Chronic Kidney Disease Disparities: Educational Guide for Primary Care

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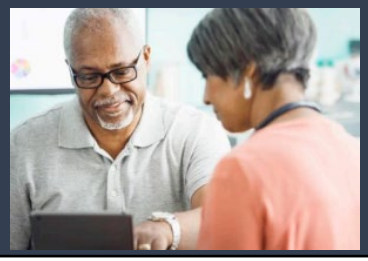
Summary: Approaches to CKD Disparities Reduction

Approaches to Identifying CKD



Develop and implement a CKD detection protocol that defines the population at risk

Leverage health information systems to identify and track at-risk patients and prompt the clinical care team about the need for CKD detection

Promote detection at every opportunity

Use two tests to detect CKD over a 3-month period

Determine risk or stage of CKD and inform patient

Measure, track and improve CKD detection rates

Approaches to Treatment and Monitoring of CKD

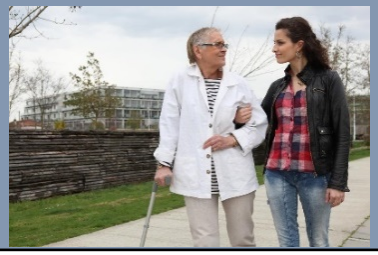
Integrate CKD guidelines into the control of diabetes, hypertension and cardiovascular conditions

Educate patients about health behaviors that may affect CKD progression

Monitor CKD progression

Establish relationships with nephrologists and other specialists

Approaches to Centering Care on the Patient



Assemble a multidisciplinary care team with defined roles and responsibilities

Develop a strategy for educating patients about CKD

Understand and address the patient's social determinants of health

Include family, caregivers and the patient's community in educational efforts

Periodically reassess the patient's understanding of their diagnosis and treatment plan, to encourage opportunities to iteratively address identified patient-centered barriers

Link to Available Resources

Introduction

Healthy People defines health care disparities as "health outcomes seen to a greater or lesser extent between populations… that contribute to an individual's ability to achieve good health" (Healthy People, 2019a). Racial, ethnic and socioeconomic disparities exist in the quality of primary care for patients with chronic kidney disease (CKD) and CKD risk factors. Low-income and racial and ethnic minority patients are less likely to receive recommended care related to CKD risk factors and are less likely to reduce CKD risk through recommended treatment goals (blood pressure, diabetes, cholesterol control). Racial and ethnic minorities are also more likely to progress from CKD to end-stage renal disease (ESRD)—also known as end-stage kidney disease (ESKD)—and are less likely to have been under the care of a nephrologist before starting dialysis. These disparities are related to patient, clinician, clinical and system factors.

- *Patient factors* include genetic predisposition (e.g., APOL1 risk variants), barriers to accessing care, low health literacy, cultural and attitudinal beliefs, such as mistrust of health care providers and language barriers.
- *Clinician factors* include limited knowledge of CKD, discomfort with its clinical complexity, and communication challenges.
- *Clinical factors* include conflicting guidance about screening for CKD and the complexity of treating patients with multiple comorbid conditions.
- *System factors* include limited access to care and lack of clinical decision support tools.

Primary care practice teams can help reduce disparities in care for CKD through early identification, treatment, monitoring progression, collaborating with nephrologists and other specialists, building care teams and engaging patients. This educational guide is intended to foster the development of primary care practice teams in order to enhance care for vulnerable patients who are at risk of CKD or who have CKD and are at risk of progression of disease or complications. This guide addresses three aspects of care: identification of CKD; treatment and monitoring progression; and delivering patient-centered care. It is meant to inform readers about disparities in the care of patients with CKD, present potential actions that may improve care and suggest other available resources that may be used by primary care practice teams in caring for vulnerable patients.

About Chronic Kidney Disease

CKD is progressive loss of renal function, beginning with asymptomatic kidney damage and potentially ending in near total kidney failure—ESRD—which requires renal replacement therapy for ongoing survival. According to the Centers for Disease Control and Prevention (CDC), 37 million adults in the US have CKD and most of them are unaware of their condition.

The clinical stages of CKD are defined by declining glomerular filtration rates (GFR) and albuminuria categories indicating increasing damage to kidney function. Equations for estimating GFR include adjustments for race, because non-Hispanic blacks have higher GFR than non-Hispanic whites at the same level of serum creatinine. Similarly, males have higher GFR than females and younger people have higher GFR than older people at the same levels of creatinine.

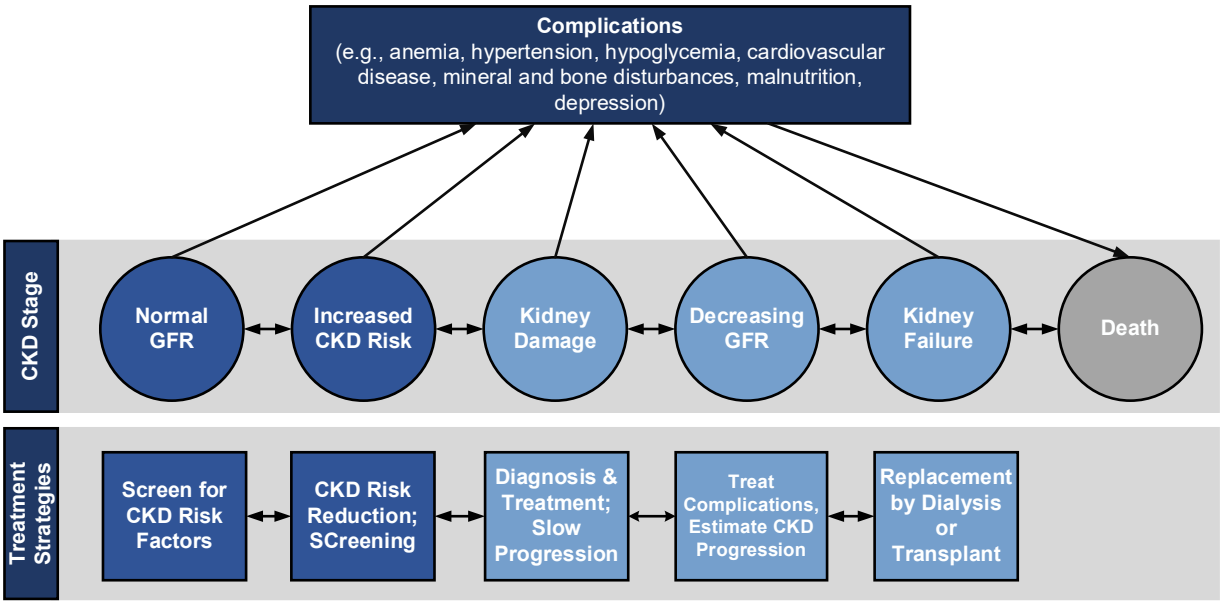
Quick Facts About CKD

- 15% of US adults – 37 million people – are estimated to have CKD
- Most (9 in 10) adults with CKD do not know they have it
- 1 in 2 people with very low kidney function who are not on dialysis do not know they have CKD
- CKD is more common in non-Hispanic blacks (16%) than in non-Hispanic whites (13%) or non-Hispanic Asians (12%)
- About 14% of Hispanics have CKD

(CDC, 2019)

While CKD is typically progressive, it does not affect all patients at the same rate. Racial minorities have a greater risk of progressing from CKD to ESRD and progress more rapidly than their non-Hispanic white counterparts.

Progression of CKD



Source: Adapted from Eckardt, K.U., Coresh, J., Devuyst, O., Johnson, R.J., Kottgen, A., Levey, A.S. (2013). Evolving Importance of Kidney Disease: From Subspecialty to Global Health Burden. Global Kidney Disease. 382; 9887: 158-169. Available at https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(13)60439-0/fulltext

It is also true that the vast majority of patients with CKD do not ever progress to kidney failure. CKD is considered a disease multiplier because it often occurs with other conditions such as diabetes, hypertension or heart disease. Notably, CKD patients have a heightened risk of cardiovascular disease and death at every stage of CKD. The two conditions are linked: CKD and heart disease share risk factors such as diabetes and hypertension, and each condition can lead to or worsen the other.

Only 3% of patients with chronic kidney disease experience kidney failure in their lifetime (KFRE, 2019).

CKD is diagnosed through a blood test measuring serum creatinine and a urine test to assess albumin. CKD is staged using both results over a 3-month time period. In the early stages of CKD (Stages 1–3), the focus of care is on slowing or preventing progression and treating complications; in the later stages (Stages 4–5), the focus of care shifts to planning for kidney failure.

The KDIGO Heat Map displays the risk of progression for each GFR category. Progression of CKD is related to control of comorbidities, (diabetes, hypertension, cardiovascular disease), prevention of additional damage (acute kidney injury, nephrotoxic agents), optimizing health consequences (anemia, proteinuria), and recognition of population-based risk (race/ethnicity, age, family history). Early diagnosis and appropriate treatment can prevent or delay progression to later-stage CKD, resulting in decreased morbidity, mortality and costs.

KDIGO Heat Map (KDIGO, 2017)

Prognosis of CKD by GFR and albuminuria categories: KDIGO 2012				Persistent albuminuria categories Description and range		
				A1	A2	A3
				Normal to mildly increased	Moderately increased	Severely increased
				<30 mg/g <3 mg/mmol	30–300 mg/g 3–30 mg/mmol	>300 mg/g >30 mg/mmol
GFR categories (ml/min per 1.73 m²) Description and range	G1	Normal or high	⩾90			
	G2	Mildly decreased	60–89			
	G3a	Mildly to moderately decreased	45–59			
	G3b	Moderately to severely decreased	30–44			
	G4	Severely decreased	15–29			
	G5	Kidney failure	<15			

Green: low risk (if no other markers of kidney disease, no CKD); yellow: moderately increased risk; orange: high risk; red, very high risk.

Source: Kidney Disease Improving Global Outcomes (KDIGO). (2017). KDIGO 2017 Clinical Practice Guideline Update for the Diagnosis, Evaluation, Prevention, and Treatment of Chronic Kidney Disease – Mineral and Bone Disorder (CKD-MBD). Available at https://kdigo.org/wp-content/uploads/2017/02/2017-KDIGO-CKD-MBD-GL-Update.pdf

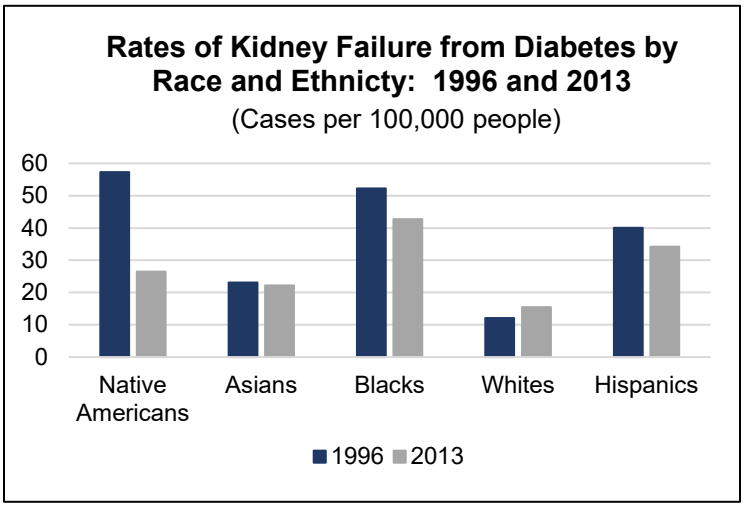
Primary Care Is Key to Reducing Disparities in Chronic Kidney Disease

Interventions that can slow progression of CKD include early identification, controlling blood pressure, controlling blood glucose reducing albuminuria, eating a healthy diet and maintaining a healthy lifestyle. Primary care practice teams have an opportunity to apply population health strategies that may improve identification of individuals with CKD, improve care for patients with CKD and slow progression of the disease. As the front line of health care, primary care is especially important for conditions such as CKD, which may not cause symptoms until the late stages of disease. By increasing awareness of known racial, ethnic and economic disparities in care for CKD, this guide encourages primary care professionals to adopt strategies that can improve health care and health for vulnerable populations.

Some patients only learn about CKD once their kidneys fail. 33%-63% of patients experience an unplanned start to dialysis – meaning that they start dialysis in the hospital without preparation for vascular access or options for dialysis mode and setting (Molnar et al., 2016).

Example: Indian Health Service Improvements in Care for Chronic Kidney Disease

The Indian Health Service (IHS) cut the rate of kidney failure in half for Native Americans with diabetes by applying population health approaches to patients with noted socioeconomic disparities. In 1996, American Indians and Alaska Natives had the highest rates of diabetes-related ESRD incidence, compared with other racial and ethnic groups in the US. By 2013, the incidence of diabetes-related ESRD had decreased from 57.3 percent in 1996 to 26.5 percent in 2013 (Bullock et al., 2017).



The decrease coincided with incorporating the assessment and treatment of CKD into IHS standards for managing diabetes. While the IHS had previously adopted systematic approaches to controlling diabetes, including multidisciplinary team-based care, patient education, community outreach, and tracking process and outcome data, the revised standards included:

- Routine laboratory reporting of GFR in the electronic medical record.
- Annual monitoring of urine albumin excretion.
- Prescription of angiotensin converting enzyme (ACE) inhibitors and angiotensin II receptor blockers (ARB).

To improve diabetes care, IHS also developed clinical education programs and tools, culturally relevant patient education materials and electronic medical record-based population management tools. With these efforts, the IHS was able to achieve a 54 percent decrease in age-adjusted incidence of diabetes-related ESRD for patients with well-documented socioeconomic disparities, including poverty, limited health care resources and disproportionate burden of comorbidities (Bullock et al., 2017).

How This Guide Is Organized

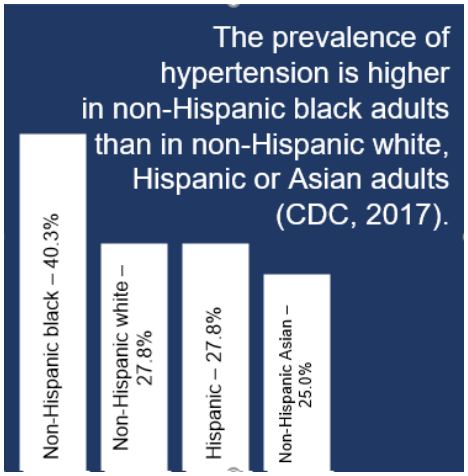
This guide is written for primary care practice teams and is intended to raise awareness of disparities in CKD and improve the care of vulnerable patients with CKD, and suggests possible approaches to improve the care of vulnerable patients with CKD. It is divided into the following sections:

- Summary.
- Approaches to Identifying Chronic Kidney Disease.
- Approaches to Treatment and Monitoring of CKD Progression.
- Approaches to Centering Care on the Patient.

Introduction

Each of the topical sections in the guide explains the importance of the issue and describes potential interventions that primary care practice teams can take to address disparities in care. The *Suggested Steps* and *Resources* sections include links to available resources. Existing resources are paired with suggested action steps and are categorized by type (informational materials, practical tools, training materials) and format (CKD tracking tool, letter template, mobile app, online calculator, pamphlet/handout, reference material, referral form, video, webpage).

Clinicians and their teams can use this guide to educate themselves, encourage the development and use of protocols to identify people with CKD, monitor progress, connect patients to appropriate resources and refer those who need specialty care.



The prevalence of hypertension is higher in non-Hispanic black adults than in non-Hispanic white, Hispanic or Asian adults (CDC, 2017).

American Indians/Alaskan Natives (15.1%), non-Hispanic blacks (12.7%), and Hispanics (12.1%) have higher rates of diabetes than Asian Americans (8.0%) or non-Hispanic whites (7.4%) (ADA, 2018).

In a study where 44% of non-Hispanic black participants had a clinical risk factor for CKD, only 24% had been screened for CKD within the last year (Horowitz et al., 2016).

Why Is It Important to Identify Chronic Kidney Disease?

Racial and ethnic minorities are more likely to progress from CKD to renal failure than their non-Hispanic white counterparts. Beyond kidney failure, CKD progression has other consequences, such as anemia, hypertension, hypoglycemia, mineral and bone disturbances, cardiovascular disease, polypharmacy, medication side effects and death. Most CKD is a long-term consequence of difficult-to-control diabetes and hypertension, conditions that are more common among racial minorities and low-income populations. Early identification and intervention can slow or prevent CKD progression.

CKD may have no symptoms in most stages, so many people are unaware of their CKD status until late-stage disease. In addition, limited provider awareness of CKD risk factors and surveillance guidelines can contribute to low patient awareness. Improving identification allows earlier treatment of CKD, which may reduce the number of people who progress to later-stage CKD, require transplant or dialysis or experience secondary consequences.

Identification of CKD typically includes screening at-risk individuals, determining the stage of disease and communicating results and next steps to patients. There are multiple challenges to improving disparities in identification of CKD:

- Clinical care teams and people at risk need to understand more about CKD, including its causes, stages and consequences.
- Primary care practice teams need protocols for detecting CKD. Most guidelines agree that people with diabetes or hypertension should be screened. Research shows that older individuals, non-Hispanic blacks, Native Americans and Hispanics should also be considered for CKD screening.
- Screening for CKD may be conducted by community-based organizations that are not coordinated with primary care teams.

Addressing these challenges can improve identification of CKD in vulnerable populations, which has the potential to slow or prevent the progression of disease.

Approaches to Identifying Chronic Kidney Disease

Improving Identification of CKD: Suggested Steps	Resources
Develop and implement a CKD detection protocol that defines the population at risk	Informational Materials Practical Tools Training Materials
Leverage health information systems to identify and track at-risk patients and prompt the clinical care team of the need for CKD detection *Develop scripts* for the care team to explain the risks of CKD and how it is detected	Practical Tools
Promote CKD detection at every opportunity *Include CKD detection* during preventive or well-care visits *Integrate CKD detection* into care management programs (e.g., diabetes, hypertension, heart disease) *Coordinate with community-based CKD screening activities* that outreach to racial and ethnic minorities and low-income populations	Informational Materials Practical Tools
Use two tests to detect CKD over a 3-month period *Spot urine* for albumin-to-creatinine ratio (ACR) to detect albuminuria *Blood test* for serum creatinine to estimate GFR *Repeat* positive tests over a 3-month period	Informational Materials Practical Tools
Determine risk or stage of CKD and inform patient *Use culturally and linguistically appropriate* materials *Have information available* in various formats (written, visual, video, apps) *Address emotional response* *Consider health literacy* levels	Informational Materials Practical Tools
Measure, track and improve CKD detection rates *Examine differences* based on race, ethnicity, other risk factors *Review* with the clinical care team	Informational Materials Training Materials

Hispanics are less likely to achieve CKD management goals, including BP control, ACE/ARB use and prevention of cardiovascular disease, than non-Hispanics (Fischer et al., 2016).

Patients receiving dialysis in areas with low household income, with a disproportionate share of non-Hispanic black patients, or in areas with low educational attainment, are less likely to have received pre-dialysis care from a nephrologist (Nee et al., 2016).

Non-Hispanic black and Hispanic individuals experience more rapid rates of eGFR decline than non-Hispanic white individuals (Derose et al., 2013).

Why Is It Important to Treat and Monitor CKD Progression?

Although the prevalence of CKD is relatively similar across racial and ethnic groups, minorities are more likely to progress from CKD to ESRD, and progress more rapidly than non-Hispanic whites. Clinical and system-wide interventions for slowing the progression of CKD largely consist of controlling risk factors, developing treatment plans and encouraging lifestyle changes. Accordingly, management of CKD often coexists with control of conditions such as diabetes, hypertension and cardiovascular disease.

Care for CKD consists of treating the risk factors for progression, including diabetes, hypertension, use of nephrotoxic medications, history of acute kidney injury, proteinuria and albuminuria, and treating the consequences of CKD, including anemia, electrolyte abnormalities and mineral bone disorders. The main interventions usually include:

- Medical treatment (e.g., control blood pressure and glucose, manage cardiovascular disease, reduce albuminuria).
- Prevention (administer vaccinations, avoid nephrotoxic medications, including NSAIDS such as ibuprofen or naproxen).
- Nutritional guidance (e.g., limit sodium intake).
- Lifestyle modifications (e.g., exercise, quit smoking).

Although interventions to slow progression or treat consequences of CKD are known, research suggests that many patients do not receive appropriate education about CKD and controlling risk factors, and minority patients are least likely to receive the information.

Recent studies have shown that CKD registries have the potential to improve care for diverse populations in the areas of albuminuria monitoring, prescriptions for ACE inhibitors/ARBs, nephrotoxic medication use, hepatitis B immunizations, outpatient nephrology visits, vascular access placement and referral to transplant (Tuot et al., 2018, Mendu et al., 2019).

Challenges to improving disparities in CKD treatment and fostering collaboration between primary care teams and specialists include:

- Clinical care teams need guidance on treating CKD in the context of comorbid conditions such as diabetes, hypertension and cardiovascular disease.
- Clinical care teams need tools that address multifaceted and complex health care needs, coupled with other life challenges that can impact the progression of disease in minority and underserved populations.
- Although electronic health records have the potential to support CKD care, they must be incorporated into the daily workflow and need additional functionality and customization to track clinical factors.
- Limited access to nephrologists for consultation.

Addressing these barriers can improve CKD management in vulnerable populations, which has the potential to reduce disparities and the risk of progression to ESRD.

Approaches to Treatment and Monitoring of CKD Progression

Improving Treatment and Monitoring of CKD Progression: Suggested Steps	Resources
Integrate CKD guidelines into the control of diabetes, hypertension and cardiovascular conditions *Control blood pressure:* Set target goals and consider prescribing angiotensin receptor blockers (ARB)/angiotensin converting enzyme (ACE) inhibitors for patients with elevated blood pressure *Control diabetes:* Determine HbA1c targets, consider SLGT2 inhibitors for appropriate patients *Reduce albuminuria* through RAAS therapy and blood pressure control *Consider statin therapy* for appropriate patients	Informational Materials Practical Tools Training Materials
Educate patients about health behaviors that may affect progression of CKD *Promote healthy eating and monitoring of fluid intake:* Consider referral for dietary counseling *Encourage* exercise and weight control *Discourage* smoking, illegal drug use, excessive alcohol consumption *Advise patients* regarding use of over-the-counter nephrotoxic medications (e.g., NSAIDs, protein-pump inhibitors, supplements) *Address emotional response* to diagnosis and recommendations to change behaviors	Informational Materials Practical Tools Training Materials
Monitor CKD progression *Determine testing interval* for monitoring GFR and albuminuria based on stage of CKD and risk of progression *Monitor medications* that require dose adjustment based on level of kidney function and adjust as necessary *Use health information systems* to prompt clinicians of the need for CKD monitoring and further follow-up when progression is identified (e.g., automated urine albumin testing reminders)	Practical Tools
Establish relationships with nephrologists and other specialists *Establish consulting relationships* with nephrologists *Identify triggers* for referral to nephrology. Consider: level of complexity, GFR threshold, rapidity of decline in GFR and preparation for renal replacement therapy *Consider eConsults* for patients with potential delays in specialty referral	Informational Materials Practical Tools

A systematic review found that education programs rooted in multidisciplinary care models are effective in delaying or preventing CKD progression (Narva, Norton, & Boulware, 2016).

In one study, 52% of Hispanic hemodialysis patients had not received any form of pre-dialysis care from a nephrologist, compared with 44% among non-Hispanic patients (Acre et al., 2012).

Why Is It Important to Center Care on the Patient?

The Institute of Medicine defines patient centered care as "…care that is respectful of, and responsive to, individual patient preferences, needs and values and ensuring that patient values guide all clinical decisions" (IOM, 2001). The Commonwealth Fund identified the following characteristics of a patient-centered primary care practice: superb access to care; patient engagement in care; clinical information systems that support high-quality care, practice-based learning and improvement; care coordination; integrated, comprehensive care and smooth information transfer across the provider team; ongoing, routine patient feedback; publicly available information on practices (Davis et al., 2005).

Treatment for CKD may be complicated by other health conditions and by socioeconomic challenges such as poverty, lack of health insurance, low health literacy, language barriers, inadequate access to healthy food, financial barriers to obtaining medications, limited transportation and environmental or safety concerns.

Challenges to treating vulnerable CKD patients in primary care include:

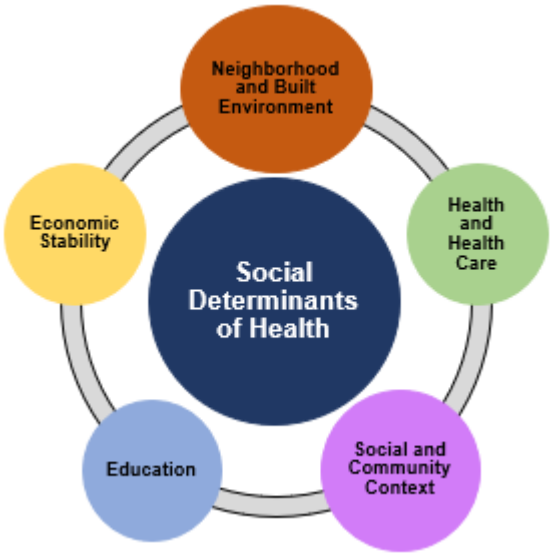
- Limited time during clinic visits. It takes time to educate patients about the causes, stages and consequences of CKD and how to manage it.
- A diagnosis of CKD can evoke an emotional response that can negatively affect the patient's ability to learn how to manage it.
- Patients might have limited health literacy in CKD-related topics.
- Living conditions can significantly affect an individual's health status. Complex social determinants such as unstable housing, food insecurity, poverty, lack of education, unsafe neighborhoods and access to transportation contribute to disparities in CKD.

Social Determinants of Health

Health professionals are increasingly aware of the importance of nonmedical factors on health. Where and how a person lives can have a greater impact on health than medical care delivered by the health care system (Healthy People, 2019b).

Organizations are working to develop tools for practices to address social determinants of health; for example, materials that educate teams about health disparities and health equity, assess implicit bias or offer guidance on collecting population data or building relationships with community-based organizations. These resources can help primary care practices evolve their care processes to meet patient needs more effectively.

Delivering patient-centered care, forming multidisciplinary care teams (e.g., pharmacists, community health workers, dieticians, social workers) and assessing social determinants of health can help address disparities in care for CKD.



Approaches to Centering Care on the Patient

Improving Patient-Centered Care: Suggested Steps	Resources
Assemble a multidisciplinary care team with defined roles and responsibilities *Identify multidisciplinary care team members* (e.g., pharmacists, community health workers, dieticians, social workers) *Consider creating care coordination agreements* with specialists and team members to formally specify responsibilities	Informational Materials
Develop a strategy for educating patients about CKD *Determine* the basic components of CKD education and adapt available resources of CKD education to your practice *Review and refer* patients to CKD resources that include a variety of formats and platforms—such as written materials, podcasts, videos, apps—to address variability in learning styles and level of health literacy *Connect* patients to CKD educational resources that are culturally and linguistically appropriate *Consider* community health workers, patient navigators and group educational efforts *Compile* a list of community-based CKD resources and initiatives to share with patients and caregivers *Refer patients* to benefits available through Medicare (e.g., medical nutrition therapy services, CKD education benefit)	Informational Materials Training Materials
Understand and address the patient's social determinants of health *Ask* patients about social determinants of health (e.g., ability to pay for medications) *Incorporate* CKD detection into the practice workflow *Identify community resources* that can address social determinants of health *Connect* patients with resources that can meet their needs	Informational Materials Practical Tools
Include family, caregivers and the patient's community in treatment and educational efforts *Incorporate patient and family/caregiver preferences* (e.g., cultural, religious, personal values) into treatment plans and educational efforts.	Informational Materials Training Materials
Periodically reassess the patient's understanding of their diagnosis and treatment plan, to encourage opportunities to iteratively address identified patient-centered barriers	Informational Materials

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Comprehensive Resource List

	Resource*	Informational Material	Practical Tool	Training Material	Patient - Focused	Alternative Languages
Suggested Resources for Identifying CKD	**1. Develop and implement a CKD detection protocol that defines the population at-risk**					
	NKF—Minorities and Kidney Disease (Webpage)	✓				
	Berns—Screening in Asymptomatic Adults (Reference Material)	✓				
	NKF—Laboratory Engagement Plan (Reference Material)	✓			✓	
	NKF—Critical Care Algorithm: How to Manage Your CKD Patients (Reference Material)		✓			
	Primaris—CKD Information Tool (Reference Material)		✓			
	AAKP—Field Ambassadors (Webpage)		✓		✓	
	NKF—A Primary Care Approach to CKD Management (Reference Material)			✓		
	2. Leverage health information systems to identify and track at-risk patients and prompt clinical care team of the need for CKD detection					
	RPA—Patient Identification Assessment Evaluation Tool (CKD Tracking Tool)		✓			
	RPA—Patient Identification Assessment Instructions (CKD Tracking Tool)		✓			
	3. Promote detection at every opportunity					
	NKF—KEEP Screening Events (Webpage)	✓			✓	
	NKDEP—Kidney Sundays: A Toolkit—Guide for Faith-Based Communities on Making the Kidney Connection (Reference Material)		✓		✓	
	4. Use two tests to detect CKD over a 3-month period					
	NKDEP—Making Sense of CKD: A Concise Guide for Managing CKD in Primary Care (Reference Material)	✓				✓ (Spanish)
	NKDEP—UACR In Evaluating Patients with Diabetes for Kidney Disease (Reference Material)	✓				
	NKF—Frequently Asked Questions About GFR Estimates (Reference Material)	✓				
	NKF—eGFR Calculator (Mobile App)		✓			
	NKDEP—GFR Calculators (Online Calculator)		✓			
	NKF—GFR Calculators (2) (Online Calculator)		✓			
	NKF—Screening for Albuminuria in Patients with Diabetes (Reference Material)		✓			
	5. Determine stage of CKD and inform patient					
	ANNA—CKD Fact Sheet (Reference Material)	✓				
	MEI—CKD: Take Charge of Your Health (Pamphlet/Handout) ($)	✓			✓	
	NKDEP—Communicating Difficult Messages to Patients (Webpage)	✓				
	NKF—Kidney Disease Can Be Treated—Printable Stages Chart (Pamphlet/Handout)	✓			✓	
	NKF—Quick Reference Guide on Kidney Disease Screening (Reference Material)	✓				
	NKDEP—Explaining Your Kidney Test Results: A Tear-Off Pad for Clinical Use (Pamphlet/Handout)		✓		✓	✓ (Chinese, French, Spanish, Vietnamese)
	NKDEP—Your Kidney Test Results (Pamphlet/Handout)		✓		✓	✓ (Spanish)
	NKF—CKD Risk Assessment Tool (Reference Material)		✓			
	6. Measure, track, and improve CKD detection rates					
	NKF—CKD Change Package (Reference Material)	✓				
	CDC—CKD Surveillance System (Reference Material)	✓				
	Kirwan Institute—Implicit Bias Module Series (Reference Material)			✓		
	AAFP—Addressing Implicit Bias in Health Care Delivery (Reference Material)			✓		

Comprehensive Resource List

Suggested Resources for Treatment and Monitoring of CKD Progression	Resource*	Informational Material	Practical Tool	Training Material	Patient - Focused	Alternative Languages
	1. Integrate CKD guidelines into the control of diabetes, hypertension and cardiovascular conditions					
	Upstate NY Practice-Based Research Network—CKD Quick Reference Guide for the Primary Care Clinician (Reference Material)	✓				
	NKF—Cholesterol and Kidney Disease: What Your Need to Know (Pamphlet/Handout)	✓			✓	
	NKDEP—Making Sense of CKD: A Concise Guide for Managing CKD in the Primary Care Setting (Reference Material)	✓				✓ (Spanish)
	NKF—Hypertension and Antihypertensive Agents in CKD (Reference Material)	✓				
	NKF—Cardiovascular Disease in CKD (Reference Material)	✓				
	NKF—Heart Failure and CKD: What Your Need to Know (Pamphlet/Handout)	✓			✓	
	University of Buffalo—An Algorithm for Managing CKD in the Primary Care Setting (Reference Material)		✓			
	NKF—Critical Care Algorithm: How to Manage Your CKD Patients (Reference Material)		✓			
	SelectHealth and Intermountain Healthcare—Management of CKD: Care Process Model (Reference Material)		✓			
	NKDEP—CKD Training Program for Diabetes Educators (Video)			✓		
	2. Educate patients about health behaviors that may affect progression of CKD					
	NKDEP—CKD and Diet: Assessment, Management, and Treatment (Reference Material)	✓				
	NKDEP—Collaborate with a Registered Dietician (Webpage)	✓				
	Unknown—Dietary Approaches to Stop Hypertension (DASH) Diet Modified for Adults with CKD (Reference Material)	✓				
	NKDEP—Eating Right for Kidney Health (Pamphlet/Handout)	✓			✓	✓ (Spanish)
	NKDEP—Nutrition Tips for People with CKD (Sodium, Protein, Phosphorus, Potassium, Food Label Reading) (Pamphlet/Handout)	✓			✓	✓ (Spanish—Sodium, Protein, Phosphorus, Potassium, Food Label Reading)
	Proscia—MyPlate for Healthy Eating with CKD (Reference Material)	✓				
	NKDEP—Keeping Kidneys Safe: Smart Choices About Medicines (Webpage)	✓			✓	
	NKF—Phosphorus and Your Kidney Diet (Pamphlet/Handout)	✓			✓	
	NKF—CKD: Know the Risks of Medications and Imaging Studies (Safety Card for Patient Care) (Reference Material)	✓				
	AAKP—Understanding Depression in Kidney Disease (Pamphlet/Handout)	✓			✓	
	NKDEP—CKD Diet Counseling (Medical Nutrition Therapy) Referral Form (Referral Form)		✓			
	NKF—CRN Pocket Guide to Nutrition Assessment in the Patient with CKD Mobile App (Mobile App)		✓			
	AAKP—Nutrition Counter: A Reference for the Kidney Patient (Reference Material)		✓		✓	✓ (Spanish)
	NKDEP—CKD and Nutrition for Dietetic Educators—CKD 101: Nutrition Educators (Reference Material)			✓		
	NKDEP—CKD Nutrition Management Training Program (Video)			✓		
	NKDEP—Keeping Kidneys Safe: Pharmacist's Role in Counseling High-Risk Patients on NSAID Use to Prevent Kidney Injury (Video)			✓		
	3. Monitor CKD progression					
	RPA—Patient Management Assessment and Evaluation Tools and Instruction Document (CKD Tracking Tool)		✓			

Comprehensive Resource List

	Resource*	Informational Material	Practical Tool	Training Material	Patient - Focused	Alternative Languages
Suggested Resources for Treatment and Monitoring of CKD Progression	RPA—Advanced CKD Management Flow Sheet (CKD Tracking Tool)		✓			
	Kidney Failure Risk Equation (Online Calculator)		✓			
	4. Establish relationships with nephrologists and other specialists					
	NKDEP—Collaborate with a Nephrologist (Webpage)	✓				
	RPA—Awareness Letter (Letter Template)		✓			
	RPA—CKD Post-Consult Letter (Letter Template)		✓			
	RPA—Referring Physician Fax-Back Form (Referral Form)		✓			
	NKF—Relative Risk, Monitoring and Referral in Patients with CKD (Mobile App)		✓			
	NKDEP—Nephrology Referral Form (Referral Form)		✓			
	NKDEP—CKD Diet Counseling (Medical Nutrition Therapy) Referral Form (Referral Form)		✓			
	Ontario Renal Network—Outpatient Nephrology Form for Primary Care Providers (Referral Form)		✓			
Suggested Resources for Centering Care on the Patient	**1. Assemble a multidisciplinary care team with defined roles and responsibilities**					
	NKDEP—Collaborate with a Registered Dietician (Webpage)	✓				
	NKDEP—Collaborate with a Nephrologist (Webpage)	✓				
	2. Develop a strategy for educating patients about CKD					
	NKDEP—Kidney Disease Education Lesson Builder (Webpage)	✓				
	Tuot—Assessment of CKD Patient Educational Materials (Reference Material)	✓				
	CDC—Chronic Kidney Disease in the United States (Pamphlet/Handout)	✓			✓	
	AAKP—Kidney Beginnings: A Patient's Guide to Living with Reduced Kidney Function (Reference Material) ($)	✓			✓	
	AAKP—Pocket Guide to Managing Kidney Disease (Pamphlet/Handout)		✓		✓	
	NKDEP –Kidneys, Treasures: Education Program for Community Health Workers (Reference Material)			✓	✓	✓ (Spanish)
	3. Understand and address the patient's social determinants of health (SDOH)					
	NACHC—PRAPARE Implementation and Action Toolkit (Reference Material)	✓				
	AAFP—Addressing Social Determinants of Health in Primary Care (Reference Material)	✓				
	AAFP—The EveryONE Project Toolkit (Reference Material)	✓				
	Banerjee—Food Insecurity and CKD (Reference Material)	✓				
	AAFP—Social Determinants of Health Screening Tools (Screening Form)		✓		✓	✓ (Spanish, Chinese, French, Korean, Tagalog, Vietnamese)
	4. Include family, caregivers and the patient's community in treatment and educational efforts					
	NKDEP—Communicating Difficult Messages to Patients (Webpage)	✓				
	NKDEP—Family Reunion Health Guide (Reference Material)	✓			✓	
	NKDEP—Kidney Sundays: A Toolkit—Guide for Faith-Based Communities on Making the Kidney Connection (Reference Material)	✓			✓	
	AAKP—KidneyWorks Employment Resources (Reference Material)	✓			✓	
	NKDEP—Kidneys, Treasures: Education Program for Community Health Workers (Reference Material)			✓	✓	✓ (Spanish)
	5. Periodically reassess the patient's understanding of their diagnosis and treatment plan to encourage opportunities to iteratively address identified patient-centered barriers					
	RPA—Appropriate Patient Preparation for Renal Replacement Therapy (Reference Material)	✓				

*Resources current as of February 2020; $ = Cost associated with resource