes CKD Work Group. KDIGO 2024 clinical practice guideline for the evaluation and management of chronic kidney disease. Kidney Int 2024;105(4S):S117–314.

The global burden of CKD

The current overall prevalence of CKD worldwide is estimated at 13.0% [11]. The prevalence is higher in those >60 years of age (19.3%) and a higher prevalence is also associated with increased body mass index, diabetes and hypertension [11]. In 2021, the ERA, the American Society of Nephrology and the International Society of Nephrology, supported by the Asian Pacific Society of Nephrology, the African Society of Nephrology, the Latin American Society of Nephrology and Hypertension and the World Heart Federation, released a statement estimating that >850 million people are living with some form of kidney disease [12, 13]. The 2024 report from the Global Burden of Diseases, Injuries, and Risk Factors Study using 2021 data shows that CKD itself (excluding cardiac deaths attributed to CKD) is the 11th leading cause of death, with 1.53 million deaths annually [14]. A further 2.1 million deaths are attributable to the excess CVD caused by CKD, making CKD the 8th level 2 risk factor for death, accounting for 3.62 million deaths in 2021 [15]. CKD is also expected to increase from the 23rd leading cause of disease burden worldwide in 2022 to 10th, and the 5th leading cause of death by 2050 [4].

Although more difficult to measure, CKD and kidney failure are associated with a very high economic burden, accounting for 22.3% (US$81.8 billion) and 7.2% (US$36.6 billion), respectively, of all fee-for-service spending in 2018 in the USA [16, 17]. European estimates show an annual societal cost of >€140 billion [18]. These calculations do not include costs due to productivity loss. The environmental burden is substantial as well, with significant production of greenhouse gasses and water and plastic waste largely because of the dialysis process in those with kidney failure [19].

Table 2: GFR and albuminuria categories in CKD.

GFR category	GFR (ml/min/1.73 m^2)	Terms
G1	>90	Normal or high
G2	60–89	Mildly decreased
G3a	45–59	Mildly or moderately decreased
G3b	30–44	Moderately or severely decreased
G4	15–29	Severely decreased
G5	<15	Kidney failure

Albuminuria category	AER (mg/24 h)	UACR (approximately equivalent)		Terms
		mg/mmol	mg/g	
A1	<30	<3	<30	Normal or mildly increased
A2	30–300	3–30	30–300	Moderately increased
A3	>300	>30	>300	Severely increased

AER: albumin excretion rate.
In the absence of evidence of kidney damage, neither G1 nor G2 fulfils the criteria for CKD.
Adapted from Kidney Disease: Improving Global Outcomes CKD Work Group. KDIGO 2024 clinical practice guideline for the evaluation and management of chronic kidney disease. Kidney Int 2024;105(4S):S117–314.

Risk of developing CKD

Hypertension and CVD, as well as diabetes and obesity, are major contributors to the global burden of CKD and are considered traditional risk factors [20, 21]. Indeed, CKM multimorbidity is becoming increasingly common [3, 22, 23]. Approximately 25–40% of adults with type 2 diabetes mellitus (T2DM) [24, 25], 30% of adults with hypertension, 37% of people with CVD and 17% of obese adults have CKD [20, 26]. Approximately 50% of patients with heart failure also have CKD and up to 70% of patients with CKD also have some clinical or preclinical feature of heart failure [27, 28]. Furthermore, CKD is an important risk amplifier in these conditions [20, 29, 30].

There are also multiple non-traditional risk factors for CKD, including nephromodulatory agents (e.g. prescription and over-the-counter medications, X-ray contrast media, cytotoxic and new biological and targeted treatments and alternative treatments), hyperuricaemia, kidney stones, foetal and maternal exposures, chronic fresh water deprivation, climate change, infections, environmental factors and acute kidney injury [10, 20, 31]. The burden of CKD that can be attributed to these factors is unknown and requires further study but may be more predominant in low- and middle-income countries [20].

CKD and the risk of progression to kidney failure

People with lower levels of GFR [usually calculated as estimated GFR (eGFR) from serum creatinine] and higher levels of albuminuria [measured as the urine albumin:creatinine ratio (UACR)] are at highest risk of progressive CKD and developing kidney failure requiring kidney replacement therapy (KRT)—either dialysis treatment or a kidney transplant. The graded risk can be depicted as a heatmap to predict the risk of progression to kidney failure at the population level. It can also be used to assess cardiovascular risk and all-cause mortality at the population level [10]. The heatmap concept provides a simple classifier based on GFR and urine albumin levels, thereby providing guidance on the need for treatment and frequency of monitoring (Fig. 1) [10]. Multiple GFR and albuminuria categories may appear complex, and these have been simplified to categorize CKD as mild, moderate and severe, a proposal supported by the ERA, as this may facilitate uptake of the heatmap by non-nephrologist healthcare providers (Fig. 1) [7, 32].

Several risk prediction equations have been developed and externally validated, allowing healthcare providers to more precisely estimate the risk of an individual with CKD progressing to kidney failure and to facilitate personalized care [33–35]. Box 1 highlights that two individuals that fall within the same cell on the heatmap (Fig. 1) and having the same GFR have very different risks of progression to kidney failure because they have different levels of albuminuria. All risk prediction equations, akin to the heatmap, use GFR and UACR, as well as age and sex, and highlight the importance of both albuminuria and kidney function in determining the risk of kidney failure.

CKD and CVD

CKD is associated with increased morbidity and mortality from CVD, especially if diabetes mellitus is also present (CKM multimorbidity) [29, 30]. However, what is perhaps not appreciated is that this increased risk begins with both mildly reduced GFR and low levels of albuminuria (UACR >30 mg/g and <300 mg/g; see Box 2 for standard unit conversions) and increases exponentially with worsening GFR and albuminuria independent of each other, with the highest risk being observed at low levels of GFR and very high levels of albuminuria [10, 29, 36]. Akin to the risk of progression to kidney failure, this increased cardiovascular risk at a population level can also be expressed as a heatmap (Fig. 2).

Cardiovascular risk prediction tools developed in the general (non-CKD) population consistently underestimate risk at an individual level [10]. The calculated risk is used to identify candidates for risk-lowering therapy and it is possible that the underestimation of risk in people with CKD has contributed to suboptimal treatment in these individuals in the past [10]. More recently, new risk estimation equations have been developed specifically for adults with CKD, existing equations recalibrated with the addition of GFR and albuminuria and new equations (e.g. predicting risk of CVD events [PREVENT]) developed incorporating both GFR and albuminuria [37–42]. Pragmatically, several cardiovascular prevention guidelines consider CKD as a disease-modifying risk factor and will automatically classify patients with different levels of CKD as having high or very high risk of CVD and recommend risk-modifying therapies accordingly [32, 43]. However, regardless of the method used to assess cardiovascular

			Albuminuria categories		
			A1	A2	A3
			<30 mg/g	30-299 mg/g	≥300 mg/g
GFR categories (ml/min/1.73m²)	G1	≥90		Mild CKD	Moderate CKD
	G2	60-89		Mild CKD	Moderate CKD
	G3a	45-59	Mild CKD	Moderate CKD	Severe CKD
	G3b	30-44	Moderate CKD	Severe CKD	Severe CKD
	G4	15-29	Severe CKD	Severe CKD	Severe CKD
	G5	<15	Severe CKD / Kidney failure	Severe CKD / Kidney failure	Severe CKD / Kidney failure

Low risk (if no other markers of kidney disease, no CKD)

Moderately increased risk

High risk

Very high risk

CKD, chronic kidney disease; GFR, glomerular filtration rate.

Figure 1: Risk of progression of CKD by GFR and albuminuria. Adapted from Kidney Disease: Improving Global Outcomes CKD Work Group. KDIGO 2024 clinical practice guideline for the evaluation and management of chronic kidney disease. *Kidney Int* 2024;105(4S):S117–314.

Box 1: Jean and Juan are both 60-year-old men with severe CKD category G3bA2 with identical GFRs. However, Juan has a higher UACR, thus Juan has a much higher risk of progression to kidney failure.

Jean
60-year-old man
Severe CKD category G3bA2
GFR 30 ml/min/1.73 m²
UACR 30 mg/g

Risk of kidney failure at
2 years = 1.4%
5 years = 5.1%

Juan
60-year-old man
Severe CKD category G3bA2
GFR 30 ml/min/1.73 m²
UACR 299 mg/g

Risk of kidney failure at
2 years = 4.0%
5 years = 13.6%

Risk of progression to kidney failure estimated using the Kidney Failure Risk Equation (https://kidneyfailurerisk.com).

Box 2: Conversion factors of conventional units to SI units.

	Conventional Unit	Conversion Factor	SI Unit
Creatinine	mg/dL	88.4	µmol/L
Urine albumin-to-creatinine ratio (uACR)	mg/g	0.113	mg/mmol
Urine protein-to creatinine ratio (uPCR)	mg/g	0.113	mg/mmol

Cardiovascular Mortality

	Urine albumin-creatinine ratio (mg/g)				
GFR	**<10**	**10-29**	**30-299**	**300-999**	**>1000**
90-104	ref	1	2	2	4
60-89	1	1	2	2	3
45-59	1	2	2	3	4
30-44	2	2	3	4	5
15-29	3	3	4	5	7
<15	6	6	6	7	8

All-Cause Mortality

	Urine albumin-to-creatinine ratio (mg/g)				
GFR	**<10**	**10-29**	**30-299**	**300-999**	**>1000**
90-104	ref	1	2	3	3
60-89	1	1	2	2	3
45-59	1	2	2	2	3
30-44	2	2	3	3	4
15-29	3	3	3	4	6
<15	5	5	5	6	7

Figure 2: Associations of CKD staging by GFR by serum creatinine and UACR categories and risk of all-cause and cardiovascular mortality. Numbers reflect the adjusted hazard ratio compared with the reference cell. Adjustment variables included age, sex, smoking status (current, former or never), systolic BP, total cholesterol, high-density lipoprotein cholesterol, body mass index, use of antihypertensive medications and a medical history of diabetes, coronary heart disease, stroke, heart failure, atrial fibrillation, peripheral artery disease, cancer or chronic obstructive pulmonary disease. Adapted from Kidney Disease: Improving Global Outcomes CKD Work Group. KDIGO 2024 clinical practice guideline for the evaluation and management of chronic kidney disease. Kidney Int 2024;105(4S):S117–314.

risk, they all necessitate knowing both the GFR and the level of albuminuria.

CKD and all-cause mortality

CKD is associated with multiple other comorbidities in addition to being part of the CKM syndrome [44, 45], ranging from infection to cancer and disproportionately affecting young adults [46–48]. Individuals with CKD had some of the highest observed risks for COVID-19 death [49, 50]. Therefore, not surprisingly, CKD is also associated with an increased risk of premature death that can also be expressed as a heatmap (Fig. 2). The increased risk of premature death is not solved by KRT, as life expectancy may be reduced up to 44 years (dialysis) or 22 years (kidney transplantation) in young adults when compared with the general population [51]. It

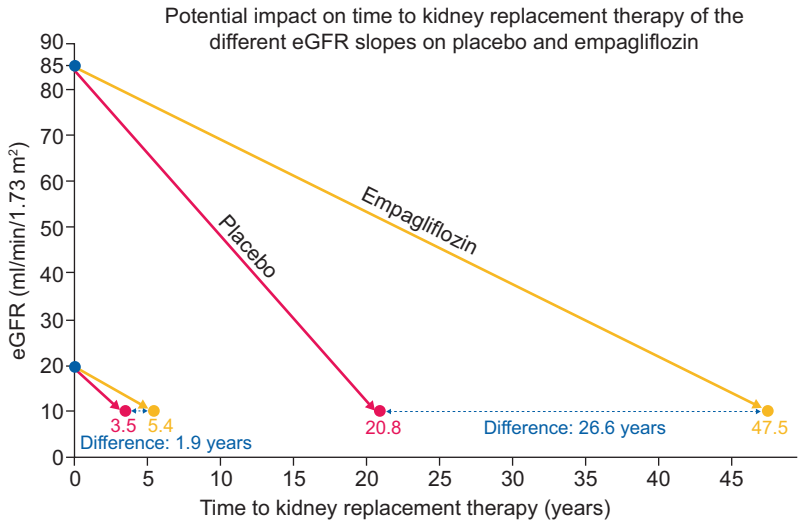

Figure 3: Hypothetical transformation of chronic eGFR slopes into time to kidney failure, defined as GFR 10 ml/min/1.73 m^2, in the EMPA-KIDNEY trial. Time to kidney failure according to baseline GFR was estimated from each baseline eGFR value by applying the chronic eGFR slopes corresponding to participants on placebo and on empagliflozin within the pre-specified GFR subgroups (GFR cut-off points to define subgroups set at 30 and 45 ml/min/1.73 m^2) as per reference. The delay in time (years) to kidney failure on empagliflozin versus placebo, according to baseline eGFR, was obtained by subtracting the time to kidney failure on empagliflozin from the time to kidney failure on placebo. This conceptual model assumes that patients will live up to the point where they need kidney replacement therapy and that chronic GFR slopes observed in the clinical trial are maintained stable beyond the duration of the trial. Reproduced from Fernandez-Fernandez B, Sarafidis P, Soler MJ, Ortiz A. EMPA-KIDNEY: expanding the range of kidney protection by SGLT2 inhibitors. Clin Kidney J 2023;16:1187–1198.

should be emphasized that the risk of death for most patients with CKD is higher than that of pression to kidney failure, especially if also diabetic [52]. These dismal outcomes can only be forestalled by early detection and adequate treatment using agents shown to reduce all-cause mortality in patients with CKD [53].

Awareness of CKD—mobilizing patient power?

Despite GFR being calculated and reported automatically by laboratories, there remains suboptimal classification of patients as having CKD based on GFR alone, even in well-developed healthcare systems [12, 54–57]. A recently published international study including five European countries—England, France, Germany, Italy and Spain—found that the proportion of patients with CKD based solely on GFR criteria and classified as actually having CKD was only 43%, 5%, 16%, 23% and 15% for each country, respectively [56, 57]. Furthermore, clinical studies persistently show that albuminuria is also not frequently assessed, even in high-risk populations in well-developed healthcare systems [12, 54, 58–61]. In the same international study, the proportion of patients with CKD with UACR measured was less than one-third, ranging from 1.3 to 33.4% across countries [57].

Reasons for this lack of awareness of the need for CKD diagnosis and monitoring, despite measurement of GFR and UACR being simple, inexpensive and enshrined not only in all CKD guidelines, but also in multiple other guidelines including those for diabetes [62, 63], hypertension [64, 65] and CVD [32] are not really understood. These are very likely to be complex and multifactorial and differ between countries, healthcare systems and societal perspectives. One potential explanation is a lack of appreciation that the results will lead to positive action [66], especially in the early phases of CKD. Until recently, the management of CKD has been based on lifestyle measures and the treatment of blood pressure (BP) and albuminuria, particularly with angiotensin-converting enzyme inhibitors (ACEis) and angiotensin receptor blockers (ARBs). Despite decades of evidence of benefit, there is considerable evidence for the underutilization of these therapeutic agents in individuals with hypertension and albuminuria [67–69]. Recently, the addition of multiple novel agents including non-steroidal mineralocorticoid receptor antagonists (nsMRAs) [70], sodium–glucose co-transporter 2 inhibitors (SGLT2is) [71] and glucagon-like peptide-1 receptor antagonists (GLP-1ras) [72] have been tested in large randomized controlled trials showing very significantly improved cardiovascular and kidney outcomes in individuals with CKD. Not surprisingly perhaps, given the data on ACEis and ARBs, there is again evidence accumulating of the underuse of these newer agents despite having been rapidly incorporated into guidelines and consensus documents [69, 73]. Furthermore, early use of these agents when CKD is mild can have a dramatic benefit on survival without kidney failure compared with starting these agents later in more advanced stages of CKD (Fig. 3) [74]. For instance, in the example shown in Fig. 3, starting the SGLT2i empaglifozin when the GFR is 85 ml/min/1.73 m^2 will potentially delay an individual reaching kidney failure by 26.6 years, whereas starting the same agent when the GFR is 20 ml/min/1.73 m^2 will only delay reaching kidney failure by 1.9 years [74]. Although several assumptions have been made in creating this extreme example, including consistent adherence to treatment and no competing risk of death, it makes the very important point that early detection and treatment of CKD is critical. Actuarial analyses using data from large-scale randomized outcome trials show that combination treatment with SGLT2i, GLP-1ra and nsMRA is projected to afford substantial gains in cardiovascular, kidney and overall survival [75]. Conversely, another important consequence of a lack of awareness of CKD is the associated continued overprescription or overdosing of potentially nephromodulatory medications—e.g. non-steroidal anti-inflammatory drugs and proton pump inhibitors [67].

Another plausible explanation for the lack of awareness of CKD diagnosis may be the fact that many guidelines are published solely in the English language. In Spain, however, multiple

medical societies have collaborated to produce consensus documents on the management and prevention of CKD and have published them in both Spanish and English [76, 77]. Spain has some of the highest rates of CKD classification and albuminuria testing reported across Europe [56, 57], suggesting that removing the language barrier may improve accessibility to information about CKD.

Attempts to raise awareness of CKD and appropriate testing works, as shown by a recent Italian study where a targeted training program aimed at primary care physicians was implemented. This resulted in increased rates of UACR and GFR testing in the population and consequently there was increased detected prevalence of CKD, especially in high-risk groups including T2DM (6.3% to 12.7%), hypertension (5.6% to 9.9%) and heart failure (10.8% to 23.7%) [78].

While addressing the lack of awareness of CKD among healthcare practitioners in general, it is just as important and imperative that people with concerns about their kidneys, especially those considered at risk of CKD (Box 3), are encouraged and empowered to seek clinical advice and be tested for kidney health.

Box 3: Three categories that define early risk for chronic kidney disease.

1. Metabolic diseases
   a. Type 1 and type 2 diabetes mellitus
   b. Pre-diabetes, gestational diabetes
   c. Steatotic liver disease
   d. Morbid obesity
   e. Any type of cardiovascular disease
   f. Gout
   g. Multisystem diseases with potential kidney involvement (e.g. systemic lupus erythematosus)
2. Familial, intrinsic, extrinsic and multifactorial conditions
   a. Family history of chronic kidney disease
   b. Ethnic minorities
   c. Premature birth (low gestational age/low birth weight)
   d. Hypertension, pre-eclampsia
   e. Congenital abnormalities of the kidneys and urinary tract (CAKUT)
   f. Unilateral nephrectomy
   g. Recurrent kidney stones
   h. Incidental detection of haematuria or albuminuria
3. Environmental
   a. Toxins (e.g. air pollution)
   b. Medication (non-steroidal anti-inflammatory drugs, lithium, calcineurin inhibitors)
   c. Previous episode of acute kidney injury
   d. Young rural males in Central America

Concept of the ABCDE campaign

The ABCDE campaign aims to empower individuals to establish whether their kidneys are healthy or whether they are at risk of developing CKD by asking their healthcare practitioners five key questions (Fig. 4). The strength of the ABCDE approach is its simplicity and its ability to encapsulate several risk factors simultaneously. This is especially true with regards to the CKM multimorbidity syndrome. It is directly aligned with the cardiovascular risk groups identified by the 2021 European Society of Cardiology Cardiovascular Prevention Guidelines as requiring specific actions to decrease cardiovascular risk [32]. Personal risk factors, e.g. family history or lifestyle measures like smoking, level of physical activity, weight and diet, can be assessed by any individual. The ABCDE approach is centred around information on risk factors that can be generated by the healthcare system only by answering five questions for any individual:

What is my **A**lbuminuria (albumin in urine)?
What is my **B**lood pressure?
What is my **C**holesterol?
Am I **D**iabetic?
What is my kidney function (**E**stimated GFR)?

An equally important aim is to continue to inform primary care physicians and non-nephrology specialists about the importance of preventing and diagnosing CKD early, at a point where intervention can be maximally effective. Crucially, the ABCDE campaign intends to work with national medical societies to produce information sources in different languages aimed at individuals and healthcare providers.

Albuminuria

Urine albumin measurement is in general preferable to total protein measurement because it provides a more sensitive measure of changes in glomerular permeability [10, 79]. Urinary albumin measurement also appears to be a more sensitive test for detecting glomerular pathology associated with systemic diseases including hypertension and diabetes [10, 80].

Albuminuria is readily quantified from a spot urine sample as the UACR. This ratio of albumin to creatinine allows for correction for urinary concentration and reduces intra-individual variability [81–83]. Although the first morning urine is generally recommended, random samples are acceptable, greatly facilitating incorporation into routine clinical practice [10]. Timed urine collections (e.g. 24-hour urine collections) are no longer considered necessary [10].

Dipstick measures of albuminuria are convenient for a rapid screen but have low sensitivity and high interobserver variation and are not recommended for diagnosing CKD [10]. However, dipstick testing and semi-quantitative automated UACR estimation may allow selected samples to be sent for quantitative albuminuria testing if there are financial or laboratory restrictions [10, 84, 85].

BP

A total of 1.4 billion people worldwide have hypertension (defined as a BP >140/90 mmHg), of whom 1 in 2 are unaware of their diagnosis and only 1 in 5 have their BP controlled by treatment [66, 86]. Hypertension is the second most common cause of CKD after diabetes and an independent and modifiable risk factor for CKD progression [87, 88]. Up to 25% of patients with treated and sustained hypertension will develop albuminuria indicating progressive kidney damage [60, 89]. Hypertension is also a very common consequence of CKD, accelerating progression of CKD if inadequately treated [29, 30].

BP should be measured as recommended by multiple national and international guidelines [64, 65, 90]. In general, individuals with and without CKD should have their BP lowered to at least 130/80 mmHg, or lower if tolerated [64, 65, 90]. Use of ACEi/ARB should be prioritized in individuals with albuminuria and/or CVD and/or diabetes [64, 65, 90].

Cholesterol

As discussed, individuals with CKD are at increased risk of CVD, especially in the context of the CKM multimorbidity syndrome.

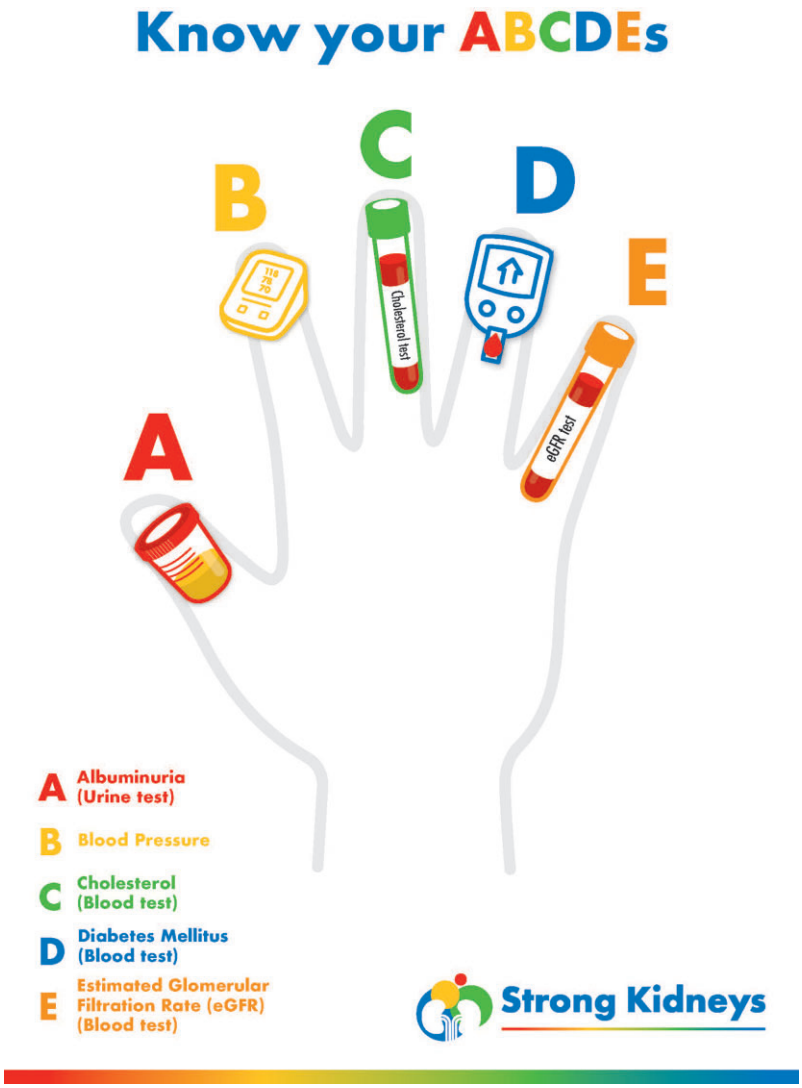

Figure 4: Infographic for the Strong Kidneys ABCDE campaign.

Individuals at risk of CKD (Box 3) and with CKD should have their lipid profile (total cholesterol, low-density lipoprotein cholesterol, high-density lipoprotein cholesterol and triglycerides) checked [91, 92]. In general, individuals with moderate to severe CKD (Fig. 1, Table 2) are considered to be at high or very high risk for CVD and should be treated with a statin or statin/ezetimibe combination [32, 91, 92]. Risk in other individuals should be assessed with risk equations, preferably those including GFR and albuminuria [37–42], and treated accordingly.

Diabetes

Diabetes is the most common cause of CKD [93–97] and there is an urgent need for optimized strategies and tools to reduce both the incidence of diabetes and related complications, especially CKD [98]. According to the International Diabetes Federation, there are currently 537 million people living with diabetes globally and, of them, 90% have T2DM and a further 541 million have impaired glucose tolerance or prediabetes [99]. Almost one in two people with diabetes are unaware of their diagnosis [99]. People with diabetes are at risk for diabetes-related complications and 40–50% develop CKD, which is associated with an increased risk of progression to kidney failure, excess atherosclerotic CVD and an increase in heart failure and mortality [98, 99].

Given the central importance of diabetes to the development of and risk associated with CKD, it is essential it is diagnosed as soon as possible. Diagnosis is usually made from a random plasma glucose ≥11.1 mmol/l or a fasting plasma glucose ≥7.0 mmol/l (on at least two occasions if asymptomatic) and/or a haemoglobin A1c ≥48 mmol/l [100–103]. Timed oral glucose tolerance tests can also be used to diagnose diabetes, especially in high-risk individuals who may be diagnosed only by a 1-hour or 2-hour plasma glucose after an oral glucose load [104], although these can be inconvenient and burdensome for individuals and healthcare systems.

Once a diagnosis of diabetes has been established, a comprehensive management strategy must be implemented to reduce the risk of CVD and a crucial component of this is to either reduce the risk of development of CKD or to limit the progression of established CKD [94]. It should also be pointed out that this strategy will not only address the effects of diabetes on the kidney, but also on other devastating effects of diabetes including diabetic eye disease and neuropathy, as well as potentially associated conditions such as obstructive sleep apnoea, all of which have major impacts on both quality and quantity of life.

Box 4: Charlotte and Charles both have the same serum creatinine. However, Charlotte has CKD category G3a while Charles has normal renal function.

- Charlotte
  - 80-year-old woman
  - Serum creatinine 100 μmol/l
  - GFR 49 ml/min/1.73 m^2

- Charles
  - 18-year-old man
  - Serum creatinine 100 μmol/l
  - GFR >90 ml/min/1.73 m^2

eGFR

Serum creatinine alone cannot be used to estimate kidney function because it is influenced by age and biological sex and can be misleading (Box 4). The use of serum creatinine in an estimating equation, adjusting for age and sex, is recommended for initial assessment of GFR and is generally appropriate and most easily accessible for diagnosis, staging and monitoring of progression of CKD [10]. Most laboratories across Europe will now routinely report the eGFR in addition to serum creatinine. Several validated equations in adults are currently in use across Europe, including the Chronic Kidney Disease Epidemiology Collaboration (CKD-EPI) 2021, CKD-EPI 2009, European Kidney Function Consortium 2021 and the Lund–Malmo 2014 revised equations [10]. Which equation is used is not critical and will depend on several local factors, but for longitudinal monitoring, the same equation should be used in the same individual where possible. Timed urine collections for creatinine clearance are no longer recommended, as they are very prone to error [10].

The future

Recent years have seen an exciting transformation in the ability to manage CKD through a combination of extremely effective new therapies and an increased recognition that largely CKD does not exist on its own but as part of the CKM multimorbidity syndrome. Therapeutic nihilism or 'renalism', where patients with CKD were actively excluded from major cardiovascular and diabetes clinical trials, is firmly in the past and rightly no longer acceptable. Now, in 2025, tens of thousands of patients with CKD have been recruited into trials with both cardiovascular and kidney hard endpoints and there is undisputed evidence for a variety of therapeutic strategies. Consequently, those with CKD now can receive multiple therapies with significant prognostic benefit (ACEi/ARB, SGLT2i, GLP1ra and nsMRA). These have been described as the four pillars of treatment for CKD, analogous to the pillars of treatment promoted for heart failure and atrial fibrillation. Used individually or in combination, these agents have been repeatedly demonstrated to reduce the incidence of major adverse cardiovascular events and cardiovascular mortality, reduce the risk of progression of CKD towards kidney failure and reduce all-cause mortality. Equity of access to these therapies is crucial in the fight against CKD and the fight for kidney and heart health. Saving kidneys saves hearts and saves lives.

The Strong Kidneys Task Force of the ERA, together with the EKHA and the EKPF, has launched the ABCDE campaign, largely through social media channels and in collaboration with national medical societies, targeting people concerned about their kidney health to seek medical advice and testing as needed. The overall aim is to empower the public to have an informed conversation with their healthcare providers and take some control of their own kidney health. By asking five simple questions, an individual can get a comprehensive assessment of their kidney health, cardiovascular risk and metabolic status. Being in possession of this information will allow individuals to make lifestyle choices to improve their overall health, reduce their risk of progression of CKD and improve their cardiovascular risk and metabolic status (this will be the subject of future specific campaigns). In addition, it should prompt discussions with their healthcare professionals on the appropriate use of affordable state-of-the-art treatments improving overall health.

This article aims to be a resource to all interested people, including the public, but is mainly directed towards generalist and primary care medical teams who see patients with CKD and may not yet know it. Diagnosis of CKD is simple, and we are getting increasingly better at managing it. We now need to translate our knowledge into meaningful action. There is much work to be done in terms of ensuring equity of access to resources, care, treatment and support, but the first step to raise awareness. The first step really is as easy as ABCDE!

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No new data were generated or analysed in support of this research.

CONFLICT OF INTEREST STATEMENT

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REFERENCES

1. Cockwell P, Fisher LA. The global burden of chronic kidney disease. *Lancet* 2020;**395**:662–4. https://doi.org/10.1016/S0140-6736(19)32977-0
2. Jager KJ, Kovesdy C, Langham R *et al.* A single number for advocacy and communication-worldwide more than 850 million individuals have kidney diseases. *Nephrol Dial Transplant* 2019;**34**:1803–5. https://doi.org/10.1093/ndt/gfz174
3. Ndumele CE, Rangaswami J, Chow SL *et al.* Cardiovascular-kidney-metabolic health: a presidential advisory from the American Heart Association. *Circulation* 2023;**148**:1606–35. https://doi.org/10.1161/CIR.0000000000001184
4. Global Burden of Disease Forecasting Collaborators. Burden of disease scenarios for 204 countries and territories, 2022–2050: a forecasting analysis for the Global Burden of Disease Study 2021. *Lancet* 2024;**403**:2204–56. https://doi.org/10.1016/S0140-6736(24)00685-8
5. Ortiz A, Ferro CJ, Balafa O *et al.* Mineralocorticoid receptor antagonists for nephroprotection and cardioprotection in patients with diabetes mellitus and chronic kidney disease. *Nephrol Dial Transplant* 2023;**38**:10–25. https://doi.org/10.1093/ndt/gfab167
6. Mark PB, Sarafidis P, Ekart R *et al.* SGLT2i for evidence-based cardiorenal protection in diabetic and non-diabetic chronic kidney disease: a comprehensive review by EURECA-m and ERBP working groups of ERA. *Nephrol Dial Transplant* 2023;**38**:2444–55. https://doi.org/10.1093/ndt/gfad112
7. Ortiz A, Wanner C, Gansevoort R *et al.* Chronic kidney disease as cardiovascular risk factor in routine clinical practice: a position statement by the Council of the European Renal Association. *Nephrol Dial Transplant* 2023;**38**:527–31. https://doi.org/10.1093/ndt/gfac257
8. Fraser SD, Blakeman T. Chronic kidney disease: identification and management in primary care. *Pragmat Obs Res* 2016;**7**:21–32.
9. Perez-Gomez MV, Bartsch LA, Castillo-Rodriguez E *et al.* Clarifying the concept of chronic kidney disease for non-nephrologists. *Clin Kidney J* 2019;**12**:258–61. https://doi.org/10.1093/ckj/sfz007
10. Kidney Disease: Improving Global Outcomes CKD Work Group. KDIGO 2024 clinical practice guideline for the evaluation and management of chronic kidney disease. *Kidney Int* 2024;**105**(4 Suppl):S117–314. https://doi.org/10.1016/j.kint.2023.10.018
11. Duff R, Awofala O, Arshad MT *et al.* Global health inequalities of chronic kidney disease: a meta-analysis. *Nephrol Dial Transplant* 2024;**27**:1692–709. https://doi.org/10.1093/ndt/gfae048
12. Francis A, Harhay MN, Ong ACM *et al.* Chronic kidney disease and the global public health agenda: an international consensus. *Nat Rev Nephrol* 2024;**20**:473–85. https://doi.org/10.1038/s41581-024-00820-6
13. Torra R. Kidney health matters: a global imperative for public health. *Nephrol Dial Transplant* 2024;**39**:1371–4. https://doi.org/10.1093/ndt/gfae083
14. Institute for Health Metrics and Evaluation. *GBD 2021 cause and risk summary: chronic kidney disease—level 3 cause*. Seattle, WA: Institute for Health Metrics and Evaluation, University of Washington, 2024. https://www.healthdata.org/research-analysis/diseases-injuries-risks/factsheets/2021-chronic-kidney-disease-level-3-disease (accessed 5 January 2025).
15. Institute for Health Metrics and Evaluation. *GBD 2021 cause and risk summary: chronic kidney disease—level 2 risk*. Seattle, WA: Institute for Health Metrics and Evaluation, University of Washington, 2024. https://www.healthdata.org/research-analysis/diseases-injuries-risks/factsheets/2021-kidney-dysfunction-level-2-risk (accessed 5 January 2025).
16. United States Renal Data System. Chapter 9: healthcare expenditures for persons with ESRD. In: *USRDS annual data report, volume 2: end stage renal disease*. Bethesda, MD: National Institutes of Health, National Institute of Diabetes and Digestive and Kidney Diseases, 2020. https://adr.usrds.org/2020/end-stage-renal-disease/9-healthcare-expenditures-for-persons-wth-esrd (accessed 8 November 2023).
17. United States Renal Data System. Chapter 6: healthcare expenditures for persons with CKD. In: *USRDS annual data report, volume 1: chronic kidney disease*. Bethesda, MD: National Institutes of Health, National Institute of Diabetes and Digestive and Kidney Diseases, 2020. https://adr.usrds.org/2020/chronic-kidney-disease/6-healthcare-expenditures-for-persons-wth-ckd (accessed 8 November 2023).
18. Vanholder R, Annemans L, Bello AK *et al.* Fighting the unbearable lightness of neglecting kidney health: the decade of the kidney. *Clin Kidney J* 2021;**14**:1719–30. https://doi.org/10.1093/ckj/sfab070
19. Vanholder R, Agar J, Braks M *et al.* The European Green Deal and nephrology: a call for action by the European Kidney Health Alliance. *Nephrol Dial Transplant* 2023;**38**:1080–8. https://doi.org/10.1093/ndt/gfac160
20. Luyckx VA, Tuttle KR, Garcia-Garcia G *et al.* Reducing major risk factors for chronic kidney disease. *Kidney Int Suppl (2011)* 2017;**7**:71–87. https://doi.org/10.1016/j.kisu.2017.07.003
21. GBD 2015 Mortality and Causes of Death Collaborators. Global, regional, and national life expectancy, all-cause mortality, and cause-specific mortality for 249 causes of death, 1980–2015: a systematic analysis for the Global Burden of Disease Study 2015. *Lancet* 2016;**388**:1459–544.

22. Ostrominski JW, Arnold SV, Butler J *et al.* Prevalence and overlap of cardiac, renal, and metabolic conditions in US adults, 1999–2020. *JAMA Cardiol* 2023;**8**:1050–60. https://doi.org/10.1001/jamacardio.2023.3241
23. Lassen MCH, Ostrominski JW, Claggett BL *et al.* Cardiovascular-kidney-metabolic overlap in heart failure with preserved ejection fraction: cardiac structure and function, clinical outcomes, and response to sacubitril/valsartan in PARAGON-HF. *Eur J Heart Fail* 2024;**26**:1762–74. https://doi.org/10.1002/ejhf.3304
24. Adler AI, Stevens RJ, Manley SE *et al.* Development and progression of nephropathy in type 2 diabetes: the United Kingdom Prospective Diabetes Study (UKPDS 64). *Kidney Int* 2003;**63**:225–32. https://doi.org/10.1046/j.1523-1755.2003.00712.x
25. White S, Chadban S. Diabetic kidney disease in Australia: current burden and future projections. *Nephrology (Carlton)* 2014;**19**:450–8. https://doi.org/10.1111/nep.12281
26. Cases Amenós A, Gonzalez-Juanatey JR, Conthe Gutierrez P *et al.* Prevalence of chronic kidney disease in patients with or at a high risk of cardiovascular disease. *Rev Esp Cardiol* 2010;**63**:225–8.
27. Khan MS, Ahmed A, Greene SJ *et al.* Managing heart failure in patients on dialysis: state-of-the-art review. *J Card Fail* 2023;**29**:87–107. https://doi.org/10.1016/j.cardfail.2022.09.013
28. Law JP, Pickup L, Pavlovic D *et al.* Hypertension and cardiomyopathy associated with chronic kidney disease: epidemiology, pathogenesis and treatment considerations. *J Hum Hypertens* 2023;**37**:1–19. https://doi.org/10.1038/s41371-022-00751-4
29. Zoccali C, Mallamaci F, Adamczak M *et al.* Cardiovascular complications in chronic kidney disease: a review from the European Renal and Cardiovascular Medicine Working Group of the European Renal Association. *Cardiovasc Res* 2023;**119**:2017–32. https://doi.org/10.1093/cvr/cvad083
30. Zoccali C, Mark PB, Sarafidis P *et al.* Diagnosis of cardiovascular disease in patients with chronic kidney disease. *Nat Rev Nephrol* 2023;**19**:733–46. https://doi.org/10.1038/s41581-023-00747-4
31. Garcia-Garcia G, Jha V, Tao Li PK *et al.* Chronic kidney disease (CKD) in disadvantaged populations. *Clin Kidney J* 2015;**8**:3–6. https://doi.org/10.1093/ckj/sfu124
32. Visseren FLJ, Mach F, Smulders YM *et al.* 2021 ESC guidelines on cardiovascular disease prevention in clinical practice. *Eur Heart J* 2021;**42**:3227–337. https://doi.org/10.1093/eurheartj/ehab484
33. Ramspek CL, de Jong Y, Dekker FW *et al.* Towards the best kidney failure prediction tool: a systematic review and selection aid. *Nephrol Dial Transplant* 2020;**35**:1527–38. https://doi.org/10.1093/ndt/gfz018
34. Tangri N, Kitsios GD, Inker LA *et al.* Risk prediction models for patients with chronic kidney disease: a systematic review. *Ann Intern Med* 2013;**158**:596–603. https://doi.org/10.7326/0003-4819-158-8-201304160-00004
35. Grams ME, Brunskill NJ, Ballew SH *et al.* The kidney failure risk equation: evaluation of novel input variables including eGFR estimated using the CKD-EPI 2021 equation in 59 cohorts. *J Am Soc Nephrol* 2023;**34**:482–94.
36. Matsushita K, Ballew SH, Wang AY *et al.* Epidemiology and risk of cardiovascular disease in populations with chronic kidney disease. *Nat Rev Nephrol* 2022;**18**:696–707.
37. Khan SS, Coresh J, Pencina MJ *et al.* Novel prediction equations for absolute risk assessment of total cardiovascular disease incorporating cardiovascular-kidney-metabolic health: a scientific statement from the American Heart Association. *Circulation* 2023;**148**:1982–2004.
38. Khan SS, Matsushita K, Sang Y *et al.* Development and validation of the American Heart Association's PREVENT equations. *Circulation* 2024;**149**:430–49.
39. Matsushita K, Jassal SK, Sang Y *et al.* Incorporating kidney disease measures into cardiovascular risk prediction: development and validation in 9 million adults from 72 datasets. *EClinicalMedicine* 2020;**27**:100552.
40. Grams ME, Sang Y, Ballew SH *et al.* Predicting timing of clinical outcomes in patients with chronic kidney disease and severely decreased glomerular filtration rate. *Kidney Int* 2018;**93**:1442–51. https://doi.org/10.1016/j.kint.2018.01.009
41. Hippisley-Cox J, Coupland C, Brindle P. Development and validation of QRISK3 risk prediction algorithms to estimate future risk of cardiovascular disease: prospective cohort study. *BMJ* 2017;**357**:j2099. https://doi.org/10.1136/bmj.j2099
42. Bansal N, Katz R, De Boer IH *et al.* Development and validation of a model to predict 5-year risk of death without ESRD among older adults with CKD. *Clin J Am Soc Nephrol* 2015;**10**:363–71. https://doi.org/10.2215/CJN.04650514
43. Arnett DK, Blumenthal RS, Albert MA *et al.* 2019 ACC/AHA guideline on the primary prevention of cardiovascular disease: executive summary: a report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines. *J Am Coll Cardiol* 2019;**74**:1376–414. https://doi.org/10.1016/j.jacc.2019.03.009
44. Sebastian SA, Padda I, Johal G. Cardiovascular-kidney-metabolic (CKM) syndrome: a state-of-the-art review. *Curr Probl Cardiol* 2024;**49**:102344.
45. MacRae C, Mercer SW, Guthrie B *et al.* Comorbidity in chronic kidney disease: a large cross-sectional study of prevalence in Scottish primary care. *Br J Gen Pract* 2021;**71**:e243–9.
46. Kula AJ, Prince DK, Katz R *et al.* Mortality burden and life-years lost across the age spectrum for adults living with CKD. *Kidney360* 2023;**4**:615–21.
47. Kitchlu A, Reid J, Jeyakumar N *et al.* Cancer risk and mortality in patients with kidney disease: a population-based cohort study. *Am J Kidney Dis* 2022;**80**:436–48.e1. https://doi.org/10.1053/j.ajkd.2022.02.020
48. Wang HE, Gamboa C, Warnock DG *et al.* Chronic kidney disease and risk of death from infection. *Am J Nephrol* 2011;**34**:330–6. https://doi.org/10.1159/000330673
49. Abdel-Qadir H, Austin PC, Sivaswamy A *et al.* Comorbidity-stratified estimates of 30-day mortality risk by age for unvaccinated men and women with COVID-19: a population-based cohort study. *BMC Public Health* 2023;**23**:482.
50. ERA-EDTA Council, ERACODA Working Group. Chronic kidney disease is a key risk factor for severe COVID-19: a call to action by the ERA-EDTA. *Nephrol Dial Transplant* 2021;**36**:87–94.
51. Cordero L, Ortiz A. Decreased life expectancy: a health outcome not corrected by kidney replacement therapy that emphasizes the need for primary prevention of CKD. *Clin Kidney J* 2024;**17**:sfae053.
52. Tonelli M, Wiebe N, Culleton B *et al.* Chronic kidney disease and mortality risk: a systematic review. *J Am Soc Nephrol* 2006;**17**:2034–47.
53. Iatridi F, Carrero JJ, Gall EC *et al.* KDIGO 2024 clinical practice guideline for the evaluation and management of chronic kidney disease in children and adults: a commentary from the European Renal Best Practice (ERBP). *Nephrol Dial Transplant* 2025;**40**:273–82.
54. Agvall B, Ashfaq A, Bjurstrom K *et al.* Characteristics, management and outcomes in patients with CKD in a

healthcare region in Sweden: a population-based, observational study. *BMJ Open* 2023;**13**:e069313. https://doi.org/10.1136/bmjopen-2022-069313
55. Ene-Iordache B, Perico N, Bikbov B *et al.* Chronic kidney disease and cardiovascular risk in six regions of the world (ISN-KDDC): a cross-sectional study. *Lancet Glob Health* 2016;**4**:e307–19. https://doi.org/10.1016/S2214-109X(16)00071-1
56. Tangri N, Moriyama T, Schneider MP *et al.* Prevalence of undiagnosed stage 3 chronic kidney disease in France, Germany, Italy, Japan and the USA: results from the multinational observational REVEAL-CKD study. *BMJ Open* 2023;**13**:e067386. https://doi.org/10.1136/bmjopen-2022-067386
57. Tangri N, Alvarez CS, Arnold M *et al.* Suboptimal monitoring and management in patients with unrecorded stage 3 chronic kidney disease in real-world settings: Insights from REVEAL-CKD. *Eur J Clin Invest* 2024;**54**:e14282. https://doi.org/10.1111/eci.14282
58. Tanaka T, Maruyama S, Chishima N *et al.* Population characteristics and diagnosis rate of chronic kidney disease by eGFR and proteinuria in Japanese clinical practice: an observational database study. *Sci Rep* 2024;**14**:5172. https://doi.org/10.1038/s41598-024-55827-7
59. de Sequera P, Ariasd J, Quirogae B *et al.* Cardiovascular risk assessment: missing albuminuria contributing to gender inequality. *Nefrologia* 2025;**45**:87–93.
60. Ruilope LM, Ortiz A, Lucia A *et al.* Prevention of cardiorenal damage: importance of albuminuria. *Eur Heart J* 2023;**44**:1112–23. https://doi.org/10.1093/eurheartj/ehac683
61. Chu CD, Xia F, Du Y *et al.* Estimated prevalence and testing for albuminuria in US adults at risk for chronic kidney disease. *JAMA Netw Open* 2023;**6**:e2326230. https://doi.org/10.1001/jamanetworkopen.2023.26230
62. Sacks DB, Arnold M, Bakris GL *et al.* Guidelines and recommendations for laboratory analysis in the diagnosis and management of diabetes mellitus. *Diabetes Care* 2023;**46**:e151–99. https://doi.org/10.2337/dci23-0036
63. Marx N, Federici M, Schutt K *et al.* 2023 ESC guidelines for the management of cardiovascular disease in patients with diabetes. *Eur Heart J* 2023;**44**:4043–140. https://doi.org/10.1093/eurheartj/ehad192
64. Mancia G, Kreutz R, Brunstrom M *et al.* 2023 ESH guidelines for the management of arterial hypertension The Task Force for the management of arterial hypertension of the European Society of Hypertension: endorsed by the International Society of Hypertension (ISH) and the European Renal Association (ERA). *J Hypertens* 2023;**41**:1874–2071.
65. Williams B, Mancia G, Spiering W *et al.* 2018 ESC/ESH guidelines for the management of arterial hypertension. *Eur Heart J* 2018;**39**:3021–104.
66. Luyckx VA, Tuttle KR, Abdellatif D *et al.* Mind the gap in kidney care: translating what we know into what we do. *Kidney Int* 2024;**105**:406–17.
67. Tuttle KR, Alicic RZ, Duru OK *et al.* Clinical characteristics of and risk factors for chronic kidney disease among adults and children: an analysis of the CURE-CKD Registry. *JAMA Netw Open* 2019;**2**:e1918169. https://doi.org/10.1001/jamanetworkopen.2019.18169
68. Chu CD, Powe NR, McCulloch CE *et al.* Angiotensin-converting enzyme inhibitor or angiotensin receptor blocker use among hypertensive US adults with albuminuria. *Hypertension* 2021;**77**:94–102. https://doi.org/10.1161/HYPERTENSIONAHA.120.16281
69. Nicholas SB, Daratha KB, Alicic RZ *et al.* Prescription of guideline-directed medical therapies in patients with diabetes and chronic kidney disease from the CURE-CKD Registry, 2019–2020. *Diabetes Obes Metab* 2023;**25**:2970–9. https://doi.org/10.1111/dom.15194
70. Agarwal R, Filippatos G, Pitt B *et al.* Cardiovascular and kidney outcomes with finerenone in patients with type 2 diabetes and chronic kidney disease: the FIDELITY pooled analysis. *Eur Heart J* 2022;**43**:474–84. https://doi.org/10.1093/eurheartj/ehab777
71. Nuffield Department of Population Health Renal Studies Group,SGLT2 inhibitor Meta-Analysis Cardio-Renal Trialists' Consortium. Impact of diabetes on the effects of sodium glucose co-transporter-2 inhibitors on kidney outcomes: collaborative meta-analysis of large placebo-controlled trials. *Lancet* 2022;**400**:1788–801. https://doi.org/10.1016/S0140-6736(22)02074-8
72. Perkovic V, Tuttle KR, Rossing P *et al.* Effects of semaglutide on chronic kidney disease in patients with type 2 diabetes. *N Engl J Med* 2024;**391**:109–21.
73. Limonte CP, Hall YN, Trikudanathan S *et al.* Prevalence of SGLT2i and GLP1RA use among US adults with type 2 diabetes. *J Diabetes Complications* 2022;**36**:108204. https://doi.org/10.1016/j.jdiacomp.2022.108204
74. Fernandez-Fernandez B, Sarafidis P, Soler MJ *et al.* EMPA-KIDNEY: expanding the range of kidney protection by SGLT2 inhibitors. *Clin Kidney J* 2023;**16**:1187–98.
75. Neuen BL, Heerspink HJL, Vart P *et al.* Estimated lifetime cardiovascular, kidney, and mortality benefits of combination treatment with SGLT2 inhibitors, GLP-1 receptor agonists, and non-steroidal MRA compared with conventional care in patients with type 2 diabetes and albuminuria. *Circulation* 2024;**149**:450–62.
76. Alcazar R, Egocheaga MI, Orte L *et al.* [SEN-SEMFYC consensus document on chronic kidney disease]. *Nefrologia* 2008;**28**:273–82.
77. Garcia-Maset R, Bover J, Segura de la Morena J *et al.* Information and consensus document for the detection and management of chronic kidney disease. *Nefrologia (Engl Ed)* 2022;**42**:233–64.
78. Pesce F, Pasculli D, Pasculli G *et al.* "The Disease Awareness Innovation Network" for chronic kidney disease identification in general practice. *J Nephrol* 2022;**35**:2057–65.
79. Ballantyne FC, Gibbons J, O'Reilly DS. Urine albumin should replace total protein for the assessment of glomerular proteinuria. *Ann Clin Biochem* 1993;**30**:101–3.
80. Shihabi ZK, Konen JC, O'Connor ML. Albuminuria vs urinary total protein for detecting chronic renal disorders. *Clin Chem* 1991;**37**:621–4.
81. Newman DJ, Pugia MJ, Lott JA *et al.* Urinary protein and albumin excretion corrected by creatinine and specific gravity. *Clin Chim Acta* 2000;**294**:139–55.
82. Keane WF, Eknoyan G. Proteinuria, albuminuria, risk, assessment, detection, elimination (PARADE): a position paper of the National Kidney Foundation. *Am J Kidney Dis* 1999;**33**:1004–10.
83. Beetham R, Cattell WR. Proteinuria: pathophysiology, significance and recommendations for measurement in clinical practice. *Ann Clin Biochem* 1993;**30**:425–34.
84. Salinas M, Lopez-Garrigos M, Flores E *et al.* Urinary albumin strip assay as a screening test to replace quantitative technology in certain conditions. *Clin Chem Lab Med* 2018;**57**:204–9.
85. Stephen R, Jolly SE, Nally JV *et al.* Albuminuria: when urine predicts kidney and cardiovascular disease. *Cleve Clin J Med* 2014;**81**:41–50.

86. World Health Organization. *Global report on hypertension: the race against a silent killer*. Geneva: World Health Organization, 2023.
87. Boenink R, Astley ME, Huijben JA *et al.* The ERA Registry Annual Report 2019: summary and age comparisons. *Clin Kidney J* 2022;**15**:452–72. https://doi.org/10.1093/ckj/sfab273
88. Johansen KL, Chertow GM, Gilbertson DT *et al.* US Renal Data System 2021 annual data report: epidemiology of kidney disease in the United States. *Am J Kidney Dis* 2022;**79**:A8–12. https://doi.org/10.1053/j.ajkd.2022.02.001
89. Cerezo C, Ruilope LM, Segura J *et al.* Microalbuminuria breakthrough under chronic renin-angiotensin-aldosterone system suppression. *J Hypertens* 2012;**30**:204–9. https://doi.org/10.1097/HJH.0b013e32834d9e0f
90. Kidney Disease: Improving Global Outcomes Blood Pressure Work Group. KDIGO 2021 clinical practice guideline for the management of blood pressure in chronic kidney disease. *Kidney Int* 2021;**99**(3S):S1–87.
91. Kidney Disease: Improving Global Outcomes Lipid Working Group. KDIGO clinical practice guideline for lipid management in chronic kidney disease. *Kidney Int Suppl* 2013;**3**:263–305.
92. Ferro CJ, Mark PB, Kanbay M *et al.* Lipid management in patients with chronic kidney disease. *Nat Rev Nephrol* 2018;**14**:727–49. https://doi.org/10.1038/s41581-018-0072-9
93. Vucic Lovrencic M, Bozicevic S, Smircic Duvnjak L. Diagnostic challenges of diabetic kidney disease. *Biochem Med (Zagreb)* 2023;**33**:030501.
94. Kidney Disease: Improving Global Outcomes Diabetes Work Group. KDIGO 2022 clinical practice guideline for diabetes management in chronic kidney disease. *Kidney Int* 2022;**102**(5S):S1–127. https://doi.org/10.1016/j.kint.2022.06.008
95. McGill JB, Haller H, Roy-Chaudhury P *et al.* Making an impact on kidney disease in people with type 2 diabetes: the importance of screening for albuminuria. *BMJ Open Diabetes Res Care* 2022;**10**:e002806. https://doi.org/10.1136/bmjdrc-2022-002806
96. Thomas B. The global burden of diabetic kidney disease: time trends and gender gaps. *Curr Diab Rep* 2019;**19**:18. https://doi.org/10.1007/s11892-019-1133-6
97. Koye DN, Magliano DJ, Nelson RG *et al.* The global epidemiology of diabetes and kidney disease. *Adv Chronic Kidney Dis* 2018;**25**:121–32. https://doi.org/10.1053/j.ackd.2017.10.011
98. Rossing P, Frimodt-Moller M, Persson F. Precision medicine and/or biomarker based therapy in T2DM: ready for prime time? *Semin Nephrol* 2023;**43**:151430. https://doi.org/10.1016/j.semnephrol.2023.151430
99. International Diabetes Federation. *IDF diabetes atlas, 10th edition*. Brussels: International Diabetes Federation, 2021.
100. American Diabetes Association Professional Practice Committee. 2. Classification and diagnosis of diabetes: standards of medical care in diabetes–2022. *Diabetes Care* 2022;**45**(Suppl 1):S17–38.
101. Riddle MC, Cefalu WT, Evans PH *et al.* Consensus report: definition and interpretation of remission in type 2 diabetes. *Diabetes Care* 2021;**44**:2438–44. https://doi.org/10.2337/dci21-0034
102. Humphreys A, Bravis V, Kaur A *et al.* Individual and diabetes presentation characteristics associated with partial remission status in children and adults evaluated up to 12 months following diagnosis of type 1 diabetes: an ADDRESS-2 (After Diagnosis Diabetes Research Support System-2) study analysis. *Diabetes Res Clin Pract* 2019;**155**:107789.
103. International Expert Committee. International Expert Committee report on the role of the A1C assay in the diagnosis of diabetes. *Diabetes Care* 2009;**32**:1327–34. https://doi.org/10.2337/dc09-9033
104. Bergman M, Manco M, Satman I *et al.* International Diabetes Federation position statement on the 1-hour post-load plasma glucose for the diagnosis of intermediate hyperglycaemia and type 2 diabetes. *Diabetes Res Clin Pract* 2024;**209**:111589. https://doi.org/10.1016/j.diabres.2024.111589

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