

The ABCDEF Ultra Violet S: A Family Medicine Guide for Comprehensive Chronic Disease Management

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Abstract

The *ABCDEF Ultra Violet S: a Family Medicine Guide for Comprehensive Chronic Disease Management* is an evidence-based, checklist-driven framework designed to close critical gaps in chronic disease management within primary care. Grounded in international and regional guidelines, the tool integrates preventive strategies across metabolic, cardiovascular, mental health, cancer, and vaccination domains into a single, practical format for busy family medicine clinics. Its dual-purpose design supports clinicians by reducing cognitive load and standardizing care delivery, while empowering patients through education and shared decision-making. Expected outcomes include improved adherence to screening protocols, earlier detection of complications, enhanced patient engagement, and cost savings through prevention. Implementation requires provider training, stakeholder engagement, and iterative refinement, supported by quality audits and continuous improvement initiatives. This guide reflects the core principles of family medicine, comprehensive, patient-centered, and quality-driven care, and offers a scalable model for transforming chronic disease management in Qatar and beyond.

Keywords: Diabetic Care, Diabetes Mellitus, Non-communicable Diseases, Hypertension, Chronic Kidney Diseases, Retinopathy, Neuropathy, Nephropathy

Introduction

Family medicine clinics serve as the cornerstone of healthcare delivery, particularly for patients managing chronic conditions such as diabetes, hypertension, cardiovascular disease, and chronic kidney disease. These conditions, collectively referred to as Cardiovascular-Kidney-Metabolic (CKM) disorders, require ongoing monitoring, preventive interventions, and patient education to prevent complications and optimize outcomes (1). However, the reality of clinical practice often falls short of the ideal. Physicians face significant time pressures, with the average primary care visit lasting only 10 to 15 minutes, during which they must address acute concerns, manage multiple chronic conditions, provide preventive care, and educate patients. This demanding environment creates a fertile ground for care gaps, where important screening tests, vaccinations, or patient counseling may be inadvertently omitted.

Significant percentage of deaths are attributed to behavioural and preventable causes, many of which could be addressed through systematic preventive care in primary care settings (2). Patients with chronic diseases represent a substantial share of healthcare spending, with a large portion of these costs stemming from complications that could have been prevented (2). The challenge is not a lack of knowledge about what should be done, but rather the absence of a reliable system to ensure that all necessary care elements are consistently delivered in every patient encounter. In the local context of Qatar, no clear data are published on expenditure on chronic diseases but is expected to be similar to high income countries with large burden.

In this article we present a model that provides a comprehensive approach to care of patients with chronic disease in primary care clinics and general medicine clinics. Components of this tabular model are supported by narrative literature review of evidence from well-known clinical societies and published studies.

Care Areas

The following table summarizes care areas across all categories of the ABCDEF-UVS guide:

	Medical Intervention	Relevant guidance	Reference(s)
A	HbA1c Testing	Diabetes: ≥ 2 /year if stable; every 3 months if therapy changed or not at goal; consider more frequent per clinical judgement; non-diabetes: screen every 3 years if at risk; annually if prediabetes or history of gestational diabetes; avoid if assay accuracy affected.	(3–9)
	Aspirin Therapy	Primary prevention: consider age 40–59 with $\geq 10\%$ 10-yr CVD risk & low bleeding risk; avoid initiating ≥ 60; individualize in diabetes; secondary prevention: indicated.	(10–16)
B	Blood Pressure Monitoring	Measure at every visit; confirm elevated readings; home/ambulatory monitoring for HTN/white-coat/masked; targets $<130/80$ for diabetes/CKD/CAD; follow-up monthly during titration , then q3–6 months when controlled.	(17–25)
	BMI Documentation	Height/weight & BMI annually; q3 months during active weight management; consider waist circumference .	(25–29)
C	CVD Risk Assessment	Documented in only 5–16% of eligible patients. 59% of physicians do not calculate it routinely. Use PREVENT (or validated tool) at baseline; repeat q4–6 years (age 40–75) or with risk change; annual risk factor review in diabetic patients.	(30–37)
	Cholesterol Screening	Adults with diabetes: lipid profile at diagnosis/initial visit; annually thereafter; 4–12 weeks after statin start/dose change, then annually ; pediatrics: initial post-glycemic optimization, annual , treat if LDL >130 after lifestyle. 30–37% of patients miss recommended lipid screening.	(17,38,39)
D	Depression & Anxiety Screening	At initial visit and at least annually; more often with history or triggers; tools: PHQ-9, GAD-7, WHO-5, PAID.	(25,40–46)
	Dental assessment	Annually in DM, HTN, dialysis/transplant patients , semiannual in uncontrolled/poor control patients, consider pre-procedural for CVD procedures.	(41,47–57)
E	Erectile Dysfunction & Genitourinary symptoms in females	Proactive inquiry routinely; use SHIM ; initial labs (AM testosterone, glucose, lipids); assess CVD risk; screen for bladder dysfunction when indicated and screen for other urinary symptoms.	(58–62)
	Electrocardiogram	Baseline for HTN, consider for DM & CKD Annually for HTN, consider according to risk and stage for other chronic conditions	(8,17,20,63–65)

	Medical Intervention	Relevant guidance	Reference(s)
F	Diabetic Foot Exam	Comprehensive annual exam; every visit if LOPS/prior ulcer/amputation; risk-stratified follow-up: 12 mth (very low), 6–12 mth (low), 3–6 mth (moderate), 1–3 mth (high); self-care education.	(66–71)
	Fundus/Eye Exam	T1D: first within 5 years of diagnosis; T2D: at diagnosis; q1–2 years if no retinopathy & good control, else annually or more often; pregnancy: pre-conception/1st trimester & as indicated ; validated retinal imaging is an acceptable option. Fundus examination is only indicated when end-organ damage is expected in patients with HTN and despite the high risk of ophthalmic conditions in patients with CKD, screening is individualized as per clinical need..	(25,38,66,72–75)
	FIB-4 Score (Liver)	At diagnosis/initial evaluation for T2D/prediabetes/CM risk; repeat q1–2 years if low risk; if FIB-4 ≥1.3 , do elastography/ELF; >2.67 : refer hepatology	(41,76–80)
	Heart Failure Screening (Pro BNP)	Baseline at diagnosis (T2D; T1D after ~5 yrs) and annually ; if NT-proBNP ≥125 pg/mL consider echocardiography.	(17,81–86)
U	Urine albumin creatinine ratio	Annually : T2D at diagnosis; T1D starting 5 years post-diagnosis; 1–4×/year if CKD; confirm abnormalities within 3–6 months ; q3–6 months if worsening or after therapy change	(7,8,87,88)
V	Influenza Vaccine	Annually (inactivated) for all with diabetes/CM conditions	(41,89–91)
	Pneumococcal Vaccine	Age 19–64 : PCV15 or PCV20 (if PCV15 → PPSV23 ≥1 yr later); ≥65 : PCV15 or PCV20 with same follow-up.	(25,41,90)
	Hepatitis B Vaccine	Universal <60 yrs ; ≥60 yrs : consider by risk	(41,90)
	HZV, Tdap Vaccine	Recombinant HZV (shingles) 2 doses for ≥50 yrs ; Tdap booster every 10 yrs	(25,41,90)
	RSV	≥60 yrs : single RSV vaccine particularly those with congestive heart failure, chronic obstructive lung disease, diabetes mellitus, chronic kidney disease. Give around late summer, early autumn.	(41,92–97)

	Medical Intervention	Relevant guidance	Reference(s)
S	General Screening	Patients with chronic diseases have consistently lower cancer screening rates . Follow age/sex-appropriate national guidelines in coordination with PCP.	(41)
	Breast, Cervical, Colorectal	CRC: start 45–75 yrs (FIT yearly; mt-sDNA q3 yrs; colonoscopy q10 yrs; CT colonography q5; flex sig q5); Breast: annual 45–54, then biennial ≥55 (or annual); Cervical: Pap q3 yrs (21–29); HPV+Pap q5 yrs (30–65)	(98–106)
	Osteoporosis	DXA ≥65 yrs (women) & ≥70 yrs (men) or earlier with risk; monitor q2–3 yrs ; consider diabetes-specific risks. Qatar national guidelines recommend locally calibrated FRAX tool (Q-FRAX) in postmenopausal women and men aged ≥50 years, with particular emphasis on identifying high fracture risk among patients with chronic conditions where DXA scanning is reserved for those classified as high-risk by Q-FRAX.	(41,107,108)
	Sleep apnea	Annual screening in high-risk adults (T2D, obesity, resistant HTN, etc.) using STOP-Bang/Epworth ; evaluate symptoms; integrate into cardio-metabolic pathways	(25,41,91,109–113)

BMI: body mass index, CVD: cardiovascular disease, PHQ-9: patient health questionnaire, GAD-9: Generalized anxiety disorder questionnaire, SHIM: sexual health inventory for men, LOPS: loss of protective sensation, PCV: pneumococcal vaccine, HZV: herpes zoster virus, RSV: respiratory syncytial virus, Tdap: tetanus, diphtheria, and acellular pertussis, colorectal cancer, DXA: dual energy x-ray absorptiometry, FRAX: fracture risk assessment tool.

3. Chronic Disease Care

Extensive research across multiple countries and healthcare systems has documented significant and consistent gaps between evidence-based clinical guidelines and the care delivered to patients with chronic diseases. These gaps are not merely academic concerns; they represent missed opportunities to prevent disease progression, reduce complications, and improve quality of life. The following analysis presents chronic disease management care plan of the key domains addressed by the ABCDEF-UVS mnemonic guide.

3.1 HbA1c Testing:

Glycemic control is the cornerstone of diabetes management, yet adherence to recommended HbA1c testing is alarmingly low. A comprehensive five-year retrospective cohort study in Australian general practice found that the overall median HbA1c testing frequency was only 1.6 tests per year, with an adherence rate of just 50% to guideline-recommended testing intervals.⁽³⁾ This means that half of diabetic patients are not receiving the monitoring necessary to guide treatment adjustments. In some populations, the situation is more deficient. Adherence to recommended HbA1c monitoring among patients with diabetes in Saudi Arabia has shown similar suboptimal range. Studies report that less than half of patients undergo annual HbA1c testing, with compliance rates ranging from approximately 12% to 39% across different regions^(4,5). The clinical implications are significant: patients with low adherence to HbA1c testing showed persistently elevated glucose levels over time, while those with high adherence achieved better glycemic control and had a significantly lower risk of developing chronic kidney disease.

The American Diabetes Association (ADA) recommends that for patients with diabetes mellitus, hemoglobin A1C should be measured at least twice yearly in those meeting treatment goals and with stable glycemic control, and at least quarterly (every 3 months) in patients whose therapy has changed or who are not meeting glycemic goals. More frequent testing may be warranted based on clinical judgment and individual circumstances, such as hospital admission without a recent A1C result^(6–8). The rationale is that A1C reflects average glycemia over 2–3 months and is strongly linked to diabetes complications; regular monitoring allows for timely adjustments in therapy and assessment of long-term glycemic control^(6,7).

For patients with chronic diseases other than diabetes mellitus, the ADA does not recommend routine A1C testing unless there is a clinical suspicion of diabetes or prediabetes. In individuals with risk factors or conditions associated with insulin resistance (e.g., obesity, cardiovascular disease, hypertension, metabolic-associated steatotic liver disease), screening for diabetes or prediabetes should be considered, with repeat testing at least every 3 years if results are normal, and annually for those with prediabetes⁽⁹⁾. The frequency should be individualized based on risk status and initial results, as

there is no consensus for routine A1C monitoring in non-diabetic chronic disease populations⁽⁹⁾. A1C testing is not recommended for individuals with conditions that affect red blood cell turnover or hemoglobin variants, as these can interfere with assay accuracy⁽⁶⁾.

3.2 Aspirin Therapy:

The ASCEND trial in patients with diabetes but no established cardiovascular disease showed that aspirin modestly reduced serious vascular events but significantly increased major bleeding, resulting in a net neutral benefit for most patients⁽¹⁰⁾. Similar findings were reported in the general population, with ARRIVE and ASPREE trials demonstrating little or no net benefit for primary prevention due to increased bleeding risk, particularly in older adults^(11,12).

For other chronic conditions such as hypertension or stable coronary artery disease without prior events, the USPSTF recommends considering aspirin for primary prevention only in adults aged 40–59 years with a $\geq 10\%$ 10-year CVD risk and low bleeding risk, and not initiating it in those aged 60 or older⁽¹³⁾. The overall benefit is small, and shared decision-making is emphasized.

Sex differences have been explored, with some evidence suggesting aspirin may reduce myocardial infarction risk in men and stroke risk in women. However, the benefit for primary prevention in women with diabetes remains inconclusive⁽¹⁶⁾. Meta-analyses confirm that any benefit is generally limited to those at higher cardiovascular risk, and the risk of gastrointestinal and major bleeding events must be carefully weighed^(14,15).

In summary, aspirin for primary prevention in diabetes and other chronic non-communicable diseases should be individualized, focusing on patients with elevated cardiovascular risk and low bleeding risk, and generally avoided in older adults or those at increased bleeding risk. For secondary prevention, the benefit of aspirin remains well established^(10,12,13).

3.3 Blood Pressure Monitoring:

In Qatar and the region, and despite the confidence of primary care physicians in the management of hypertension, a marked deficiency exists in the frequency and target achievement with less than one third achieving the target blood pressure^(114–116). The ADA advises measuring blood pressure at every routine visit for patients with diabetes and other chronic non-communicable diseases, confirming elevated readings (systolic 120–129 mmHg and diastolic < 80 mmHg) with multiple measurements before diagnosing hypertension^(17,18). Home blood pressure monitoring is recommended for patients with diabetes and hypertension to detect white-coat or masked hypertension, while orthostatic measurements should be performed initially and periodically in those with symptoms or autonomic dysfunction risk^(17–19). Similar principles apply to other chronic conditions, with routine checks at clinical visits and individualized frequency based on risk factors and treatment changes⁽¹⁷⁾. The American Heart

Association (AHA) and American College of Cardiologists (ACC) recommend annual screening for adults at increased risk and more frequent monitoring for those with hypertension or elevated readings, with office visits every 3–6 months once goals are achieved and monthly follow-up during medication titration (20,117). Home monitoring and ambulatory monitoring are strongly encouraged for high-risk patients,(20,22,25) and accurate technique with standardized protocols remains essential (22,25).

The ACC/AHA recommends a blood pressure target of <130/80 mm Hg for adults with diabetes, CKD, CAD, and hypertension to reduce cardiovascular events, CKD progression, and mortality (20,24). Evidence from trials such as ACCORD and BROAD supports intensive control, though ACCORD did not show added benefit for a systolic target <120 mm Hg compared to <140 mm Hg, leading to the current recommendation of <130/80 mm Hg as a balance between benefit and risk, with individualization for frailty or intolerance (20). For CKD, SPRINT and meta-analyses support a systolic target <130 mm Hg, and ACE inhibitors or ARBs are preferred in patients with albuminuria ≥ 30 mg/g (20). For CAD, the same <130/80 mm Hg target applies, with nonpharmacologic strategies as first-line therapy and guideline-directed medications for compelling indications, while caution is advised to avoid diastolic BP <60 mm Hg in older adults or those with diabetes (23,24). Overall, intensive BP lowering reduces stroke, heart failure, coronary events, and mortality, with adverse effects being infrequent when monitored appropriately, and targets should be individualized for patients with limited tolerance or life expectancy (20).

3.4 Body Mass Index (BMI) Documentation:

BMI should be assessed and documented at least annually in all patients with diabetes and other chronic non-communicable diseases, and more frequently (every 3 months) during active weight management or when clinical concerns arise (26). The ADA emphasizes annual height and weight measurement to calculate BMI, with increased frequency during intervention or instability (26). While BMI is a useful screening tool for overweight and obesity, it should not be the sole measure; additional assessments such as waist circumference are recommended, particularly in populations with varying body composition and cardiometabolic risk (25,27,28). The American Association of Clinical Endocrinology advises confirming BMI through physical examination to exclude confounders like muscle mass or edema and recommends waist circumference as a marker of cardiometabolic risk (25). Documentation should be sensitive and nonjudgmental, using person-first language and explaining the clinical value of BMI assessment (26).

For patients with other chronic non-communicable diseases, routine BMI assessment is similarly recommended to guide weight management and monitor outcomes (24,28). Clinicians should consider racial and ethnic differences in BMI thresholds, as some populations experience increased cardiometabolic risk at lower BMI values (25,29). These recommendations aim to ensure accurate assessment, reduce stigma, and support individualized care.

Comorbidity	Screening Method / Diagnostic Criteria
Asthma / Respiratory Disease	History, physical examination; spirometry as indicated
Diabetes	Fasting plasma glucose ≥ 126 mg/dL; HbA1c $\geq 6.5\%$; 2-hour oral glucose tolerance test
Dyslipidemia	Lipid panel: triglycerides, HDL-C, LDL-C, total cholesterol, non-HDL-C
Gastroesophageal Reflux Disease	History; endoscopy as indicated
Hypertension	Sitting blood pressure $\geq 130/80$ mm Hg
Metabolic Syndrome	≥ 3 of: waist circumference ≥ 88 cm (women) or ≥ 102 cm (men); triglycerides ≥ 150 mg/dL; fasting glucose ≥ 100 mg/dL; BP $\geq 130/85$ mm Hg; HDL-C < 40 mg/dL (men) or < 50 mg/dL (women)
Nonalcoholic Fatty Liver Disease	Liver function tests; Fibrosis-4 Index calculation; imaging
Obstructive Sleep Apnea	Neck circumference: screening questionnaires (e.g., STOP-BANG); polysomnography as indicated
Osteoarthritis	History; physical examination (weight-bearing joints); radiography as indicated
Prediabetes	Fasting plasma glucose 100–125 mg/dL; HbA1c 5.7–6.4%; 2-hour oral glucose tolerance test

3.5 CVD Risk Calculation and Electrocardiogram:

Atherosclerosis cardiovascular disease risk estimation is an essential component of cardiovascular prevention in patients with diabetes mellitus, hypertension, chronic kidney disease, and other chronic non-communicable diseases. Baseline assessment should be performed at the initial evaluation using validated tools such as the PREVENT risk calculator, and repeated every 4–6 years in adults aged 40–75 years, or more frequently if new risk factors develop or clinical status changes (30,31). For adults with diabetes, annual risk factor assessment is recommended, and PREVENT can be used to estimate 10-year risk of ASCVD, heart failure, and total CVD, incorporating kidney function and metabolic parameters when available (30,31). This tool is designed for primary prevention in adults without established CVD and offers a more contemporary and accurate risk estimate than older models (30–32).

PREVENT uses age, sex, blood pressure, cholesterol, smoking status, diabetes, eGFR, and optionally HbA1c and urine albumin-to-creatinine ratio, providing a comprehensive risk profile (30–32). A 10-year predicted CVD risk of $\geq 7.5\%$ defines increased risk and guides decisions on statin and antihypertensive therapy, consistent with ACC/AHA guidelines (31,33,34). Compared to the Pooled Cohort Equations (PCE), PREVENT generally produces lower risk estimates, which may influence treatment eligibility thresholds (31,33,34).

In Qatar and the GCC region, utilization of ASCVD risk calculators remains low and inconsistent. Most clinicians rely on Western tools such as PCE, SCORE2, WHO/ISH, or QRISK3, but systematic integration into routine practice is limited, and region-specific models are rarely used (35–37). Studies highlight poor agreement between calculators and emphasize the need for locally validated tools. In Qatar, risk calculators are recommended but not consistently implemented, with gaps in clinician awareness and compliance to documentation in the electronic health record (35–37). Improved adoption and regional validation of PREVENT and similar tools are essential to optimize CVD prevention strategies.

Electrocardiogram (ECG) screening plays an important role in chronic disease care particularly those with marked association with cardiovascular complications. For hypertension, the 2025 ACC/AHA guideline recommends obtaining a baseline ECG in all adults as part of the initial diagnostic evaluation, since it provides valuable information on subclinical cardiovascular disease such as left ventricular hypertrophy (20). ECG may then be repeated annually, or sooner if clinical changes occur, to monitor progression of target organ damage and evolving cardiovascular risk (20). In diabetes, a resting ECG is reasonable for CVD risk assessment in asymptomatic adults, but routine annual screening is not supported; instead, ECG should be performed at diagnosis and repeated only if symptoms or abnormal findings arise (17,63,118,119). Advanced cardiac testing, including exercise ECG, may be considered in adults ≥ 40 years with suspected cardiac or vascular disease (17).

For chronic kidney disease (CKD), while no specific guideline mandates routine baseline ECG, it remains clinically useful for detecting left ventricular hypertrophy, atrial fibrillation, and other arrhythmias, which are common across CKD stages (64,65). The frequency of cardiovascular monitoring in CKD should be guided by disease stage and albuminuria, ranging from once yearly in stage G3 to every 1–3 months in stage G5, with ECG integrated into this framework given the high cardiovascular burden (8). Together, these recommendations highlight the importance of tailoring ECG screening to disease-specific risks, ensuring timely detection of subclinical cardiovascular disease while avoiding unnecessary routine testing.

3.6 Cholesterol Screening:

The ADA recommends that in adults with diabetes mellitus or prediabetes not taking lipid-lowering therapy, a lipid profile should be obtained at diagnosis, at the initial medical evaluation, and annually thereafter, or more frequently if clinically indicated. For those starting statin or other lipid-lowering therapy, a lipid profile should be checked at initiation, 4–12 weeks after starting or changing dose, and then annually to monitor response and adherence (17).

For children and adolescents with diabetes, lipid screening should be performed initially after glycemic optimization and then annually. If lipids are abnormal, initial management focuses on optimizing glycemia and dietary intervention, with statin therapy considered if LDL cholesterol remains >130 mg/dL after 6 months of lifestyle changes. The treatment goal for LDL cholesterol in youth is <100 mg/dL, HDL cholesterol >35 mg/dL, and triglycerides <150 mg/dL (38).

Treatment targets for adults with diabetes and established ASCVD are an LDL cholesterol goal of <70 mg/dL, with high-intensity statin therapy recommended. If this target is not achieved, addition of ezetimibe or a PCSK9 inhibitor may be considered. For primary prevention in adults aged 40–75 years, moderate-intensity statin therapy is recommended, with high-intensity statin preferred for those at higher risk. Statin therapy may also be reasonable in adults <40 or >75 years based on individual risk assessment (39).

For patients with other chronic non-communicable diseases, the ADA and American College of Cardiology/American Heart Association recommend similar screening and treatment targets, emphasizing annual lipid assessment and individualized statin therapy based on ASCVD risk (17,39).

3.7 Depression and Anxiety:

The ADA recommends at least annual screening for depression in individuals with diabetes using validated tools such as the Patient Health Questionnaire-9 (PHQ-9), with more frequent screening for those with a history of depression (40). Anxiety screening is also advised, particularly for patients at risk of hypoglycemia or with

fear of hypoglycemia (40). Screening should occur at the initial visit and annually thereafter, as well as during key transitions such as diabetes diagnosis, hospitalizations, treatment changes, or when glycemic targets are not met (40,41). Additional triggers include the diagnosis of complications or significant changes in medical status. The American Association of Clinical Endocrinology further recommends screening during each clinic encounter when appropriate (25).

Validated instruments for mental health screening include the PHQ-9 for depression, Generalized Anxiety Disorder-7 (GAD-7) for anxiety, WHO Wellbeing Index (WHO-5), and the Problem Areas in Diabetes Scale for diabetes distress (25,40,42). Despite these recommendations, screening rates remain suboptimal globally and regionally. Studies from the GCC region show a prevalence of depression among patients of T2DM ranging between 5.21%-21.1% (46,47,48). However, these studies primarily report prevalence rather than systematic implementation of screening protocols.

Globally, depression affects approximately 35% of individuals with diabetes, impacting nearly one in four patients with type 1 or type 2 diabetes (40,42,46). Anxiety and diabetes distress are also common and associated with poor glycemic control, reduced adherence, and increased complications. These findings underscore the importance of embedding routine mental health screening into chronic disease management pathways. Early identification and intervention can improve quality of life, treatment adherence, and clinical outcomes, making mental health care a critical component of comprehensive diabetes and chronic disease management.

3.8 Dental assessment:

Dental screening is essential in chronic diseases because periodontitis and other oral complications are strongly linked to systemic outcomes. In diabetes, the ADA recommends at least annual dental exams, as periodontal disease is more severe and prevalent, worsens glycemic control, and increases A1C levels; semiannual screening may be warranted in poorly controlled patients (41,47,50). In hypertension, periodontitis is independently associated with uncontrolled blood pressure, and annual screening is advised, with more frequent exams for those with poorly controlled hypertension (51–53). In cardiovascular disease, periodontal disease approximately doubles myocardial infarction risk, and consensus guidelines recommend routine dental exams every 6–12 months, plus mandatory screening before elective cardiothoracic or interventional procedures to prevent complications such as infective endocarditis (54,55,120,121).

In CKD, KDIGO advises dental evaluation before transplantation, with annual screening for adults and semiannual exams for dialysis or post-transplant patients due to risks such as enamel defects, calculus accumulation, candidiasis, and gingival overgrowth (48,49,56,57,122). Overall, integrating regular dental screening, annual for most patients and semiannual for high-risk groups, into

chronic disease management is critical to reduce systemic complications and improve outcomes.

3.9 Sexual Health and Urinary Dysfunction:

Routine screening for erectile dysfunction (ED) and genitourinary symptoms in men with diabetes hypertension, and CKD is essential, as these conditions are frequently underreported. Expert consensus and recent evidence emphasize the need for proactive physician inquiry, with the American Urological Association recommending clinicians initiate discussions about ED since many men hesitate to raise sexual concerns. Validated questionnaires, such as the Sexual Health Inventory for Men, provide a structured approach to assessment and help quantify symptom severity and treatment response (58). A comprehensive evaluation should include medical, sexual, and psychosocial history, physical examination, and selective laboratory testing. For men presenting with ED, assessment should address cardiovascular risk factors, diabetes control, medication history, and signs of hypogonadism, with morning serum testosterone, glucose, and lipid profiles recommended as part of the initial workup (59,60). ED is also recognized as a marker for underlying cardiovascular disease, warranting further evaluation for occult vascular pathology (58,60).

Recent meta-analyses confirm that ED in diabetes is strongly associated with poor glycemic control, longer disease duration, diabetic neuropathy, retinopathy, nephropathy, cardiovascular disease, hypertension, metabolic syndrome, and depression (61,62). These findings highlight the importance of targeted screening in patients with these risk factors, as early identification and management can improve sexual function and overall health outcomes. Beyond ED, clinicians should assess for bladder dysfunction and urinary incontinence, which may indicate diabetic autonomic neuropathy or other complications, particularly in those with recurrent urinary tract infections or neurogenic bladder (61,62). Multidisciplinary management involving sexual medicine, endocrinology, and mental health support is often required. In summary, structured, proactive screening using validated tools and targeted laboratory evaluation is recommended for men with diabetes and other chronic diseases, as early detection facilitates timely intervention and improves quality of life (58–62).

3.10 Diabetic Foot Examination:

The ADA recommends that all patients with diabetes mellitus undergo a comprehensive foot examination at least annually to identify risk factors for ulcers and amputations. This evaluation should include inspection of the skin, assessment of foot deformities, neurological testing using the 10-g monofilament combined with at least one other method (such as pinprick, temperature, or vibration), and vascular assessment of pedal pulses and signs of peripheral artery disease (PAD) (66). Individuals with sensory loss, prior ulceration, or amputation should have their feet inspected at every clinical visit (66). Initial PAD screening should include assessment of lower-extremity pulses and symptoms, with further vascular

vascular testing such as ankle-brachial index when indicated (66). Screening frequency is stratified by risk: very low risk (no loss of protective sensation [LOPS], no PAD) annually; low risk (LOPS or PAD) every 6–12 months; moderate risk (LOPS plus PAD or foot deformity) every 3–6 months; and high risk (LOPS or PAD plus history of ulcer, amputation, or end-stage renal disease) every 1–3 months (66). All patients should receive education on daily foot self-examination and preventive care, and those at high risk should be referred to foot care specialists and consider specialized footwear(66).

These recommendations are based on the high prevalence and morbidity of diabetic foot complications. Diabetic foot ulcers affect approximately 2–6% of people with diabetes annually, and the lifetime risk of ulceration is up to 25%, with amputation rates significantly higher than in the general population (66). Up to 50% of diabetic peripheral neuropathy cases are asymptomatic, making early recognition critical to prevent progression to ulceration and amputation (66). Major risk factors include poor glycemic control, neuropathy, PAD, foot deformities, prior ulceration or amputation, smoking, retinopathy, and nephropathy(66). For other chronic non-communicable diseases, routine foot screening is not specifically recommended unless diabetes or PAD is present(66). Early detection and intervention can substantially reduce morbidity and improve outcomes.

Recent epidemiological studies and meta-analyses provide further insight into the burden and risk factors for diabetic foot complications. Large-scale data indicate that the lifetime risk of developing a diabetic foot ulcer (DFU) in patients with diabetes is at least 19–34%, with annual prevalence rates ranging from 2.2% to 6.3% and incidence rates around 4–6% depending on the population and setting (67–69). Recurrence after healing is common, with rates up to 65% at 3–5 years, and the risk of lower-extremity amputation following a DFU is approximately 20% over a lifetime (67,69). Notably, the presence of a DFU more than doubles mortality risk compared to diabetic patients without foot ulcers (68). PAD is present in about half of patients with DFU and is a major predictor of non-healing and amputation (68,70). Socioeconomic disparities and comorbid cardiovascular disease further increase the risk and worsen outcomes, with recent trends showing rising amputation rates, particularly among younger and minority populations (67,68).

Validated screening tools such as the Michigan Neuropathy Screening Instrument, Semmes-Weinstein monofilament, and Ipswich Touch Test are widely used for objective assessment of neuropathy and ulcer risk (25,71). In addition to neuropathy screening, comprehensive foot exams should include evaluation for vascular insufficiency, musculoskeletal deformities, and skin breakdown, as these factors are integral to risk stratification and prevention (25). For patients with other chronic non-communicable diseases, the incidence of foot complications is substantially lower unless diabetes

or PAD is present. However, multidisciplinary monitoring, patient education, and periodic foot examination remain essential strategies to reduce ulceration and amputation risk in high-risk groups (69).

3.11 Retinopathy Screening:

The ADA recommends that adults with type 1 diabetes undergo an initial dilated and comprehensive fundus examination within five years of diagnosis, while those with type 2 diabetes should have this exam at the time of diagnosis (38,66,72). If no retinopathy is detected and glycemic control is optimal, screening may be repeated every 1–2 years; otherwise, annual exams are advised. More frequent assessments are required if retinopathy is present, progressing, or sight-threatening, and during pregnancy in patients with preexisting diabetes, with exams before conception, in the first trimester, and as indicated throughout pregnancy and postpartum (38,66,72). Screening methods include dilated fundus examination and validated retinal photography, which may be interpreted by trained professionals or FDA-approved artificial intelligence systems. Digital retinal imaging improves access, but abnormal or poor-quality images require referral for in-person examination, and all results should be documented and communicated to the referring provider (38,66).

Diabetic retinopathy (DR) is often asymptomatic until advanced stages and remains a leading cause of vision loss. Epidemiological studies show that up to 20% of patients with newly diagnosed type 2 diabetes have retinopathy, and the lifetime risk exceeds 30% (25,73). Vision-threatening DR is less common initially but increases with longer diabetes duration, poor glycemic control, and comorbid hypertension, and can progress rapidly during pregnancy or puberty (73). Despite clear guidelines, only about 60% of people with diabetes receive annual retinal screenings, highlighting gaps in preventive care and the need for improved access (73). While the gold standard remains a dilated fundus examination, validated digital retinal imaging interpreted by trained readers or AI systems offers an effective alternative, particularly in resource-limited settings (25,73). For patients without retinopathy and well-controlled diabetes, screening intervals may be safely extended to every 2–3 years, whereas those with any degree of retinopathy or additional risk factors require at least annual assessments (25,74). Comprehensive eye exams also detect other ocular conditions such as cataracts, glaucoma, and age-related macular degeneration, which are more prevalent in diabetes and other chronic diseases (25,75).

3.12 FIB-4 Score for Liver Fibrosis:

The ADA recommends that adults with type 2 diabetes, prediabetes, or other cardiometabolic risk factors, including obesity and established cardiovascular disease, be screened for risk of cirrhosis related to metabolic dysfunction–associated steatotic liver disease (MASLD) using the FIB-4 score, even when liver enzymes are normal (41,76). Initial FIB-4 assessment should be performed at diagnosis and as part of the comprehensive

medical evaluation, with repeat surveillance every 1–2 years if initial risk is low and no new risk factors develop. If FIB-4 is ≥ 1.3 , further risk stratification with liver stiffness measurement (transient elastography) or the enhanced liver fibrosis (ELF) test is recommended; if FIB-4 exceeds 2.67, direct referral to hepatology is warranted (41,76). For patients with persistently elevated aminotransferases (>6 months) and low FIB-4, evaluation for other causes of liver disease is advised. In type 1 diabetes, routine FIB-4 screening is not recommended unless additional risk factors such as obesity, abnormal liver imaging, or elevated aminotransferases are present (41). FIB-4 is the most cost-effective initial screening tool in primary care and diabetes clinics, as reliance on liver enzymes alone would miss most cases of clinically significant fibrosis (41,76).

MASLD is highly prevalent in diabetes and other chronic non-communicable diseases, affecting up to 68% of individuals with type 2 diabetes and 20% of those with type 1 diabetes, largely driven by obesity (41,76). “At-risk” MASH (steatohepatitis with significant fibrosis, $\geq F2$) occurs in 12–20% of people with type 2 diabetes and 5% of those with type 1 diabetes (41,76). Recent multicenter studies show that 17.6% of patients with type 2 diabetes and/or obesity have intermediate or high risk of advanced fibrosis by FIB-4, and 9.3% have high risk, underscoring the burden of advanced liver disease in these populations (77). Consensus statements recommend FIB-4 assessment at diagnosis and repeat testing every 1–3 years if initial risk is low, with second-line elastography or serum fibrosis tests for indeterminate scores (1.3–2.7) and hepatology referral for high scores (>2.7) (78,79). MASLD is the most common chronic liver disease globally, affecting 30–40% of adults and up to 70–80% of those with obesity, with rising mortality linked to cirrhosis, hepatocellular carcinoma, cardiovascular disease, and chronic kidney disease (80). These findings reinforce the importance of regular FIB-4 screening and sequential noninvasive testing in high-risk populations to enable early detection and intervention (78–80).

3.12 Heart Failure Screening:

The ADA recommends that adults with diabetes mellitus undergo initial screening for heart failure using NT-proBNP (or BNP) at diagnosis or as part of the comprehensive cardiovascular risk assessment, even if asymptomatic (17,81). For ongoing surveillance, annual NT-proBNP measurement is advised to detect early (stage B) heart failure and guide preventive management. If NT-proBNP is ≥ 125 pg/mL (or BNP ≥ 50 pg/mL), further evaluation with echocardiography is recommended to assess for structural heart disease and diastolic dysfunction, and multidisciplinary management should be considered (17,81). Abnormal NT-proBNP results should be interpreted in clinical context, as levels may be elevated due to renal insufficiency, pulmonary disease, or other comorbidities, and may be lower in individuals with obesity (17). These recommendations are based on evidence that diabetes substantially increases the risk of heart failure, which may

be the first manifestation of cardiovascular disease in this population. Elevated NT-proBNP identifies individuals at highest risk for progression to symptomatic heart failure or death, and serial measurements (every 6–12 months) can improve sensitivity for detecting incident heart failure (81).

Recent consensus and large cohort studies further support NT-proBNP screening in diabetes and in other high-risk populations. Expert panels advise initiating NT-proBNP testing at the time of type 2 diabetes diagnosis and five years after onset of type 1 diabetes, with annual testing thereafter, beginning no earlier than age 30 for type 1 diabetes and at any age for type 2 diabetes (82). An abnormal NT-proBNP result (≥ 125 pg/mL) defines asymptomatic preclinical heart failure (Stage B), warranting echocardiography for risk stratification and management (82). Pooled analyses show that selective NT-proBNP testing, especially when combined with risk scores such as WATCH-DM, efficiently identifies high-risk individuals who benefit from preventive therapies like SGLT2 inhibitors, reducing heart failure incidence (83). Elevated NT-proBNP is highly prognostic for incident heart failure and mortality, with hazard ratios 2–4.5 times higher for levels above 125 pg/mL (84). Guidance from the Heart Failure Society of America and the American Society for Preventive Cardiology supports annual NT-proBNP measurement in asymptomatic individuals with type 2 diabetes, recognizing its predictive value and role in risk-based prevention (85). For other chronic non-communicable diseases, NT-proBNP screening is most valuable in those with multiple comorbidities or elevated cardiovascular risk rather than universal application (86). Overall, integrating NT-proBNP screening into routine diabetes care enables early identification of preclinical heart failure and supports timely preventive intervention.

3.13 Microalbuminuria Testing:

The ADA recommends annual measurement of the urine albumin-to-creatinine ratio (uACR) in all adults with type 2 diabetes starting at diagnosis and in individuals with type 1 diabetes beginning five years after diagnosis, using a spot urine sample (7,8,87). For those with established CKD, defined as persistent eGFR < 60 mL/min/1.73 m² or albuminuria ≥ 30 mg/g, monitoring of uACR and eGFR should be performed 1–4 times per year, with frequency determined by CKD stage, progression risk, and comorbidities (7,8,87). If an abnormal uACR (≥ 30 mg/g) is detected, confirmation with a repeat sample within 3–6 months is recommended due to biological variability. More frequent monitoring (every 3–6 months) is advised for patients with worsening albuminuria, declining eGFR, or after initiation or adjustment of therapies targeting kidney protection, such as ACE inhibitors, ARBs, or SGLT2 inhibitors (7,8,87). These recommendations reflect the role of albuminuria as a sensitive marker for early diabetic kidney disease and cardiovascular risk, often preceding changes in eGFR. Early detection and regular monitoring enable timely intervention to slow CKD progression and reduce cardiovascular events (7,8,87).

Recent evidence highlights that albuminuria is present in up to 40% of individuals with type 2 diabetes, and diabetic kidney disease remains the leading cause of CKD and end-stage renal disease globally, as well as an independent risk factor for cardiovascular events and mortality (88). Persistent albuminuria, confirmed by two abnormal uACR results 3–6 months apart, signals progressive renal decline and heightened cardiorenal risk. Early identification allows for timely initiation of renoprotective therapies, including SGLT2 inhibitors, ACE inhibitors, ARBs, and finerenone, which has demonstrated benefit in reducing CKD progression and cardiovascular events in patients with diabetes and CKD (123). Despite clear guidelines, many patients remain underdiagnosed and undertreated, underscoring the need for improved screening and adherence at all levels of care (88). For other chronic non-communicable diseases, uACR monitoring is most valuable in those with hypertension, cardiovascular disease, or other CKD risk factors, where albuminuria remains a strong predictor of adverse outcomes. Overall, integrating regular uACR assessment into diabetes and high-risk chronic disease care pathways is essential for early detection, risk stratification, and optimal management of CKD and its complications.

3.14 Vaccinations

The ADA recommends that adults with diabetes mellitus and other chronic non-communicable diseases receive age-appropriate vaccinations based on guidance from the Advisory Committee on Immunization Practices and the Centers for Disease Control and Prevention (41). Annual influenza vaccination with an inactivated (not live attenuated) vaccine is advised for all people with diabetes due to their increased risk of severe influenza-related complications and hospitalizations (41). Pneumococcal vaccination is recommended for adults aged 19–64 years with a single dose of PCV15 or PCV20; if PCV15 is used, PPSV23 should follow at least one year later, while PPSV23 is not needed after PCV20. Adults ≥65 years should receive one dose of PCV15 or PCV20, with similar follow-up recommendations. Hepatitis B vaccination is universally recommended for adults with diabetes under 60 years and may be considered for those ≥60 years based on individual risk (41). Additional vaccines include Tdap boosters every 10 years, herpes zoster vaccination (two-dose Shingrix) for adults ≥50 years, COVID-19 vaccination for all individuals ≥6 months, and RSV vaccination for adults ≥60 years after shared decision-making (41).

These recommendations are supported by strong evidence demonstrating increased susceptibility to infections and higher rates of complications, hospitalizations, and mortality in patients with diabetes and other chronic diseases. Meta-analyses confirm that influenza vaccination significantly reduces all-cause hospitalization, pneumonia/influenza-specific hospitalization, and mortality in people with diabetes, with a number needed to treat (NNT) of 60 for hospitalization and 250 for mortality (89). Pneumococcal vaccination is similarly justified by the elevated risk of invasive pneumococcal disease

in diabetes, and newer conjugate vaccines (PCV15, PCV20) have shown comparable immunogenicity and safety (25,90). Hepatitis B vaccination remains critical, as diabetes increases susceptibility to infection and complications; newer two-dose vaccines (HBsAg-1018) provide higher seroprotection than traditional three-dose regimens, however, are not yet available in the Middle East (25). Herpes zoster vaccination is recommended for adults ≥50 years because diabetes and other chronic conditions increase the risk and severity of shingles and its complications (25,90). Tdap boosters and COVID-19 vaccination are essential preventive measures, with COVID-19 vaccines reducing hospitalization and mortality in high-risk populations (25,91).

The ACC highlights the importance of RSV vaccination in adults with chronic medical conditions such as congestive heart failure, coronary heart disease, diabetes, and chronic obstructive pulmonary disease, given their elevated risk for severe RSV disease and the substantial burden of RSV-related hospitalizations and deaths among older adults in the United States (92). Clinical trial evidence, including the AReSVi-006 study, demonstrates that a single dose of RSVPreF3 (Arexvy) provides sustained efficacy against RSV-related lower respiratory tract disease across multiple seasons in adults ≥60 years, with peak efficacy of 88% and durable protection extending beyond two years despite gradual waning (93,94). Real-world data further confirm reductions in RSV-associated hospitalizations and severe in-hospital outcomes among vaccinated adults, supporting its clinical utility (95,96). Safety evaluations show that adverse events are generally mild and transient, though rare inflammatory neurologic events have been reported (97). RSV vaccines can also be co-administered with other adult vaccines, including influenza, without compromising immune responses, facilitating efficient preventive care during routine visits in late summer or early fall (94,95).

Despite clear guidelines, vaccination rates remain suboptimal among individuals with diabetes and other chronic diseases, underscoring the need for systematic assessment of immunization status at every clinical encounter and proactive strategies to overcome barriers to vaccine uptake (91). Clinical practice should also incorporate other age-appropriate vaccines such as MMR, varicella, HPV, and polio based on individual risk and travel history (25,90). Overall, integrating comprehensive immunization into routine diabetes and chronic disease care pathways is a cornerstone of preventive medicine, reducing infection-related morbidity and mortality and improving long-term health outcomes.

3.15 Cancer Screening (Category S)

The ADA recommends that patients with diabetes mellitus and other chronic non-communicable diseases follow standard, age- and sex-appropriate cancer screening guidelines for colorectal, breast, and cervical cancer in coordination with their primary care provider (41). Diabetes is associated with increased risk for several cancers,

including colorectal and breast cancer, due to shared risk factors such as older age, obesity, and physical inactivity, as well as possible diabetes-related mechanisms (41). There is no recommendation for routine pancreatic cancer screening unless symptoms or atypical diabetes presentation are present (41). For osteoporosis, the ADA advises bone mineral density (BMD) testing using dual-energy X-ray absorptiometry (DXA) in all adults aged ≥ 65 years, and in postmenopausal women and men aged ≥ 50 years with diabetes-specific risk factors (e.g., long disease duration, frequent hypoglycemia, A1C $> 8\%$, neuropathy, retinopathy, nephropathy, falls, or glucocorticoid use). BMD should be monitored every 2–3 years in older adults and younger individuals with multiple risk factors, and fracture risk should be routinely assessed, with pharmacologic therapy considered for those at high risk (41). The Qatar national guidelines recommend the use of the locally calibrated FRAX tool (Q-FRAX) for osteoporosis screening in postmenopausal women and men aged ≥ 50 years, with particular emphasis on identifying high fracture risk among patients with chronic conditions such as diabetes, hypertension, and chronic kidney disease, where DXA scanning is reserved for those classified as high-risk by Q-FRAX (108).

Current guidelines from the U.S. Preventive Services Task Force (USPSTF), National Comprehensive Cancer Network (NCCN), American Cancer Society (ACS), and American College of Physicians (ACP) reinforce that patients with diabetes should follow standard population-based screening intervals for colorectal, breast, and cervical cancer (98–102). For colorectal cancer, adults aged 45–75 years should undergo regular screening using one of several modalities: annual fecal immunochemical test (FIT) or high-sensitivity guaiac-based fecal occult blood test (gFOBT), multi-target stool DNA test every 3 years, colonoscopy every 10 years, CT colonography every 5 years, or flexible sigmoidoscopy every 5 years (98–102). Screening for ages 76–85 should be individualized based on comorbidities and life expectancy, and is not recommended after age 85 (98–102). Although diabetes confers a higher risk and earlier onset of colorectal cancer, current guidelines do not recommend earlier or more frequent screening solely based on diabetes status; however, emerging data suggest that individuals with diabetes may reach threshold risk for CRC earlier, supporting vigilant adherence to screening schedules (98–102).

For breast cancer, women aged 45–54 years should have annual mammography, transitioning to biennial screening at age ≥ 55 , with the option to continue annual screening (103–106). Screening should continue as long as overall health is good and life expectancy is ≥ 10 years. (103–106). For cervical cancer, screening should begin at age 21 with Pap testing every 3 years for women aged 21–29, and for women aged 30–65, preferred screening is HPV testing plus Pap every 5 years, or Pap alone every 3 years (103–106). Screening may be discontinued after age 65 if prior results have been consistently negative (103–106). While diabetes does not alter recommended intervals, adherence

to breast and cervical cancer screening is consistently lower in patients with diabetes, highlighting the need for targeted interventions to improve uptake (105,106).

For osteoporosis, population-based guidelines recommend DXA screening for women ≥ 65 and men ≥ 70 , or younger adults with risk factors (41). In diabetes, additional risk factors such as long disease duration, complications, and medication use may prompt earlier or more frequent screening, but intervals of every 2–3 years are generally appropriate unless clinical changes occur (41). Overall, the absolute benefit of cancer and osteoporosis screening may be greater in diabetes due to higher baseline risk, but screening intervals and modalities should be individualized based on comorbidities, life expectancy, and patient preferences (102,124). Integrating these preventive strategies into routine diabetes care is essential to reduce morbidity and mortality associated with cancer and fractures.

3.16 Obstructive sleep apnea

The American Academy of Sleep Medicine recommends annual screening for obstructive sleep apnea (OSA) in adults aged 18 years and older who are at high risk, including patients with type 2 diabetes, impaired glucose tolerance, and treatment-resistant hypertension (109). Screening should be performed at least every 12 months using a standardized tool, with documentation of a follow-up plan based on results (109). Other high-risk conditions identified in the 2024 quality measure include obesity (BMI ≥ 30 kg/m²), congestive heart failure, atrial fibrillation, nocturnal dysrhythmias, stroke, pulmonary hypertension, preoperative evaluation for bariatric surgery, and coronary artery disease (109). Although chronic kidney disease is not explicitly listed, its association with cardiovascular risk suggests that clinicians should maintain vigilance in these patients (109).

The ADA similarly emphasizes screening for OSA in individuals with diabetes, recommending evaluation in those with symptoms such as excessive daytime sleepiness, snoring, and witnessed apnea (41). The American Association of Clinical Endocrinology advises incorporating routine screening for sleep disorders either clinically through symptom-based questions or using validated tools such as the STOP-Bang questionnaire (25,91). These recommendations are supported by the high prevalence of OSA in type 2 diabetes, estimated at 23% to 58% for any sleep-disordered breathing, with rates exceeding 80% in patients with both diabetes and obesity (25,41). Untreated OSA is linked to poor glycemic control, increased cardiovascular risk, and reduced quality of life, making early detection critical.

Despite these guidelines, screening rates remain low, and underdiagnosis is common. The American Heart Association notes that 86% to 95% of individuals with clinically significant OSA report no prior diagnosis (112). While the U.S. Preventive Services Task Force concluded in 2022 that evidence is insufficient to recommend universal screening in asymptomatic adults (110,111),

recent studies highlight the gap between prevalence and diagnosis. For example, a 2025 study of 164 patients with type 2 diabetes in primary care found that 75% had OSA, with 31% requiring treatment for moderate to severe cases; central fat distribution and albuminuria were significant predictors of severe OSA (113). These findings underscore the need for targeted screening in high-risk populations using validated tools such as STOP-Bang and Epworth Sleepiness Scale, despite limitations in sensitivity and specificity (112). Integrating OSA screening into diabetes and cardiovascular care pathways can improve patient-centered outcomes and reduce long-term complications.

Conclusion

The “*ABCDEF Ultra Violet S: Family Medicine Guide*” offers a practical, evidence-based framework to close persistent gaps between guideline recommendations and real-world practice in chronic disease management. By standardizing preventive care and empowering both clinicians and patients, the guide addresses critical domains from metabolic monitoring and cardiovascular risk assessment to mental health, cancer screening, and vaccination, within a single, streamlined approach. Its dual-purpose design reduces cognitive load for providers while enhancing patient engagement and health literacy, fostering shared decision-making and continuity of care. Expected benefits include improved clinical outcomes through earlier detection and better disease control, enhanced patient satisfaction, and cost savings from complication prevention. Successful implementation will require provider training, stakeholder engagement, and iterative refinement based on feedback and data. Future quality audits, adherence monitoring, and structured quality improvement projects are essential to evaluate impact, identify gaps, and sustain progress. These efforts will not only strengthen compliance with preventive care standards but also contribute valuable evidence to inform policy and practice.

Ultimately, this initiative reflects the core values of family medicine, comprehensive, patient-centered, and quality-driven care and demonstrates that systematic, checklist-based approaches can transform chronic disease management, improving outcomes for every patient, every time.

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