Supplementary Table 1—ADA and KDIGO 2022 guideline comparison (2,51)

	ADA 2022 Standards of Medical Care in Diabetes	KDIGO 2022 Clinical Practice Guideline for Diabetes Management in Chronic Kidney Disease
Lifestyle		
Medical nutrition therapy	• 5.9 An individualized medical nutrition therapy program as needed to achieve treatment goals, provided by a registered dietitian nutritionist (RD/RDN), preferably one who has comprehensive knowledge and experience in diabetes care, is recommended for all people with T1D or T2D, prediabetes, and gestational diabetes mellitus (A). • 5.10 Because diabetes medical nutrition therapy can result in cost savings (B) and improved outcomes (e.g., HbA_{1c} reduction, reduced weight, decrease in cholesterol) (A), medical nutrition therapy should be adequately reimbursed by insurance and other payers (E).	• Practice Point 3.1.4* Accredited nutrition providers, registered dietitians and diabetes educators, community health workers, peer counselors, or other health workers should be engaged in the multidisciplinary nutrition care of patients with diabetes and CKD. • Patients with newly diagnosed diabetes should be referred for individualized nutrition education at diagnosis. • Patients with long-standing diabetes and CKD should have access to nutrition education yearly, as well as at critical times, to help build self-management skills.
Diet	• 5.19 In individuals with T2D, ingested protein appears to increase insulin response without increasing plasma glucose concentrations. Therefore, carbohydrate sources high in protein should be avoided when trying to treat or prevent hypoglycemia (B). • 5.25 Sodium consumption should be limited to <2,300 mg/day (B). • 5.12 There is no ideal macronutrient pattern for people with diabetes; meal plans should be individualized while keeping total calorie and metabolic goals in mind (E). • 5.15 Carbohydrate intake should emphasize nutrient-dense carbohydrate sources that are high in fiber (at least 14 g fiber per 1,000 kcal) and minimally processed. Eating plans should emphasize nonstarchy vegetables, fruits, and whole grains, as well as dairy products, with minimal added sugars (B). • 5.20 An eating plan with emphasis on elements of a Mediterranean-style eating pattern rich in monounsaturated and polyunsaturated fats may be considered to improve glucose metabolism and lower cardiovascular disease risk (B). • 5.21 Eating foods rich in long-chain n-3 fatty acids, such as fatty fish (EPA and DHA) and nuts and seeds (ALA), is	• Recommendation 3.1.1 We suggest maintaining a protein intake of 0.8 g protein/kg body (weight)/day for those with diabetes and CKD not treated with dialysis (2C). • Recommendation 3.1.2: We suggest that sodium intake be <2 g sodium per day (or <90 mmol sodium per day or <5 g sodium chloride per day) for patients with diabetes and CKD (2C). • Practice Point 3.1.1* Patients with diabetes and CKD should consume an individualized diet high in vegetables, fruits, whole grains, fiber, legumes, plant-based proteins, unsaturated fats, and nuts and lower in processed meats, refined carbohydrates, and sweetened beverages. • No recommendations on dietary carbohydrate intake. • No recommendations on dietary fat intake.

	recommended to prevent or treat cardiovascular disease (B).	
Physical activity	• 5.28 Most adults with T1D (C) and T2D (B) should engage in ≥150 min of moderate- to vigorous-intensity aerobic activity per week, spread over at least 3 days/week, with no more than 2 consecutive days without activity. Shorter durations (minimum 75 min/week) of vigorous-intensity or interval training may be sufficient for younger and more physically fit individuals. • 5.29 Adults with T1D (C) and T2D (B) should engage in two to three sessions/week of resistance exercise on nonconsecutive days. • 5.30 All adults, and particularly those with T2D, should decrease the amount of time spent in daily sedentary behavior (B). Prolonged sitting should be interrupted every 30 min for blood glucose benefits (C).	• Recommendation 3.2.1: We recommend that patients with diabetes and CKD be advised to undertake moderate-intensity physical activity for a cumulative duration of at least 150 min/week or to a level compatible with their cardiovascular and physical tolerance (1D).
Alcohol	• 5.23 Adults with diabetes who drink alcohol should do so in moderation (no more than 1 drink/day for adult women and no more than 2 drinks/day for adult men) (C).	• No recommendations on alcohol intake.
Risk factor control		
BP management	○ 10.4 For individuals with diabetes and hypertension at higher cardiovascular risk (existing ASCVD or 10-year ASCVD risk ≥15%), a BP target of <130/80 mmHg may be appropriate, if it can be safely attained (B). ○ 10.5 For individuals with diabetes and hypertension at lower risk for cardiovascular disease (10-year ASCVD risk <15%), treat to a BP target of <140/90 mmHg (A).	• Recommendation 1.2.1 We recommend that treatment with an angiotensin-converting enzyme inhibitor (ACEi) or an angiotensin II receptor blocker (ARB) be initiated in patients with diabetes, hypertension, and albuminuria and that these medications be titrated to the highest approved dose that is tolerated (1B). • BP targets based on KDIGO 2021 Clinical Practice Guideline for the Management of Blood Pressure in Chronic Kidney Disease (39): ○ Recommendation 3.1.1 We suggest that adults with high BP and CKD be treated with a target systolic BP of <120 mmHg, when tolerated, with use of standardized office BP measurement (2B). ○ Diabetes: The benefits of intensive BP lowering are less certain among patients with concomitant diabetes and CKD than among patients with CKD without diabetes.

Lipid management	• 10.19 For patients with diabetes aged 40–75 years without ASCVD, use moderate-intensity statin therapy in addition to lifestyle therapy (A). • 10.20 For patients with diabetes aged 20–39 years with additional ASCVD risk factors, it may be reasonable to initiate statin therapy in addition to lifestyle therapy (C). • 10.21 In patients with diabetes at higher risk, especially those with multiple ASCVD risk factors or aged 50–70 years, it is reasonable to use high-intensity statin therapy (B). • 10.22 In adults with diabetes and 10-year ASCVD risk of ≥20%, it may be reasonable to add ezetimibe to maximally tolerated statin therapy to reduce LDL cholesterol levels by ≥50% (C).	• Lipid management based on 2013 2013 KDIGO Clinical Practice Guideline for Lipid Management in Chronic Kidney Disease (46): o Recommendation 2.1.1 In adults aged ≥50 years with eGFR <60 mL/min/1.73 m^2 but not treated with chronic dialysis or kidney transplantation (GFR categories G3a–G5), we recommend treatment with a statin or statin/ezetimibe combination (1A). o Recommendation 2.1.2 In adults aged ≥50 years with CKD and eGFR ≥60 mL/min/1.73 m^2 (GFR categories G1–G2) we recommend treatment with a statin (1B). o Recommendation 2.2: In adults aged 18–49 years with CKD but not treated with chronic dialysis or kidney transplantation, we suggest statin treatment in people with one or more of the following (2A): ▪ known coronary disease (myocardial infarction or coronary revascularization) ▪ diabetes ▪ prior ischemic stroke ▪ estimated 10-year incidence of coronary death or nonfatal myocardial infarction >10%.
Albuminuria	• No recommendations on ACEi or ARB use for albuminuria in the absence of HTN.	• Practice Point 1.2.1* For patients with diabetes, albuminuria, and normal blood pressure, treatment with an ACEi or ARB may be considered.
Obesity	• 5.11 For all patients with overweight or obesity, behavioral modification to achieve and maintain a minimum weight loss of 5% is recommended (A). • 8.5 Diet, physical activity, and behavioral therapy to achieve and maintain ≥5% weight loss is recommended for most people with T2D and overweight or obesity. Additional weight loss usually results in further improvements in control of diabetes and cardiovascular risk (B).	• Practice Point 3.2.4* Physicians should consider advising/encouraging patients with obesity, diabetes, and CKD to lose weight, particularly patients with eGFR ≥30 mL/min per 1.73 m^2. • Practice Point 4.2.5* GLP-1 receptor agonist may be preferentially used in patients with obesity, T2D, and CKD to promote intentional weight loss.
Other	• 5.33 Advise all patients not to use cigarettes and other tobacco products or e-cigarettes (A).	• Recommendation 1.5.1 We recommend advising patients with diabetes and CKD who use tobacco to quit using tobacco products (1D).

Glycemic control		
Metric and frequency of monitoring	• 6.1 Assess glycemic status (HbA_{1c} or other glycemic measurement such as time in range or glucose management indicator) at least two times a year in patients who are meeting treatment goals (and who have stable glycemic control) (E). • 6.2 Assess glycemic status at least quarterly and as needed in patients whose therapy has recently changed or who are not meeting glycemic goals (E).	• Practice Point 2.1.1* Monitoring long-term glycemic control with HbA_{1c} measurement twice per year is reasonable for patients with diabetes. HbA_{1c} may be measured as often as 4 times per year if the glycemic target is not met or after a change in glucose-lowering therapy. • Recommendation 2.1.1 We recommend using HbA_{1c} to monitor glycemic control in patients with diabetes and CKD (1C). • Practice Point 2.1.2* Accuracy and precision of HbA_{1c} measurement declines with advanced CKD (G4–G5), particularly among patients treated with dialysis, for whom HbA_{1c} measurements have low reliability.
Individual targets	• 6.5a An HbA_{1c} goal for many nonpregnant adults of <7% (53 mmol/mol) without significant hypoglycemia is appropriate (A). • 6.7 Less stringent HbA_{1c} goals (such as <8% [64 mmol/mol]) may be appropriate for patients with limited life expectancy or where the harms of treatment are greater than the benefits (B).	• Recommendation 2.2.1 We recommend an individualized HbA_{1c} target ranging from <6.5% to <8.0% for patients with diabetes and CKD not treated with dialysis (1C).
CGM and technology	• 7.11 Real-time CGM (A) or intermittently scanned CGM (B) should be offered for diabetes management in adults with diabetes on multiple daily injections or continuous subcutaneous insulin infusion who are capable of using devices safely (either by themselves or with a caregiver). The choice of device should be made based on patient circumstances, desires, and needs. • 7.12 Real-time CGM (A) or intermittently scanned CGM (C) can be used for diabetes management in adults with diabetes on basal insulin who are capable of using devices safely (either by themselves or with a caregiver). The choice of device should be made based on patient circumstances, desires, and needs. • 6.4 Time in range is associated with risk of microvascular complications and can be used for assessment of glycemic control. Additionally, time below target and time above target are useful parameters for evaluation of treatment regimens (C).	• Practice Point 2.1.4* Daily glycemic monitoring with CGM or self-monitoring of blood glucose (SMBG) may help prevent hypoglycemia and improve glycemic control when glucose-lowering therapies associated with risk of hypoglycemia are used. • Practice Point 2.1.3* A glucose management indicator (GMI) derived from continuous glucose monitoring (CGM) data can be used to index glycemia for individuals in whom HbA_{1c} is not concordant with directly measured blood glucose levels or clinical symptoms. • Practice Point 2.2.2* CGM metrics, such as time in range and time in a state of hypoglycemia, may be considered as alternatives to HbA_{1c} for defining glycemic targets in some patients.

	• 6.5b If using ambulatory glucose profile/glucose management indicator to assess glycemia, a parallel goal for many nonpregnant adults is time in range of >70% with time below range of <4% and time <54 mg/dL of <1% (B). • 7.21 Connected insulin pens can be helpful for diabetes management and may be used for patients on injectable therapy (E). • 7.23 Automated insulin delivery systems should be offered for diabetes management to youth and adults with T1D (A) and other types of insulin-deficient diabetes (E) who are capable of using the device safely (either by themselves or with a caregiver). The choice of device should be made based on patient circumstances, desires, and needs. • 7.24 Insulin pump therapy alone with or without sensor-augmented low-glucose suspend should be offered for diabetes management to youth and adults on multiple daily injections with T1D (A) or other types of insulin- deficient diabetes (E) who are capable of using the device safely (either by themselves or with a caregiver) and are not able to use/interested in an automated insulin delivery system. The choice of device should be made based on patient circumstances, desires, and needs (A). • 7.25 Insulin pump therapy can be offered for diabetes management to youth and adults on multiple daily injections with T2D who are capable of using the device safely (either by themselves or with a caregiver). The choice of device should be made based on patient circumstances, desires, and needs (A).	
Pharmacotherapy		
RAS inhibition	• 11.7 In nonpregnant patients with diabetes and hypertension, either an ACEi or an ARB is recommended for those with modestly elevated urinary ACR (30–299 mg/g creatinine) (B) and is strongly recommended for those with urinary ACR ≥300 mg/g creatinine or eGFR <60 mL/min/1.73 m^2 (A).	• Recommendation 1.2.1 We recommend that treatment with an angiotensin-converting enzyme inhibitor (ACEi) or an angiotensin II receptor blocker (ARB) be initiated in patients with diabetes, hypertension, and albuminuria and that these medications be titrated to the highest approved dose that is tolerated (1B).
	• *Not a recommendation but text states "While ACE inhibitors or ARBs are often prescribed for high albuminuria without hypertension, outcome trials have not been performed in this setting to determine whether they improve renal outcomes.*	• Practice Point 1.2.1* For patients with diabetes, albuminuria, and normal blood pressure, treatment with an ACEi or ARB may be considered.

	Moreover, two long-term, double-blind studies demonstrated no renoprotective effect of either ACE inhibitors or ARBs in type 1 and type 2 diabetes among those who were normotensive with or without high albuminuria (formerly microalbuminuria)"	
	• 11.9 An ACEi or an ARB is not recommended for the primary prevention of CKD in patients with diabetes who have normal BP, normal urinary ACR (<30 mg/g creatinine), and normal eGFR (A).	• *(Not a Practice Point but text states "not beneficial for patients with neither albuminuria nor elevated BP")*
	• 11.8 Periodically monitor serum creatinine and potassium levels for the development of increased creatinine or changes in potassium when ACEi, ARBs, or diuretics are used (B). • 10.13 For patients treated with an ACEi, ARB, or diuretic, serum creatinine/eGFR and serum potassium levels should be monitored at least annually (B).	• Practice Point 1.2.2* Monitor for changes in blood pressure, serum creatinine, and serum potassium within 2–4 weeks of initiation or increase in the dose of an ACEi or ARB.
	• 11.5 Do not discontinue renin-angiotensin system blockade for minor increases in serum creatinine (≤30%) in the absence of volume depletion (A).	• Practice Point 1.2.3* Continue ACEi or ARB therapy unless serum creatinine rises by >30% within 4 weeks following initiation of treatment or an increase in dose.
	• *(11.7 mentions "non pregnant")*	• Practice Point 1.2.4* Advise contraception in women who are receiving ACEi or ARB therapy and discontinue these agents in women who are considering pregnancy or who become pregnant.
	• *". . . and restriction of dietary potassium may be necessary to control serum potassium concentration. These interventions may be most important for patients with reduced eGFR, for whom urinary excretion of sodium and potassium may be impaired. For patients on dialysis, higher levels of dietary protein intake should be considered, since malnutrition is a major problem in some dialysis patients. Recommendations for dietary sodium and potassium intake should be individualized on the basis of comorbid conditions, medication use, BP, and laboratory data."*	• Practice Point 1.2.5* Hyperkalemia associated with use of an ACEi or ARB can often be managed with measures to reduce serum potassium levels rather than decreasing the dose or stopping the ACEi or ARB immediately.
	• *"Additionally, when increases in serum creatinine are up to 30% and do not have associated hyperkalemia, RAS blockade should be continued."*	• Practice Point 1.2.3* Continue ACEi or ARB therapy unless serum creatinine rises by >30% within 4 weeks following initiation of treatment or an increase in dose. • Practice Point 1.2.6* Reduce the dose or discontinue ACEi or ARB therapy in the setting of either

		symptomatic hypotension or uncontrolled hyperkalemia despite the medical treatment outlined in Practice Point 1.2.5 or to reduce uremic symptoms while treating kidney failure (estimated glomerular filtration rate [eGFR] <15 mL/min per 1.73 m^2).
	• *"Therefore, the combined use of ACEi and ARBs should be avoided."*	• Practice Point 1.2.7* Use only one agent at a time to block the RAS. The combination of an ACEi with an ARB, or the combination of an ACEi or ARB with a direct renin inhibitor, is potentially harmful.
	• 10.14 Patients with hypertension who are not meeting BP targets on three classes of antihypertensive medications (including a diuretic) should be considered for mineralocorticoid receptor antagonist therapy (B). • 11.3c In patients with CKD who are at increased risk for cardiovascular events or CKD progression or are unable to use an SGLT2i, an ns-MRA (finerenone) is recommended to reduce CKD progression and cardiovascular events (A).	• Recommendation 1.4.1 We suggest an nonsteroidal mineralocorticoid receptor antagonist with proven kidney or cardiovascular benefit for patients with T2D, eGFR ≥25 mL/min per 1.73 m^2, normal serum potassium concentration, and albuminuria (≥30 mg/g [(3 mg/mmol]) despite maximum tolerated dose of RAS inhibitor (2A). • Practice Point 1.4.1* Nonsteroidal MRA are most appropriate for patients with T2D who are at high risk of CKD progression and cardiovascular events, as demonstrated by persistent albuminuria despite other standard-of-care therapies. • Practice Point 1.4.2* An nonsteroidal MRA can be added to an RASi and an SGLT2i for treatment of T2D and CKD. • Practice Point 1.4.3* To mitigate risk of hyperkalemia, select patients with consistently normal serum potassium concentration and monitor serum potassium regularly after initiation of an nonsteroidal MRA. • Practice Point 1.4.4* The choice of a nonsteroidal MRA should prioritize agents with documented kidney or cardiovascular benefits. • Practice Point 1.4.5* A steroidal MRA should be used for treatment of heart failure, hyperaldosteronism, or refractory hypertension, but may cause hyperkalemia or a reversible decline in glomerular filtration, particularly among patients with a low GFR.
Metformin	• 9.4a First-line therapy depends on comorbidities, patient-centered treatment factors, and management needs and generally includes metformin and comprehensive lifestyle modification (A).	• Recommendation 4.1.1 We recommend treating patients with T2D, CKD, and eGFR ≥30 mL/min per 1.73 m^2 with metformin (1B).

		• Practice Point 4.1.3* Adjust the dose of metformin when eGFR is <45 mL/min per1.73 m^2 and for some patients when eGFR is 45–59 mL/min per 1.73 m^2
SGLT2 inhibitors	• 10.42 Among patients with T2D who have established ASCVD or established kidney disease, an SGLT2i or GLP-1 receptor agonist with demonstrated cardiovascular disease benefit is recommended as part of the comprehensive cardiovascular risk reduction and/or glucose-lowering regimens (A). • 10.42a In patients with T1D and established ASCVD, multiple ASCVD risk factors, or diabetic kidney disease, an SGLT2i with demonstrated cardiovascular benefit is recommended to reduce the risk of major adverse cardiovascular events and/or heart failure hospitalization (A). • §11.3a For patients with T2D and diabetic kidney disease, use of an SGLT2i in patients with eGFR ≥20 mL/min/1.73 m^2 and urinary albumin ≥200 mg/g creatinine is recommended to reduce CKD progression and cardiovascular events (A). • §11.3b For patients with T2D and diabetic kidney disease, use of an SGLT2i is recommended to reduce chronic kidney disease progression and cardiovascular events in patients with an estimated glomerular filtration rate ≥20 mL/min/1.73 m^2 and urine albumin ranging from normal to 200 mg/g creatinine (A).	• Recommendation 1.3.1 We recommend treating patients with type 2 diabetes (T2D), CKD, and an eGFR ≥20 ml/min/1.73 m^2 with an SGLT2i (1A). • Practice Point 1.3.1* The recommendation for SGLT2i is for kidney and cardiovascular protection and SGLT2i have been shown to have safety and benefit in CKD patients, even for those without T2D. Thus, if patients are already being treated with other glucose-lowering agents, an SGLT2i can be added to current treatment regimen. • Practice Point 1.3.2* The choice of an SGLT2i should prioritize agents with documented kidney or cardiovascular benefits and take eGFR into account. • Practice Point 1.3.3* It is reasonable to withhold SGLT2i during times of prolonged fasting, surgery, or critical medical illness (when patients may be at greater risk for ketosis). • Practice Point 1.3.4* If a patient is at risk for hypovolemia, consider decreasing thiazide or loop diuretic dosages before commencement of SGLT2i treatment, advise patients about symptoms of volume depletion and low blood pressure, and follow up on volume status after drug initiation. • Practice Point 1.3.5* A reversible decrease in eGFR with commencement of SGLT2i treatment may occur and is generally not an indication to discontinue therapy. • Practice Point 1.3.6* Once an SGLT2i is initiated, it is reasonable to continue an SGLT2i even if eGFR falls below 20 mL/min/1.73 m^2, unless it is not tolerated or kidney replacement therapy is initiated. • Practice Point 1.3.7* SGLT2i have not been adequately studied in kidney transplant recipients, who may benefit from SGLT2i treatment, but are immunosuppressed and potentially at increased risk for infections; therefore, the recommendation to use SGLT2i does not apply to kidney transplant recipients (see Recommendation 1.3.1).
GLP-1 receptor agonists	• 10.42 Among patients with T2D who have established ASCVD or established kidney disease, an SGLT2i or a	• Recommendation 4.2.1 In patients with T2D and CKD who have not achieved individualized glycemic targets despite

	GLP-1 receptor agonist with demonstrated cardiovascular disease benefit is recommended as part of the comprehensive cardiovascular risk reduction and/or glucose-lowering regimens (A).	use of metformin and SGLT2i treatment, or who are unable to use those medications, we recommend a long-acting GLP-1 RA (1B). • Practice Point 4.2.1* The choice of GLP-1 RA should prioritize agents with documented cardiovascular benefits. • Practice Point 4.2.2* To minimize gastrointestinal side effects, start with a low dose of GLP-1 receptor agonist and titrate up slowly. • Practice Point 4.2.3* GLP-1 RA should not be used in combination with dipeptidyl peptidase-4 (DPP-4) inhibitors. • Practice Point 4.2.4* The risk of hypoglycemia is generally low with GLP-1 RA when used alone, but risk is increased when GLP-1 RA is used concomitantly with other medications such as sulfonylureas or insulin. The doses of sulfonylurea and/or insulin may need to be reduced. • Practice Point 4.2.5* GLP-1 RA may be preferentially used in patients with obesity, T2D, and CKD to promote intentional weight loss.

The ADA defines level of evidence as follows: A for clear or supportive evidence from well-conducted, generalizable randomized control trials that are adequately powered; B for supportive evidence from well-conducted cohort or case-control studies; C for supportive evidence from poorly controlled or uncontrolled studies, or conflicting evidence with the weight of evidence supporting the recommendation; and E for expert consensus or clinical experience. KDIGO uses the GRADE framework, with the strength of recommendation indicated as level 1 (strong) or level 2 (weak/conditional) and the quality of the supporting evidence rated as A (high), B (moderate), C (low), or D (very low). ALA, α-linolenic acid; DHA, docosahexaenoic acid; EPA, eicosapentaenoic acid; HTN, hypertension.

*Practice Point: opinion-based statements that lack sufficient evidence for a formal recommendation but were considered important by the KDIGO Work Group to guide clinical care.

†Recommendations may differ for older adults, children/adolescents, and pregnant women.

§ADA recommendations 11.3a and 11.3b include updates made in September 2022 through ADA's living Standards of Care guideline update process.