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CENTER FOR PUBLIC HEALTH

Chronic Kidney Disease:

Finding a Path to Prevention, Earlier Detection, and Management

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Executive Summary

In the United States, chronic kidney disease (CKD) affects more than one in seven American adults, an estimated 37 million people. Commonly known as a "silent killer," the symptoms of CKD often do not appear until kidney function has been significantly impaired. Though it ranks as the eighth leading cause of death in the country, as many as 9 out of 10 American adults with CKD are unaware of their condition. Data indicate this health condition disproportionately affects historically underserved communities, imposing further social and financial burdens on these communities.

In the United States, the rapid increase in the number of adults with type II diabetes and obesity has reached epidemic proportions.[1] These preventable chronic conditions and the aging of the US population, combined with the effects of COVID-19 such as increased diabetes risk, kidney injury, and disruptions in access to health care, are having a significant impact on the prevalence of kidney disease in the country. The devastating health consequences of CKD and the historically high prevalence of the disease in its early stages necessitate the development and implementation of public health strategies that facilitate prevention, earlier disease detection, and management to prevent its complications and progression to kidney failure. A growing body of evidence shows that CKD can be prevented by management of underlying chronic conditions, that it can be detected earlier using simple laboratory tests, and that its complications and progression can be slowed with innovative therapies. Therefore, an integrated approach to prevent kidney disease and improve kidney health is critical.

To better understand the gaps and barriers to CKD prevention, early detection, and management,

the Milken Institute Center for Public Health conducted a landscape assessment of the CKD ecosystem. Additionally, CPH held two virtual convenings with a diverse group of thought leaders, including health-care providers, community leaders, community member advocates, business leaders, and federal partners, as well as Milken Institute advisors, stakeholders, and internal subject matter experts, to explore and identify opportunities to address the public health and health-care system needs related to CKD prevention and management.

From our work, eight broad opportunity areas emerged that centered our focus for this report: (1) root causes of health inequity that contribute to CKD, (2) nutritional services, (3) primary care infrastructure, (4) preventive screening, (5) education, health communication, and literacy, (6) telehealth services, (7) accountability in care, and (8) value-based care. By shedding light on the growing public health issue of CKD and better understanding these areas and their intersection with CKD, we can identify strategies to help address and reduce the burden of CKD in the United States.

Tackling this public health issue requires a whole-of-society effort, and in this report, we call on policymakers (federal, state, and local), government agencies, health-care administrators, health-care providers, allied health professionals, payers, members of the community, and community-based organizations (CBOs) to assume leadership and supporting roles and to collaborate with intention and urgency across public health, health delivery, and nontraditional health sectors.

To further this vision of finding a path to prevention, earlier detection, and management of CKD, robust public health and primary care infrastructure must be established, clinical practices as well as nutritional services must be augmented and streamlined, CBOs must be called upon, and individual community members must be educated and heard. To better negate the rise in CKD prevalence, CKD prevention initiatives must be adequately funded, health-care and public health workforce shortages must be addressed, and the health-care system must shift its focus from disease-centered treatment to person-centered care by implementing value-based care models. Additionally, all efforts must consider health equity and the social determinants of health to reach the under-resourced populations that are most vulnerable to this debilitating disease.

Introduction

Chronic kidney disease (CKD), a heterogeneous condition characterized by structural or functional disorders of the kidneys, usually manifests by reduced kidney function or markers of kidney damage, such as protein in the urine. The disease affects roughly 15 percent of the US population; however, 9 of 10 Americans with CKD do not know they have it.[2] The most common causes in adults are diabetes and hypertension (HTN), but many other causes affect children and young adults.

CKD often worsens over time and may progress to kidney failure which may require dialysis or kidney transplantation—also known as End-Stage Renal Disease (ESRD). In addition, CKD is associated with **complications** in virtually every organ system, including hypertension and heart disease. Irrespective of the cause, the severity of the disease can be classified according to the level of kidney function (glomerular filtration rate, GFR) and albuminuria measured through blood and urine tests, respectively.

As described in Figure 1 below, Stage G1 signifies kidney damage without loss of function, and Stage G5 is a severe decrease in function (kidney failure).[3]

Figure 1: Prognosis of CKD by GFR and albuminuria categories

Classification of CKD Cause (C) GFR (G) Albuminuria (A) KDIGO 2012				Albuminuria Categories, Description and Range		
				A1	A2	A3
				normal to mildly decreased	moderately increased	severely increased
				<30 mg/g <3 mg/mmol	30-299 mg/g 3-29 mg/mmol	≥300 mg/g ≥30 mg/mmol
GFR Categories, Description and Range (ML/min/1.73²)	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			

Source: Milken Institute (2022), adapted from KDIGO Work Group (2013)

LEGEND

- low risk (if no other markers of kidney disease, no CKD)
- moderately increased risk
- orange, high risk
- red, very high risk

If left untreated, CKD can lead to increased morbidity, reduced quality of life, and early mortality due to complications and progression to kidney failure. Furthermore, cardiovascular mortality rates in patients with earlier stages of CKD and kidney failure are significantly higher compared to individuals without CKD.[4] The nation's high prevalence and rising rates of individuals with causal factors such as diabetes and hypertension combined with the astronomical costs of CKD patient care place a significant burden on our health-care system and economy, with Medicare expenses in 2019 totaling more than $124 billion for the care of people with kidney disease.[5]

The devastating effects of CKD especially manifest in low-income populations, historically underserved groups, and the elderly, highlighting the disease's intricate ties with health equity as well as the social and structural determinants of health.

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Despite the potential to slow the progression and reduce complications of earlier stages of CKD, our health-care system focuses mostly on the advanced stages of the disease (Stages G4 and G5). However, the high prevalence of CKD and adverse clinical outcomes underscore the need for health structures and initiatives that increase the prevention, earlier detection, and management of this "silent killer," which is often not symptomatic until kidney failure. Combatting this hidden epidemic requires doing so now. Though once labeled an "untreatable" disease, public interest in CKD is resurging, and recently generated evidence can help reorient discussions about prevention, early detection, and management.[6]

As a nonprofit, nonpartisan think tank, the Milken Institute is uniquely positioned to catalyze practical, scalable solutions to global challenges by connecting human, financial, and educational resources to those who need them. The Institute's Center for Public Health leveraged a network of thought leaders and subject matter experts to actualize recommendations for this growing public health threat, focusing on an integrated, solutions-based approach. This report emphasizes the challenges and opportunities of CKD detection, diagnosis, and prevention while calling on key players and stakeholders to engage in creating a path to earlier detection, diagnosis, and management of CKD.

CKD is increasingly recognized as a global public health threat because of its high prevalence. Lack of appropriate and integrated treatment and limited control of risk factors such as diabetes, hypertension, cardiovascular disease, and obesity can make it challenging to reduce the burden of CKD.[7] Therefore, a public health approach to tackling this issue is imperative. According to the Centers for Disease Control and Prevention (CDC), prevention activities are typically categorized by three principles, and CKD prevention can be achieved by utilizing this approach:[8]

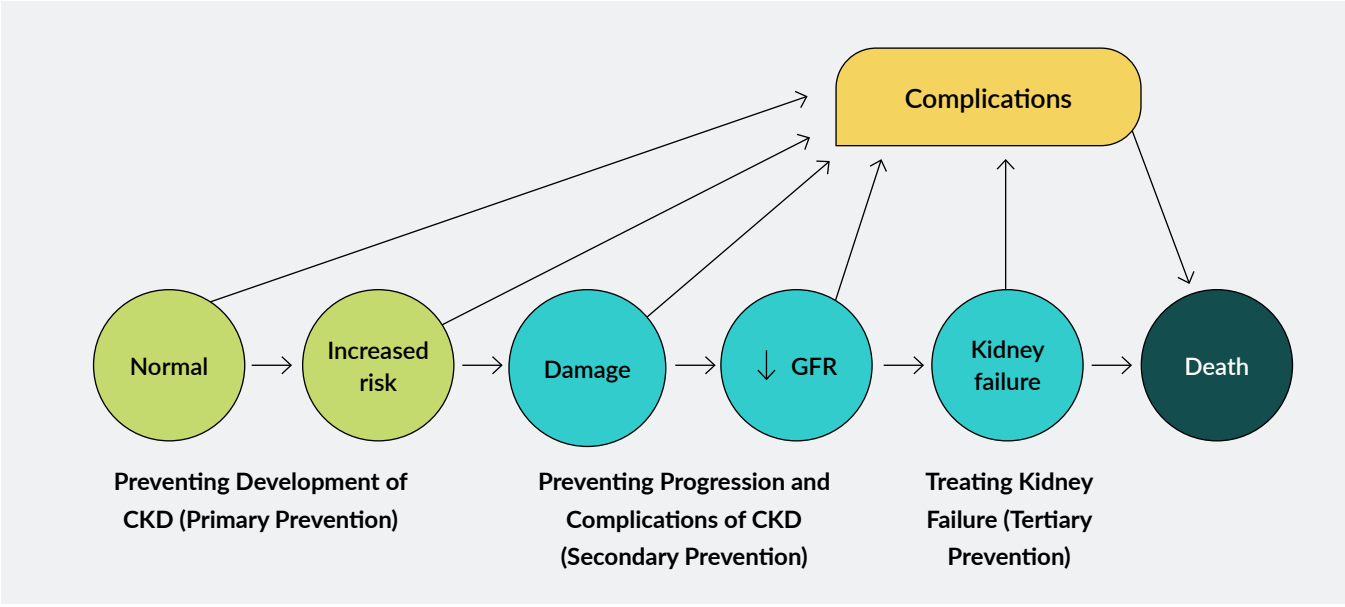
Table 1: Three Categories of Public Health Prevention

	Prevention Framework	In the Case of CKD[9]
Primary Prevention	Intervening before the disease process begins to prevent the onset of illness or injury	Preventing CKD
Secondary Prevention	Screening to identify diseases in the earliest stages	Improving outcomes in patients with CKD stages G1 to G4 by early detection and management
Tertiary Prevention	Using targeted measures for post-diagnosis management of the disease to slow or prevent its progression	Improving outcomes of patients with kidney failure (stage G5)

Source: Milken Institute (2022), adapted from Centers for Disease Control and Prevention (2017) and KDIGO (2005)

Primary and secondary prevention are the two prioritized categories for this report given its focus on upstream prevention.

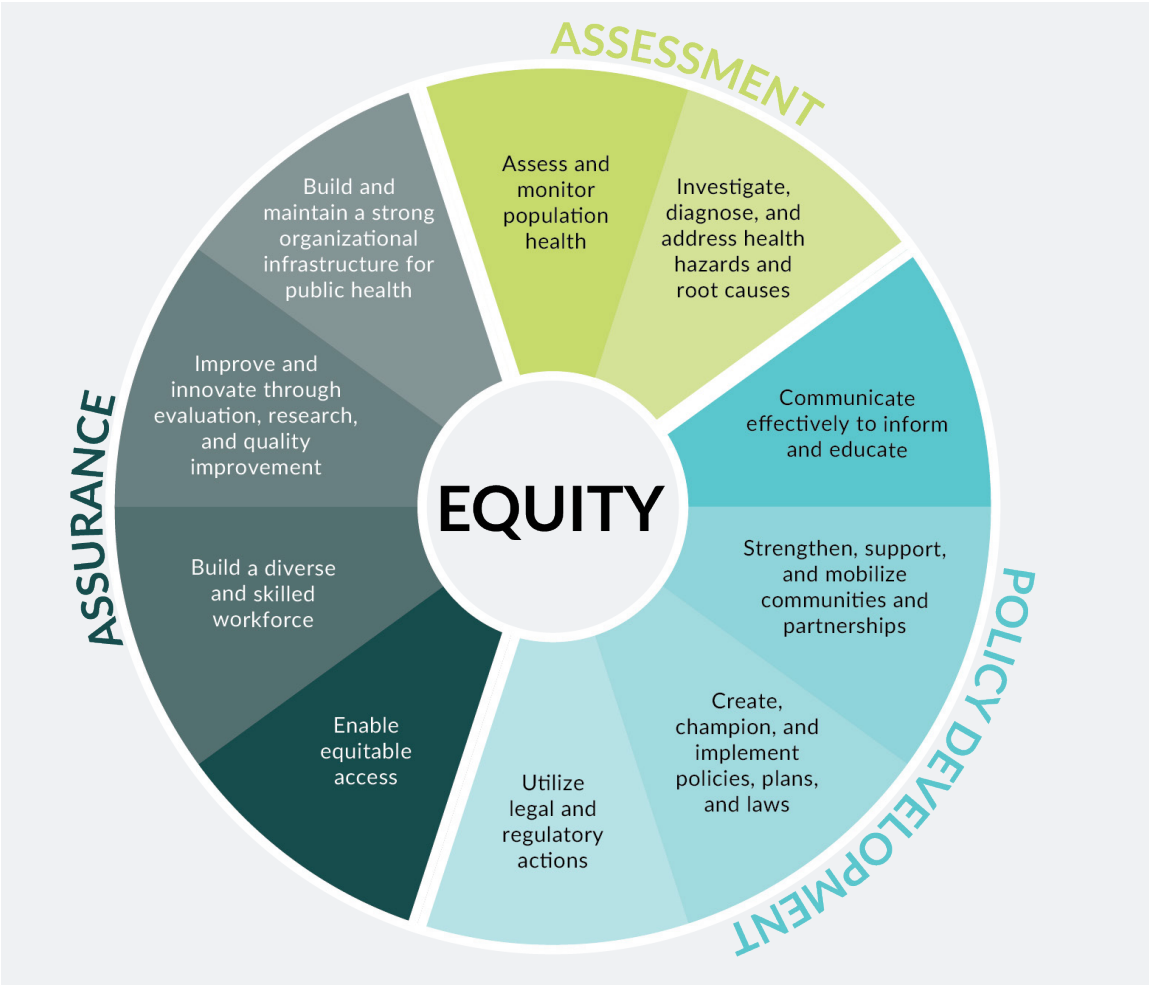
Figure 2: Conceptual Model of CKD: Public Health Approach[10]



Source: Milken Institute (2022), adapted from KDIGO (2005)

Additionally, the 10 Essential Public Health Services (EPHS) serve as a guidepost for the foundation of this report to carry out the public health mission of earlier detection and diagnosis of CKD. Organized around three core functions of public health—assessment, policy development, and assurance—the EPHS describe ways for public health to protect and promote the health of all people in all communities.[11]

Figure 3: The 10 Essential Public Health Services



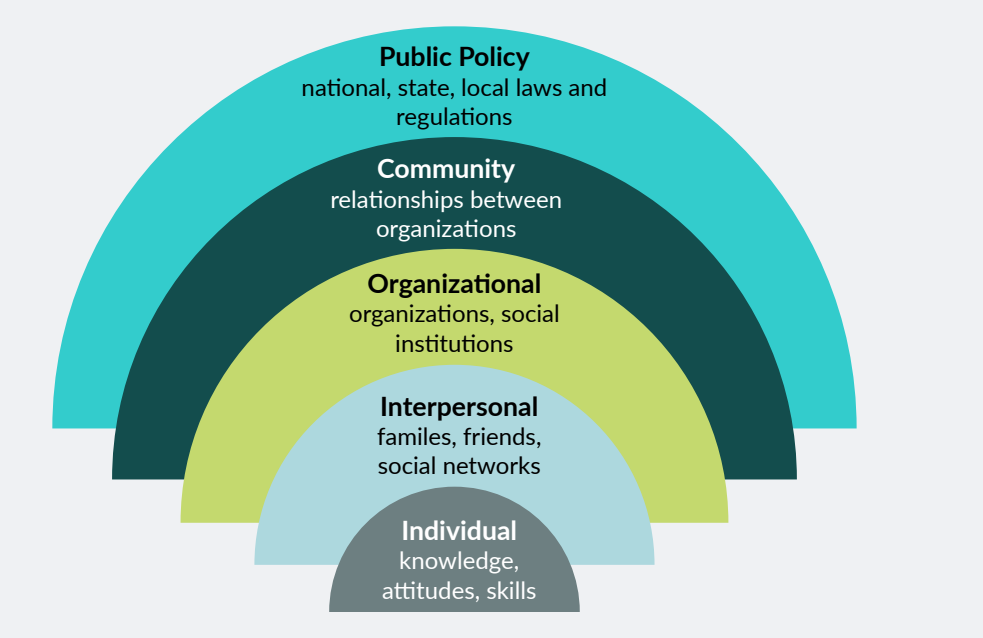
Source: Milken Institute (2022), adapted from KDIGO (2005)

This equity-centered framework is widely recognized and actively promotes policies, systems, and community conditions that eliminate the systemic and structural barriers that cause health inequities.[12] Applying these public health approaches to prevention, early detection, and management of CKD can reduce complications and progression of CKD.

Methods

In fall 2021, the Milken Institute Center for Public Health conducted a landscape analysis to uncover the existing gaps surrounding CKD and identify clear areas for thought leaders to create actionable change in prevention, early detection, and management of CKD. Following the landscape analysis, the Milken Institute used an adaptation of the social ecological model of health to build and engage a group of diverse thought leaders across the public health and health-care delivery ecosystems, emphasizing the individual, community, physical, social, and political environments that shape individual health. Thought leaders included primary care and nephrology clinicians, patient advocates, value-based care stakeholders, patient engagement leaders, federal representatives, researchers, and community health experts, among others. These thought leaders participated in two highly curated, invite-only, virtual workshops to discuss existing issues and explore tangible solutions for promoting prevention, early detection, and management of CKD in the United States.

Figure 4: Socio-Ecological Model



Source: Milken Institute (2022), adapted from Centers for Disease Control and Prevention (2017)

During the first workshop, thought leaders identified challenges and barriers to earlier detection, diagnosis, and prevention of CKD. Through these learnings, care and policy emerged as prioritized areas for deeper exploration. The second workshop included two breakout sessions focused on identifying approaches and strategies that address multidisciplinary care and policies required to reshape the management of CKD. Finding opportunities to advance health equity with education as a central tenet was core to these discussions. Examples of existing best practices and workable recommendations surfaced during this workshop to inform this final report and a forthcoming implementation roadmap that outlines a call to action for stakeholders to take in the near term.

Public Health Landscape

Despite CKD being the eighth leading cause of death in the US, it is often overshadowed by other chronic conditions (e.g., diabetes, hypertension, cardiovascular disease) because of the lack of symptoms during its earlier stages. This feeds into the traditional perception of CKD as "uncommon, without consequences, and untreatable until the stage of kidney failure." [13] Therefore, the care of those with CKD lies primarily within the subspecialty of nephrology, with a focus on dialysis and transplantation. However, this exacts a heavy toll on the lives of patients, our public health system, and our economy.

The economic burden of CKD contributes significantly to medical expenditures. In 2019, Medicare spending for beneficiaries with CKD without ESRD totaled $87.2 billion, representing 23 percent of total Medicare fee-for-service (FFS) expenditures.[14] Annual medical costs per patient with CKD can reach up to $65,000 when considering the cost of inpatient care for acute events, outpatient care, and pharmacy expenses.[15] Allowing the disease to progress to ESRD increases medical expenditures even more, with one year of dialysis care costing Medicare $81,000 to $94,600.[16]

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These numbers underscore the economic impact of CKD, but the drastic decrease in quality of life and life expectancy for people with CKD also warrants intervention. For example, the cardiovascular death risk for a 20-year-old receiving dialysis mirrors that of an 80-year-old within the general population.[17] However, most patients with CKD do not reach kidney failure, because they have a six times greater likelihood of dying from cardiovascular disease than progressing to kidney failure.[18]

In addition to the aforementioned clinical factors, various personal, social, and environmental factors can increase an individual's susceptibility to the disease and exacerbate adverse clinical outcomes. Four such factors particularly relevant to CKD are summarized below.

Race and the Social Determinants of Health

Kidney disease disproportionally affects people and communities of color.[19] There are significant disparities in disease prevalence and outcomes between communities of color and White Americans.[20] Like many chronic diseases, the most common cause of CKD arises due to lifestyle and social factors. Therefore, "the conditions in which people live, learn, work, and play," also called the social determinants of health, have a substantial part in the disparities seen in the disease's prevalence and outcomes.[21] The association between socioeconomic status (SES) and CKD rates has been heavily researched, with studies finding low SES correlating with 59 percent greater odds of CKD prevalence within people aged 30-64 years.[22]

Black Americans are more likely to occupy low SES communities because of decades of discriminatory policies and practices (such as redlining) that resulted in racialized economic segregation.[23] There is also evidence that Black Americans have poor health at a younger age due to the cumulative impact of social or economic adversity and political marginalization. Because of the chronic stress of stigmatization and disadvantage, Black individuals have a higher risk of developing chronic conditions, thus leading to higher rates of CKD as well as morbidity and mortality.[24]

Latinx communities in the United States (particularly those who are of Mexican descent) also have disproportionately high rates of diabetes resulting in CKD and experience faster progression to kidney failure as compared to non-Latinx White Americans. Social factors such as poverty and economic instability, limited health literacy, low English-language proficiency, limited access to transportation, lack of childcare, and limited paid time off prevent many Latinx people from accessing care on time.[25] Additional factors such as provider bias, lack of trust in providers, communication challenges, and cultural differences make it difficult to receive adequate care.[26] Such issues raise questions of ensuring health equity in CKD prevention, diagnosis, and care.

Age

Life expectancy in the US and around the globe has continued to increase due to socioeconomic development and medical advancements. However, as the population ages, the risk of developing CKD increases as well. Kidney function declines with age, falling about 1 percent per year after the age of 40, and the decline is faster in people with diabetes, high blood pressure, and heart disease, resulting in a high prevalence of CKD in people with comorbidities and significantly higher in people aged 65 years or older (38 percent) than in people aged 45-64 (12 percent) or 18-44 (6 percent).[27]

The Effects of COVID-19

The COVID-19 pandemic also continues to have a substantial health impact on people with CKD. A federal representative stated for this report that COVID-19 and ensuing pandemic measures left our nation with "a massive health debt," as patients found it difficult to see their doctors, acquire prescriptions, access needed health care, and lead healthy lives.

Data from the National Kidney Foundation's (NKF) 2021 Spring Clinical Meeting showed a 43 percent reduction in overall health-care utilization among Medicare beneficiaries with advanced CKD during the pandemic.[28] Though the effects of this reduction require further research, these gaps in clinical care for patients with CKD, diabetes, and hypertension may have a lasting impact on health outcomes. Further, researchers have noted the interplay between

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CKD and COVID-19. Preexisting CKD represents a major risk factor for mortality in patients with COVID-19, and many critically ill COVID-19 patients are susceptible to acute kidney injury and dialysis.[29] Additionally, the health effects of the pandemic on the CKD population extend beyond physical symptoms, with many patients suffering from "disease-related anxiety about COVID-19, increased depressive symptoms, and reduced physical health-related quality of life."[30]

Climate Change and Heat Exposure

According to the World Health Organization, climate change is the single biggest health threat facing humanity, and health professionals worldwide are already responding to the health harms caused by this unfolding crisis.[31] Our nation has felt the compounding effects of climate change, as extreme weather events such as heatwaves become more frequent and more severe.

This progressive rise in global temperatures has an especially potent effect on people performing physically demanding outdoor labor, exposing them to recurrent dehydration and heat stress.[32] Research shows that agricultural workers in Florida, a population that tends to work in extremely hot and humid conditions, exhibited increased rates of acute kidney injury, a significant risk factor for the onset of CKD.[33] The authors attribute this phenomenon to kidney damage caused by high temperatures, intense physical exertion, and limited rehydration.[34] Given the projected increases in global temperatures as climate change continues, farmworkers and other types of outdoor laborers may be exposed to more bouts of heat stress and potentially higher rates of CKD; therefore, it is necessary to engage in **renal health education** related to climate change.

Emerging Trends in the Chronic Kidney Disease Ecosystem

As articulated by a CKD thought leader during a virtual workshop, "CKD is a mirror of so many things that are wrong with the health-care system." CKD relates to other conditions, yet the disease is treated in isolation. Disease progression and complications are generally silent in the early stages, so most cases go undiagnosed and unaddressed until the late stages. CKD is inextricably tied with health disparities, including poor access to health services, food insecurity, and low socioeconomic status. Further, our health systems prioritize treatment over prevention due to a disease-focused outlook on patient care.

The nation's struggles with CKD and its treatment point to the inherent flaws in our health-care system. However, the rise of new interest, innovation, models, and federal initiatives show promise to propel CKD toward greater disease prevention and integrated, effective management of individuals' conditions. This confluence of efforts by the public and private sectors, characterized by six emerging trends, indicate that we are entering a new era in CKD.

1. **The recent approval of therapies that reduce the risk of disease progression and complications in those with CKD represent the greatest strides in its treatment in more than 20 years.** During the virtual workshops, thought leaders attributed our nation's traditional, disease-focused approach to CKD to "decades of nihilism due to the lack of innovation in the CKD space."

   For years, upon diagnosing a patient with CKD due to diabetes and hypertension, primary care physicians (PCPs) believed that they could only prescribe patients angiotensin-converting-enzyme (ACE) inhibitors to control their blood pressure and manage comorbidities that accelerate kidney decline. However, the recent success of large-scale trials testing sodium-glucose cotransporter 2 (SGLT2) inhibitors (a class of drugs traditionally used to treat type 2 diabetes) on kidney and cardiovascular outcomes has opened new treatment avenues for those with CKD.[35] New therapies for reducing the risk of kidney function decline, kidney failure, and cardiovascular death in adults with CKD, including novel mineralocorticoid receptor antagonists, have the potential to change how the health-care system approaches CKD treatment.[36] By prescribing these therapies, PCPs and nephrologists can directly affect the course of CKD progression and improve health outcomes in their patients.

2. **Recent changes to health-care models promote a value-based approach to patient care rather than the traditional FFS structure.** The FFS structure of kidney care incentivizes quantity rather than quality of care. Many health-care professionals criticize this model for pushing patients down the most expensive payment path with little prevention of disease progression, which leads to kidney failure and a need for dialysis and transplantation.

   The Center for Medicare & Medicaid Innovation's (CMMI) Kidney Care Choices (KCC) Model aims to address the flaws of FFS. By basing payments on a patient's health outcomes, care utilization, and performance on quality measures, the KCC model adds financial incentives for health-care providers to closely manage the care of Medicare beneficiaries with advanced

stage CKD and ESRD and delay the onset of dialysis.[37] This payment model represents a shift toward value-based care and supports providers in maintaining the health of their patients by incentivizing them to keep people off dialysis. Though many in the nephrology community believe that the model could go further by focusing on earlier stages of CKD, KCC opens a larger conversation on the merit and need for value-based models of care.[38]

3. **The emergence of new initiatives centered on the prevention and treatment of CKD signals a renewed interest in addressing the disease from both the public and private sectors.** In July 2019, the Trump Administration and the US Department of Health and Human Services (HHS) announced Advancing American Kidney Health (AAKH). Launched through an Executive Order, the initiative aims to reduce the general population's risk of kidney failure and improve patient access to high-quality, comprehensive treatment options.[39] The objectives of AAKH, many of which align heavily with the focus of this report, show increased federal interest in addressing the entire spectrum of CKD care rather than an exclusive focus on kidney failure, dialysis, and transplantation:

> *As articulated by a CKD thought leader during a virtual workshop, "CKD is a mirror of so many things that are wrong with the health-care system."*

Figure 5: HHS Advancing American Kidney Health Goals and Objectives

AAKH Goal 1:
Reduce the risk of kidney failure

AAKH Goal 2:
Improve access to and quality of person-centered treatment options

Source: Milken Institute, adapted from HHS Advancing American Kidney Health (2022)

AAKH also highlights the importance of the Kidney Innovation Accelerator (KidneyX), a public-private partnership between HHS and the American Society of Nephrology (ASN) created to "accelerate innovation in the prevention, diagnosis, and treatment of kidney diseases." In addition to convening thought leaders from the kidney space (e.g., nephrologists, PCPs, epidemiologists), KidneyX aims to bring in new players from systems science, engineering, and tech backgrounds to generate greater innovation in the kidney space.[41]

Additionally, HHS' Healthy People 2030 Initiative includes objectives related to CKD, end-stage kidney disease, and kidney transplantation. Specifically, the objectives aim to reduce the rates of kidney disease, its progression, its complications, and related deaths. rom a public health standpoint, it aims to increase awareness among adults who know they have CKD.[42] This comprehensive set of kidney disease, health prevention, and promotion objectives provides a framework and targets for key stakeholders to assess the health status of the community and develop an agenda for community and public health improvement. Although these three initiatives show the federal government's effort to increase awareness of kidney

disease, increased funding, innovation, and education are needed to address the larger public health and health-care issue appropriately and comprehensively.

4. **The rise of startups seeking to address CKD patient care is an opportunity for the private sector to complement federal efforts to fill the gaps in our health-care system.** Several companies, such as Somatus, Cricket Health, Monogram Health, Strive Health, and others are partnering with health systems to improve their capacity by offering comprehensive CKD treatment that emphasizes keeping patients healthy and away from the hospital. For example, Cricket Health and Strive Health partner with payers and providers to intervene at earlier stages and deliver stage-specific care to reduce costs and improve kidney disease outcomes. Monogram Health care teams visit patients' homes, where nurse care managers and social workers provide day-to-day disease management support with the guidance of nephrologists, registered dietitians, and care coordinators. The potential health and cost benefits of value-based companies to providers as well as people with or at-risk for CKD is promising for the future of kidney disease care.

5. **Health systems are shifting their approach to care from disease management-focused models to holistic and person-centered approaches.** By integrating a person's preferences, needs, and personal circumstances into the decision-making process and delivery of care, health-care providers can promote an equal relationship with individuals rather than them being passive recipients. Therefore, "meeting the person where they are" is crucial.

   While treatments may entail prescriptions, counseling and education, and procedures, one must consider the social and structural factors that prevent large portions of the population from accessing these potentially life-saving interventions. Garnering patient input about their goals and the barriers to achieving them, and assisting them in finding solutions, allow for greater understanding of how health-care providers can help them in their wellness journeys. For example, DaVita Integrated Kidney Care is providing coordinated, holistic care across the kidney care continuum by offering personalized care, education, and comorbid condition management to help people with CKD better manage their health and lifestyle.

6. **Health researchers and clinicians are taking action to advance health equity in kidney disease detection and management.** Kidney disease disproportionately affects disadvantaged communities. Because CKD and its risk factors affect a large proportion of minority, low-income, and underserved communities, conversations of health equity must underlie every aspect of CKD prevention, early detection, and management. As aptly articulated by a workshop participant, "Health equity is not necessarily another layer, but a lens through which we look at care."

   Recognizing that race is a social construct deeply rooted in discrimination and inequity rather than a biological variable, in August 2020, NKF and ASN convened a joint task force to reassess the use of race to estimate GFR.[43] To assess how well an individual's kidneys are working, health-care providers routinely assess GFR from the serum (blood) level of creatinine (a metabolic waste product). Healthy kidneys filter creatinine from the serum and excrete it in the urine. If kidney function is reduced, the serum level of creatinine increases.[44]

   Until 2021, GFR was assessed using estimating equations (estimated GFR, or eGFR) that

included race in addition to age, sex, and serum creatinine.[45] The inclusion of the coefficient for race in GFR estimating equations reflected the observations that average creatinine level in Black Americans was higher than in non-Black Americans who participated in the studies in which the equations were developed. Consequently, among patients of the same age, sex, and serum creatinine level, the estimating equation assigned higher eGFR values to Black Americans, indicating better kidney function, which is problematic if representation of Black Americans in the studies is not representative of Black Americans in real-world settings. Decision making based on flawed information could potentially lead to inequitable and delayed care, including delays in referrals to a nephrologist and/or wait-listing for kidney transplantation.[46]

In September 2021, the task force released its **final report** highlighting new race-free GFR estimating equations for use in the US.[47] The report, which was **endorsed** by the United States Pathology and Laboratory Society Leadership, also encouraged providers to use cystatin C to further evaluate eGFR in adults with or at-risk of CKD. When the two GFR estimation tests, creatinine and cystatin C, are used together, the results are more accurate and support better clinical decisions.[48]

The creation and endorsement of a new race-free GFR estimating equation underscores the impact interventions can have on increasing access to equitable care. All relevant stakeholders have a responsibility to prioritize and advance health equity. Incentives to encourage innovative design thinking and investments to research and develop strategies and execute them will be required.

7. **The pandemic has accelerated the pace of digital transformation and pushed us faster and further into the proliferation of advanced technologies that can alter how people, public health, and health-care systems approach care.** Digital health platforms such as telehealth, electronic health records (EHRs), remote monitoring/screening tools, educational platforms, wearable apps, and therapy tools increase connectivity, enable providers to maximize resources, help prevent expensive readmissions, and support adherence to and ease of access to sophisticated care.[49]

People with or at risk for CKD as well as providers are starting to utilize telehealth to raise awareness and understanding of kidney disease, as well as to enhance knowledge and CKD management among PCPs.[50] Additionally, companies such as **Healthy.io** are working to expand access to medical testing by leveraging cellphone cameras on smartphones. People can receive clinical results about their kidney health from the comfort of their own homes by using an at-home urinalysis kit and cell phone cameras. This allows health-care systems and providers to better manage an individual's condition while also lowering costs.

Furthermore, many digital engagement tools are being researched and tested to empower people with or at-risk of CKD to better understand and manage their conditions.[51] With the proliferation of and demand for elevated technological capabilities come larger policy and legislative challenges such as broadband access, privacy issues, regulations, licensures, and reimbursement that must be addressed.

The Case for Meaningful Stakeholder Engagement in Chronic Kidney Disease

Each stakeholder in the CKD ecosystem—policymakers, government agencies, health-care administrators, health-care providers, allied health professionals, payers, community members, and community-based organizations—have an important role in promoting earlier detection and diagnosis of CKD, advancing the national dialogue around CKD prevention, and prioritizing health equity for people with or at risk for CKD. Stakeholders will need to engage meaningfully by assuming leadership and supportive roles to realize this vision. Kidney disease prevention, detection, diagnosis, and management requires a whole-of-society effort to address the challenges, support community members and people affected by CKD, strengthen the health-care and public health infrastructure, and reduce the impact of environmental stressors on kidney health. Here is how each stakeholder can support this cause:

Policymakers—federal, state, and local

As the Essential Public Health Services framework suggests, policymakers are uniquely positioned to allocate funds and champion and implement policies and laws that impact health and well-being and address social determinants of health. Policymakers can shape the health-care and public health ecosystems by funding various health promotion, prevention, and treatment activities. Additionally, policymakers can influence health by addressing the various social determinants of health.

Government Agencies—federal, state, and local

Government agencies, including the National Institutes of Health (NIH), Agency for Healthcare Research and Quality (AHRQ), CDC, and state and local agencies play different but integral roles in CKD detection, diagnosis, and beyond. Government agencies conduct and support research related to CKD to create knowledge about and treatments for disease; produce evidence to make health care safer, higher quality, more accessible, equitable, and affordable; and have CKD initiatives that include public health strategies for promoting kidney health.

Public health governance structures and relationships vary between state and localities. However, both play important roles in protecting and assuring the health of the people. State agencies have overarching goals for the health of its citizens, while local agencies have goals and responsibilities as they relate to the region, county, or city and its citizens. Some of these responsibilities may be disease monitoring, outbreak response, health promotion, nutrition education, direct health services or referral to health services, environmental health programs, community health assessments, and vital statistics programs.

Payers—Medicaid, Medicare, and commercial insurance providers

Presently, most health-care systems in the nation are paid to treat rather than prevent disease. Payers play a critical role in moving the needle toward prevention by changing how they pay providers. This shift can be accomplished by increasing the utilization of preventive services with value-based payment models and health quality measure requirements.[52] Commercial payers/health plans, Medicare Advantage, Medicare, and Medicaid can align and work toward establishing requirements for quality measures for kidney disease. Payers can also offer protection against the financial impact of unexpected health events and provide people with access to health services.[53]

Health-Care Providers, Allied Health Professionals, and Health-Care Administrators

Health-care providers, allied health professionals, and health-care administrators represent the foundation of prevention and management efforts because they engage in the bulk of patient care and ultimately carry out protective measures such as screening and disease management. There must be buy-in at the executive level within the health-care institution. To many health-care providers and allied health professionals' frustration, the flaws of the nation's health-care system pose significant barriers to treating CKD patients in the most effective and coordinated manner possible. However, given their central role in patient care, health-care administrators and providers carry significant weight in shifting the dialogue from disease-centered treatment to person-centered prevention and management. By utilizing new therapies, creating health promotion opportunities for patients, and improving day-to-day clinical practices and care coordination, they can greatly aid in changing how health care approaches CKD.

Community-Based Organizations

Community leaders are trusted stewards of the society. Additionally, community health workers are an idea or a bridge between providers and community members who are champions and peer navigators and help patients and family members. As a public voice for their community, CBOs, including nonprofit organizations and local chapters of national associations, can work closely with community members to identify and address issues that are beyond the reach of health-care providers and the health-care system. CBOs are well-suited to assess population health at the grassroot levels. As members of the community, leaders have earned the trust and understanding to support, communicate, and effectively inform the needs of the community.

Members of the Community

All members of the community including people with or at risk for CKD, their support system and social network, and advocacy groups have essential roles to play in creating the path to earlier detection, diagnosis, and management of CKD. Community buy-in and action directly affect change. When members of a community unite to identify problems and find upstream solutions to prevent people from becoming CKD patients, the likelihood of the intervention being sustainable in the community increases. Health promotion and prevention rely on the community's involvement and engagement.[54]

Driving System-Level Change for CKD Prevention, Earlier Detection, and Management

In reimagining a path to prevention, earlier detection, and management of CKD, high-quality care interventions should be safe, effective, person-centered, timely, efficient, and equitable.[55] In an ideal world, US policymakers, government agencies, health-care administrators, health-care providers, allied health professionals, payers, community members, and CBOs would work to create a robust infrastructure that is conducive for upstream, prevention-focused CKD strategies and efforts across sectors and communities with a partnership point of view. Adopting this foundation will shift the health-care and public health system and environments including transformative system-level changes and modifications that advance health equity in CKD care and for individuals at risk for or living with CKD. Four system-level changes that would drive prevention, early detection, and management to impact CKD are discussed below.

System-Level Driver 1: Invest in Upstream Public Health Infrastructure to Build and Sustain Healthy Communities

Better health outcomes and reduced health disparities are critical to improving the nation's health and can only be accomplished with support from all sectors. Structure for partnerships, as well as community and patient engagement, are required to inform CKD prevention, early detection, and management. To create healthy communities, policymakers, government agencies, health-care administrators, health-care providers, allied health professionals, payers, community members, and CBOs must prioritize the mission to reduce the prevalence of CKD and align on a shared vision to achieve it as collaborative partners. Further, as health organizations and public health agencies create strategies to prevent CKD and advance health equity, they must engage with patients and their families to obtain their input and perspectives in an effective manner to inform program and policy development.[56]

Local, state, and federal governments have significant shared responsibility, where each sector has a role in protecting the public's health that requires substantial investment. Government agencies can promote the welfare of their population, ensure access to safe and quality care, and protect people from hazards. They can also implement policies and regulations to promote health and prevent disease. Further, they can develop primary prevention initiatives that promote well-being including food safety, access to nutritious food options, education access and quality, job quality and workforce development, economic safety nets, transportation, and availability of parks and recreation centers to increase physical activity. Each government agency has the responsibility of establishing an adequate public health infrastructure that includes funding, data collection, analysis, and utilization; health planning; community mobilization; and policy implementation, research, evaluation, and quality improvement.[57]

Sustainable partnerships that allow the health-care and public health systems to align and build consensus with key support and leadership from government are key for progress and can increase the likelihood of implementation of programs that protect and improve the public's health. This partnership model came from the Milken Institute Center for Public Health's report, *Learning from COVID-19: Reimagining Public-Private Partnerships in Public Health*, which calls for a new public-private partnership model for public good to create and sustain value in public health in times of crisis and non-emergencies.

Strategies for Driving System-Level Change:

- Establish state-funded task forces with diverse stakeholders to make recommendations and sustain efforts on prevention, detection, management, education, and awareness of CKD.
- Support and participate in collaboratives designed to strengthen cross-sector and community-driven partnerships to advance health equity such as the Build Health Challenge. Engage in award program initiatives as an underwriter or a participant to focus on upstream factors driving structural and social determinants of health to advance the creation of healthy community policies, programs, and practices.
- Invest in platform technologies, such as personalized community referral networks, that connect people to community and social services resources to promote wellness, meet basic needs, and manage care for illness.
- Launch mass media efforts including public service announcements to shed a light on the growing public health impact of CKD and ways to self-engage in upstream prevention.
- Design and implement frameworks to evaluate the effects of public health interventions.
- Obtain perspectives of patients and their families to inform program and policy development to prevent and manage CKD as well as advance health equity.

System-Level Driver 2: Modernize Public Health Data and Surveillance

As we enter the third decade of the 21st century, a robust public health and primary care infrastructure must be established. Implementing interventions, research, and innovation necessitates the ability to accurately analyze and act on available data. In public health, data drives decisions. The pandemic has highlighted the importance of utilizing data to make accurate decisions in a timely manner. In addition to responding to pandemics and emergency situations, public health data can help to resolve many health challenges in an equitable manner. In 2013, CDC launched a Chronic Kidney Disease Surveillance System to centralize data that will inform understanding of the magnitude of kidney disease, associated risk factors, consequences, and the public health/health-care system's capacity in managing CKD at the state, local, and national levels.[58] Despite the investment in CKD surveillance, it is a well-known fact that the nation's overall data collection and surveillance systems are outdated and in need of modernization and innovation. This fact presents an opportunity for stakeholders to capitalize on CDC's Data Modernization Initiative, which received a $1 billion investment to modernize data and surveillance infrastructure across the state and federal public health ecosystem.[59] Using public

health data to highlight the incidence and prevalence of CKD across the country in a timely manner can help make a case for increased funding and resources.

Strategies for Driving System-Level Change:

- Invest and sustain efforts to modernize data and surveillance infrastructure across the state and federal public health ecosystem by appropriating $250 million to support CDC's Data Modernization Initiative.
- Develop methods/tools to disaggregate data by populations disproportionately affected or at risk for CKD.
- Expand CDC public health data surveillance capabilities for CKD and establish a hub for CKD data collection, analysis, and reporting.
- Increase funding to support expanded CDC CKD Surveillance System capabilities.
- Ensure that the contract for the United States Renal Data System (USRDS), the national data system that collects, analyzes, and distributes information about CKD and ESRD, is consistently and adequately funded.

System-Level Driver 3: Address Public Health and CKD Research Funding Gaps

Funding is required to bring about change. Public health efforts to prevent and manage CKD are severely underfunded in the US federal annual budget. Currently, only CDC's budget includes funds for CKD, but as a single line-item, which is insufficient to achieve the desired outcomes at the state and local levels. In fiscal years (FYs) 2020-2022, prevention and management of CKD was allocated a budget of $2.5 million, which is significantly lower compared to other chronic diseases such as diabetes with proposed funding of $95.9 million.[60]

Legislative activity and policies for CKD are limited as well. For several years, Congress prioritized allocated funding for kidney disease treatment over prevention. Policy interventions and government support play a vital role in advancing CKD care toward earlier diagnosis and management. There is a pressing need for Congress to significantly increase and sustain funding for CKD awareness, education, early detection, prevention, surveillance, and management activities.

Because of limited funding, state and local public health departments cannot prioritize CKD prevention, early diagnosis, or management. Stakeholders must advocate for Congress to invest in CDC's Chronic Kidney Disease Initiative that focuses on a comprehensive public health strategy to address CKD, including surveillance, raising awareness of CKD, promoting early diagnosis and treatment, and improving quality of life for people with or at risk for CKD.

Chronic disease research (including CKD) is chronically underfunded. Now is an ideal time to invest in research to better understand the long-term effects of CKD. Research breakthroughs can lead to the development of treatments to slow disease progression and address disparities

through utilization of proven treatments. Furthermore, research will allow health-care providers and researchers to demonstrate the cost-effectiveness of treating CKD at an earlier stage.

This gap calls for policymakers to address CKD care by allocating more funds for kidney-related research. Advocates must persuade Congress to fund NIH's National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) to address gaps in implementation science, develop implementation strategies, and promote the adoption of evidence-based practices for CKD care and management. Recently, the American Association of Kidney Patients (AAKP) and ASN advocated for a funding increase of $632 million to NIDDK. This increase will provide a proportionate amount of funding proposed in the RISE Act, including dedicated funding to study the impact of COVID-19 on kidney health and people with kidney diseases and to compensate for costs associated with COVID-19 lab closures. It will also help NIDDK keep pace with the rising costs of medical expenses due to inflation.

Strategies for Driving System-Level Change:

- Increase and sustain federal funding for federal agencies to address public health infrastructure, chronic disease (specifically CKD) related activities, and expand activities that address social determinants of health.
    - Expand CDC's capabilities to implement activities that address social determinants of health in state, local, tribal, and territorial regions and reduce health disparities by appropriating $153 million in FY 2023.
    - Appropriate $1 billion in FY 2023 to assist CDC in its efforts to build state, local, tribal, and territorial capacity to respond to public health needs including workforce development, responding to public health threats, and sustaining core public health capabilities.
    - Increase CDC's funding to $170 million in FY 2023 to support state public health agencies in addressing emerging issues and gaps related to chronic diseases.
    - Support the Kidney Interagency Coordinating Committee through sustained funding to coordinate a robust federal response to CKD including surveillance, professional education and outreach, public education and outreach, quality improvement/evidence of therapy, and research.
- Encourage the US Department of Health and Human Services to update its regulations and appropriation language to dedicate a portion of its funds to addressing the CKD issue.

System-Level Driver 4: Build a Sustainable and Diverse Workforce for Healthy Communities

Workforce shortages remain a challenge across all disciplines. During the past decade, the public health workforce has shrunk significantly due to lack of funding. A recent Public Health Workforce Interests and Needs Survey indicated that a large proportion of public health professionals are keen on leaving the public health field because of inadequate pay.[61] Similarly, the nation is facing a shortage of PCPs, accounting for only 30 percent of the physician workforce. One out of every five

Americans lives in a federally designated primary care Health Professional Shortage Area (HPSA), where they lack access to PCPs or primary care services.[62]

Additionally, the growing disparity between demand and supply has reduced bandwidth and exacerbated PCP burnout.[63] There is also a shortage of dietitians who specialize in renal nutrition in the health-care system. Because so few health-care professionals specialize in renal nutrition, physicians may experience difficultly finding a nearby registered dietitian for their CKD patients, particularly in underserved rural and urban areas.[64]

The growing and aging population demands an immediate solution to address the health-care needs of communities. Thought leaders at the virtual workshops suggest adopting a bottom-up approach by encouraging children and young adults to follow STEM careers. In addition to promoting STEM careers, challenges such as low pay in the public health sector, massive educational debt in the health-care sector, and burnout/workload issues in the public health and health-care sectors must be addressed urgently to fill gaps in all public health and health-care sectors.

Thought leaders at the virtual workshops suggest adopting a bottom-up approach by encouraging children and young adults to follow STEM careers.

Furthermore, funding for public schools and state universities must be increased to ensure equitable and expanded access to education. It is also essential to increase diversity in the field of public health, primary care and nephrology, nutrition, and other allied health care sectors. To ensure that people's needs are met, these professions must reflect the diverse communities they serve, and the workforce should be trained to provide culturally and linguistically appropriate care.

A few states are changing policy to bolster the primary care workforce by increasing funding for primary care training, providing medical school debt relief as well as better reimbursement options for practice, and encouraging medical students/graduates to practice primary care medicine.[65] Nephrology associations are providing scholarships and debt relief options for graduates interested in nephrology fellowships. Registered dieticians and nutritionists have **created a movement** to increase racial and ethnic diversity in the field of nutrition by empowering leaders of color to appropriately serve their communities. Similarly, in the public health field, state and federal legislatures are considering several strategies to support the public health workforce by **increasing the number of public health/community health workers**, developing sustainable funding streams, providing scholarships and loan repayment options, and adopting legislation to protect public health workers from threats.[66]

Strategies for Driving System-Level Change:

- Equip the workforce with the necessary skills and knowledge to support community needs related to kidney health through training and continuing education by leveraging federally funded programs such as the Health Resources and Services Administration's (HRSA) **Community Worker Health Training Program**.

- Bolster the primary care infrastructure by creating incentives for the physician workforce to enter the field of primary care medicine.
- Integrate and elevate the role of health-care navigators in chronic disease into the person-centered care models that prioritize upstream interventions.
- Expand the number of health-care navigators through **grant awards** to help people with or at risk for CKD to manage their health conditions and access appropriate health services.
- Bolster the health-care and public health workforce by offering tuition reimbursement, higher education debt relief, loan repayment, and competitive salaries to pursue careers related to public health, community health, nutrition, primary care, and/or nephrology.
- Support legislation to protect the health-care and public health workforce from violence, harassment, and threats modeled after 18 U.S.C. § 46504.

Four ecosystem drivers are critical to advance the health of communities and create public health systems capable of addressing the longstanding shortcomings and disparities in CKD prevention and management. To catalyze systems-level change, the priorities identified above will help lay the foundation needed to achieve a greater focus on disease prevention, increase health equity in kidney care, and bolster the nation's public health infrastructure to better respond to CKD-specific challenges. In addition to addressing these large-scale barriers to effective kidney care, stakeholders can also capitalize on various micro-level opportunity areas that will further bolster the ability of individuals, communities, health-care systems, and the government to achieve earlier detection, prevention, and management of CKD.

Recommended Actionable Steps to Transform CKD Prevention, Earlier Detection, and Management Challenges into Opportunities

Primary Prevention

The purpose of primary prevention, as it relates to health, is to prevent the onset of the illness before the disease process begins. The goal in this case is to prevent CKD by addressing the underlying causes of poor health outcomes. Because of its association with modifiable risk factors such as diabetes, hypertension, and obesity, CKD is a preventable health condition. To address the growing problem of CKD, strategies must shift from a disease-oriented focus on kidney failure to a public health approach to CKD onset and progression. Utilizing a collaborative approach, stakeholders can work together to improve understanding of CKD among members of the community and subsequently improve the social determinants of health that result in better health outcomes related to kidney health.

CKD Opportunity 1: Collaborate across Sectors to Combat Root Causes of Health Inequity That Contribute to CKD

As the health-care system shifts its priorities from a traditional disease-centered model to adopting a holistic, person-centered care model, it is crucial to consider the various social determinants of health that affect health outcomes. Determinants of health can be grouped into five domains: 1) economic stability, 2) education access and quality, 3) health-care access and quality, 4) neighborhood and built environment, and 5) social and community context.[67] These factors have a major impact on people's health and contribute to health and racial disparities as well as inequities. Viewing social determinants of health through a primary prevention lens can help address the root causes before they result in disease and poor health outcomes.

Currently, many extrinsic and intrinsic barriers put people at an increased risk for CKD and make it challenging to achieve CKD prevention (see Figure 6).

Figure 6: Barriers and Root Causes of Health Inequity

- Limited nutritious food options
- Cultural and social barriers including stigma
- Lack of culturally and linguistically appropriate care
- Low educational attainment and literacy
- Low health literacy level
- Lack of affordable health insurance
- Lengthy wait times to access primary and specialty care
- Deteriorating opportunities for upward mobility
- Discrimination and racism
- Lack of access to physical activity programs and infrastructure including parks and recreational centers
- Inadequate transportation and transportation systems
- High cost of prescription drugs
- Increasing costs of higher education
- Underfunding of public-school systems
- Poor internet infrastructure
- Health-care workforce shortages
- Lack of affordable housing
- Lack of consistent coverage for some preventive services (e.g., medical nutrition therapy) across payers
- Poorer access to care in underserved rural and urban areas

Source: Milken Institute (2022)

CKD has a disproportionate impact on the health and well-being of Black, Hispanic/Latino, and Indigenous communities, which have historically been under-resourced and afflicted by inequities highlighted in Figure 6 above.

Furthermore, it is evident that rural communities are more likely to have poorer health outcomes than their urban counterparts. In states without Medicaid expansion, individuals struggle to access care because lack of health coverage. Incidentally, states like Alabama, Mississippi, and Georgia, which have not **expanded Medicaid**, have had **leading rates** of kidney failure. Additionally, regarding primary care, men and people of color are underserved. Many preventive activities and services are not covered by health insurance plans, further exacerbating inequities.

Essentially, CKD reflects the shortcomings and inequities of the broader health-care system. Many underlying social justice issues impede the ability of the CKD ecosystem to successfully resolve its issues. This presents an opportunity for health-care systems to cultivate and foster relationships with CBOs to advance the goal of better managing and preventing CKD. CBOs, which include health centers, faith-based organizations, community centers, and cultural organizations, play an equally important role in improving health outcomes for people who have or are at risk of developing CKD. Collaboration with CBOs allows health-care providers to gain a better understanding of the social, environmental, and economic issues affecting a person's health.

"Providing people with autonomy and meeting them where they are" was a recurring theme in discussions with thought leaders.

Community partnerships can enable health-care systems to engage with underserved populations

who might not have access to health-care services otherwise.[68] CBOs can provide community-based CKD screenings for people who do not have health insurance or access to health care, as well as personalized educational services. In February 2022, HRSA awarded approximately $55 million to 29 HRSA-funded health centers to increase virtual health-care access and quality for underserved populations through telehealth platforms, remote patient monitoring, digital tools, and health IT platforms. We must leverage community partnerships that involve people in their care, foster social support, and increase trust in the health-care system.[69]

Leaders of CBOs are also well-suited to address misinformation, fear, and stigma associated with CKD by providing accurate information about the health issue, social support, and resources for managing their condition. Because of the faith entrusted in them by community members, they are uniquely positioned to address broader community needs and can lead efforts to address the social determinants of health to reduce disparities and advance health equity.

Additionally, to further the root causes of health inequity and disparities, a multisectoral approach should be adopted. Stakeholders need to implement an upstream practice by adopting a Health in All Policies collaborative approach that integrates health considerations and factors across all sectors.[70] For example, strategic partnerships among the private sector, government agencies, schools, and nonprofit organizations can be advantageous in improving living conditions such as transportation, housing, food safety, employment, education funding, physical activity infrastructure, and other social services. Improving these conditions and environments can have a direct impact on behaviors that affect health and well-being.[71]

Recommended Actionable Steps

Stakeholders have an opportunity to improve health, address root causes that contribute to longstanding disparities, and advance health equity. To create healthy communities, stakeholders must mutually agree on the mission to prevent the onset of CKD and coordinate efforts to achieve it.

CKD Opportunity 1: Collaborate across Sectors to Combat Root Causes of Health Inequity That Contribute to CKD

Recommended Actionable Steps	PM	GA	PE	HCP	CBO	CM
1. Design and implement community-centered programs to help health-care and community partners better understand and address social determinants of health and non-clinical risk factors that impact quality of life.		●		●	●	●
2. Assess social needs when developing community-centered programs using evidence-based models and tools, such as the Protocol for Responding to and Assessing Patients' Assets, Risks, and Experience (PRAPARE) and the Accountable Health Communities Health-Related Social Needs Screening Tool		●			●	

Recommended Actionable Steps	PM	GA	PE	HCP	CBO	CM
3. Operationalize programs that are guided by principles that foster diversity, equity, and inclusion and consider approaches such as the Participatory Planning Approach that includes various stakeholders from all backgrounds and sectors of a community in planning, implementing, and evaluating health promotion or prevention activities.		●		●	●	●
4. Adopt the Health in All Policies (HiAP) community approach that integrates health considerations and factors across all sectors and implement policies in non-health sectors to impact kidney health and health equity. • Examples include implementing community and school gardens, supporting consumption of nutritious foods in school, advocating for sustainable SNAP funding, and establishing permanent supportive housing.	●	●	●	●	●	
5. Initiate collaboration between rural providers and community health leaders to establish and sustainably fund rural provider safety nets in the form of community health centers, rural health clinics, school-based clinics, and Centers for Medicare & Medicaid Services (CMS)-designated critical access hospitals.	●	●	●	●	●	
6. Provide essential community-based services such as screenings for CKD.		●	●	●	●	
7. Expand broadband infrastructure in rural areas to enable access to digital apps and virtual platforms for prevention, management, and treatment of kidney disease.	●	●				

Policymakers (PM); Government Agencies (GA); Payers (PE); Healthcare Providers (HCP); Community-Based Organizations (CBO); Members of the Community (CM)

Source: Milken Institute (2022)

CKD Opportunity 2: Optimize Nutritional Services to Slow CKD Progression

A thought leader highlighted at the virtual workshops that "nutrition is an issue that spans across all tiers of the prevention framework—primary, secondary, and tertiary." Nutrition plays a central role in mitigating CKD risk factors (such as diabetes and hypertension) and slowing CKD progression. Medical nutrition therapy (MNT), an intervention in which patients work with dietitians to assess and identify nutrition problems, and plan, achieve, and maintain lifestyle changes to improve clinical outcomes, serves as an effective treatment option for people in all stages of CKD. Though the benefits of MNT to patients with CKD are well-documented, studies show that only 1 in 10 receive any MNT before initiating dialysis.[72] Cost, access, and awareness from both patients and providers of MNT represent potential causes for this substantial gap in nutritional care.[73] Studies show that both providers and patients frequently are not aware of Medicare's share coverage for nutritional services, which allows people with diabetes and non-dialysis CKD to receive a designated amount of MNT at no cost when referred by their physician.[74]

Low reimbursement rates and exceedingly complex billing practices for MNT contribute to many health providers' decisions to not provide these services to patients. Additional barriers include inconsistent physician referral to nutritional services and the difficulty of locating dietitians who specialize in CKD management.[75] In many cases, dietitians are not co-located in clinics or integrated into the medical team, meaning that patients must travel to separate facilities to receive their treatment and may not receive a "warm handoff" that would help to facilitate care. This challenge also leads to care coordination issues between providers similar to those identified between nephrologists and PCPs.

Recommended Actionable Steps

MNT now sits near the periphery of CKD care because its utilization remains low despite its promise for slowing disease progression. Addressing the issues of cost awareness and access to nutritional services can help to bring these interventions to people with CKD and improve their quality of life. Doing so requires implementing solutions at the patient and health-care provider levels as well as instituting system-wide change in payment structures and reimbursement practices.

CKD Opportunity 2: Optimize Nutritional Services to Slow CKD Progression

Recommended Actionable Steps	PM	GA	PE	HCP	CBO	CM
8. Increase patient and provider awareness about Medicare coverage of MNT to help address some of the cost barriers associated with the treatment and improve its utilization in people with CKD.		●	●	●		●
9. Educate beneficiaries to understand current patient access benefits and policies for MNT services.			●	●	●	
10. Utilize resources such as those from the Academy of Nutrition of Dietetics to learn how to obtain coverage and maximize reimbursement.				●		
11. Advocate to appropriate payers for changes in payment structures that can mitigate the costs of MNT and incentivize its use in CKD care.	●			●	●	●
12. Provide continuing education opportunities to equip generalist registered dieticians with skills and knowledge needed to counsel patients with CKD. Refer to NIDDK resources such as CKD Nutrition Management Training Program.		●	●			

Policymakers (PM); Government Agencies (GA); Payers (PE); Healthcare Providers (HCP); Community-Based Organizations (CBO); Members of the Community (CM)

Source: Milken Institute (2022)

Secondary Prevention

Gaps and barriers to earlier diagnosis of CKD impede the possibility of secondary prevention of CKD progression and complications. Secondary prevention aims to reduce the impact of disease that has already occurred. In CKD, secondary prevention includes screening, reimbursement, and primary care tools and resources. Furthermore, once a health-care provider establishes a diagnosis of late-stage CKD for a patient, they can take various steps to slow disease progression, such as implementing lifestyle interventions and prescribing ACE inhibitors and recently approved drugs that manage CKD and its comorbidities. However, the fragmented nature of our nation's health-care system limits their ability to provide patients with effective, coordinated care to manage complications of late-stage CKD.

CKD Opportunity 3: Repurpose US Primary Care Infrastructure to Drive Person-Centered Coordinated Care

Providers may be the first point of entry for many patients, further indicating that PCPs are the best positioned clinicians in the health-care ecosystem to implement kidney-protective interventions and effective treatments. However, the primary care infrastructure faces a variety of challenges, such as lack of tools and resources necessary to implement high-quality CKD care. Supporting the primary care arm of the health-care delivery system is crucial to secondary prevention strategies of CKD.

Once a health-care provider detects CKD in a patient, providers can take various steps to slow disease progression and treat complications, such as implementing lifestyle interventions and prescribing ACE inhibitors and recently approved drugs that manage CKD and its comorbidities. The recent approval of SGLT2 inhibitors for the treatment of CKD and its comorbidities represents a massive step forward for the field. However, getting effective drugs, whether they are old therapies (ACEi/ARB) or new ones such as SGLT2 inhibitors, into the hands of patients poses another potentially greater hurdle.[76] Doing so requires increasing PCPs' awareness and comfort with prescribing these therapies to patients diagnosed with CKD.

Providers also attribute the inadequate use of new therapies to their steep costs. While coverage through private insurers, Medicare, Medicaid, and patient co-pay assistance programs reduce a patient's **out-of-pocket expenses**, significant barriers relating to formulary restrictions, insurance coverage, and cost sharing can result in delayed care, disparities in SGLT2 inhibitor uptake, decreased adherence of medications, and overall poor health outcomes.[77] Therefore, getting these innovations to the most vulnerable populations requires greater democratization of these therapies. However, the fragmented nature of our nation's health-care system limits PCPs' ability to provide patients with effective, coordinated care and keep them off dialysis.

CKD is a disease that requires regular monitoring and detailed care.[78] People with or at risk for CKD frequently have multiple comorbid health issues and conditions such as diabetes, cardiovascular disease, and hypertension, making efficient care essential. Currently, the transition from primary care to nephrology care does not occur in a timely manner, often resulting in progression of CKD from earlier stages to ESRD.

Enhancing coordinated care is required to address the complexities of treating people with or at risk for CKD. Coordinated care improves a person's long-term health by promoting medical access and facilitating information-sharing between providers and specialists, thus reducing fragmentation and siloes. Coordinated care also helps reduce disparities and inequities as care teams are often aware of the social determinants of health. Therefore, they can work on addressing the barriers that prohibit patients from receiving person-centered, holistic kidney care.[79]

Even in instances when PCPs refer their patients to a nephrologist, creating a successful working relationship between primary and specialty care comes with its own challenges, especially in the realm of communication. Primary care teams must address the complex health needs of patients with CKD in partnership with nephrology practices. Doing so includes treating CKD in the context of comorbid conditions and addressing the social challenges that affect patients, especially those from underserved backgrounds.[80]

However, various barriers prevent such coordinated care. A lack of timely information exchange about patients due to lack of shared EHR systems, lack of comprehensive notes, and poor working relationships with and limited access to nephrologists for consultation can make PCPs feel ill-equipped to address the health needs of people with CKD comprehensively.[81] A lack of clarity regarding roles and responsibilities further adds to poor synergy between care teams.[82] Furthermore, because of the limited attention to improving referral patterns and the fragmented management of comorbid conditions, many individuals face high treatment burden, poor health outcomes, and high treatment costs.[83] Developing better communication tools and infrastructure therefore proves critical to improving collaboration between PCPs and nephrologists.

A systems-level barrier to primary care providers providing CKD screening and care is limited reimbursement. Primary care physicians have identified through a mixed methods study that insufficient reimbursement due to the traditional fee-for-service payment model is a barrier to providing quality care, as insufficient reimbursement does not facilitate complex care.[84]

Furthermore, there is inadequate utilization of MNT across settings and conditions, due largely to the varying reimbursement practices across states, the amount of time it takes to issue an invoice, and returns that do not reflect the efforts devoted.[85] CKD often does not happen in isolation, with many individuals with CKD experiencing comorbidities also requiring intensive management, such as diabetes. Therefore, facilitating complex care and effectively reimbursing PCPs are essential to the quality of care an individual with CKD receives. Early detection is key to facilitating the best treatment of kidney disease.[86]

As one thought leader at a virtual workshop stated, "Innovation, when combined with health equity, should reduce disparities rather than create new inequalities."

As one thought leader at a virtual workshop stated, "Innovation, when combined with health equity, should reduce disparities rather than create new inequalities."

Recommended Actionable Steps

It is essential to invest in a well-functioning primary care system to help health care achieve its quadruple aim to (1) enhance patient experience, (2) improve population health, (3) reduce costs of care, and (4) improve the health-care team experience.[87] To do so, stakeholders must implement the following action steps and drive person-centered care.

CKD Opportunity 3: Repurpose US Primary Care Infrastructure to Drive Person-Centered Coordinated Care

Recommended Actionable Steps	PM	GA	PE	HCP	CBO	CM
13. Create provider checklists that require PCPs to discuss patient/family history related to CKD as well as share and prescribe the most recent innovative therapies that slow disease progression in a timely manner.				●		
14. Utilize risk-prediction instruments now available to assess risk of kidney failure and cardiovascular disease in CKD to permit directing of interventions to patients at higher risk, particularly vulnerable populations.				●		
15. Adopt a shared decision-making approach to help individuals make informed health decisions with the support and guidance of health and public health professionals.				●	●	●
16. Integrate a robust referral management system into existing physician workflows to help coordinate care.		●		●		
17. Utilize EHRs to share patient data in a Health Insurance Portability and Accountability Act (HIPAA)-compliant manner.				●		
18. Use EHRs to send/receive referrals with other members of the care team to facilitate a smooth transition of care, lower specialty care costs, better manage referrals, and reduce burden on physicians or patients.				●		

Policymakers (PM); Government Agencies (GA); Payers (PE); Healthcare Providers (HCP); Community-Based Organizations (CBO); Members of the Community (CM)

Source: Milken Institute (2022)

CKD Opportunity 4: Update CKD Screening Guidelines and Promote Their Universal Adherence

With the goal of slowing or stopping disease progression and complications, screening allows for disease detection and appropriate follow-up measures. However, the United States Preventive Services Task Force (USPSTF) CKD screening guideline became inactive after the 2012 recommendation was not reviewed or updated, leaving primary care providers with no universally adopted guidance on screening high-risk individuals for CKD.[88] Medical associations

and professional societies have developed their own CKD screening guidelines. Unfortunately, the lack of consensus on CKD screening is hindering opportunities to prevent, slow, or stop CKD progression as well as complications, and to provide consistent value-based care. Early screening and detection can reduce disparities, improve detection and management of CKD, and reduce health-care costs by implementing best practices, leveraging coordinated care, expanding interventions of other comorbidity issues to include CKD health, and improving the overall health and well-being of those affected by kidney disease.

Given the wide range of recommendations for CKD screening, PCPs must determine the most reasonable and appropriate method of screening. PCPs frequently rely on the 2012 USPSTF guidelines before referring to guidelines from other associations, making it difficult to provide consistent and effective care. Screening individuals with risk factors for CKD is supported and backed by clinical practice guidelines. The National Kidney Foundation Kidney Disease Outcomes and Quality Initiative, Kidney Disease: Improving Global Outcomes (KDIGO), American Diabetes Association, and the Department of Veterans Affairs/Department of Defense Clinical Practice Guidelines recommend screening adults with risk factors such as hypertension, cardiovascular disease, diabetes, and family history of kidney disease, among others on an annual basis.[89] Many cardiology groups also advocate for and have specific recommendations for screening of CKD.[90]

In addition to a lack of consensus on guidelines, adherence to screening guidelines has been selective. As per the 2021 US Renal Data System Annual Report, health-care providers treating people with diabetes and hypertension were selectively adhering to CKD screening guidelines. Despite the recommendation to screen for CKD using both eGFR and urine albumin-to-creatinine ratio (UACR), less than 50 percent of people with diabetes and less than 10 percent of people with HTN were screened for albuminuria during the one-year follow-up.[91]

The guidelines must be updated to communicate the recommendations as well as reflect the new treatments and therapies that are now available.

Recommended Actionable Steps

CKD is associated with morbidity, impaired quality of life, and excessive health-care costs. This is an opportunity for stakeholders to update the guidelines as well as establish consensus on early screening and universal adherence to improve disease detection and management, reduce health-care costs, and improve the overall health and well-being of those affected by CKD.

CKD Opportunity 4: Update CKD Screening Guidelines and Promote Their Universal Adherence

Recommended Actionable Steps	PM	GA	PE	HCP	CBO	CM
19. Build consensus on an updated screening guideline for individuals with risk factors for CKD among multidisciplinary health-care providers (PCPs, nephrologists, endocrinologists, cardiologists, and other specialists) as well as other key stakeholder advocates (manufacturers, patient advocates).	●	●		●	●	

Recommended Actionable Steps	PM	GA	PE	HCP	CBO	CM
20. Participate in public comment opportunities to inform the outcome of the USPSTF recommendation process for CKD: a. draft research plan b. draft evidence review c. draft recommendation statement.	●			●	●	●
21. Advocate for USPSTF to publish its final recommendation statement for CKD before the end of 2023.	●			●	●	●
22. Promote awareness of the coverage benefits for USPSTF-recommended preventive services mandated under the Affordable Care Act.		●	●	●	●	

Policymakers (PM); Government Agencies (GA); Payers (PE); Healthcare Providers (HCP); Community-Based Organizations (CBO); Members of the Community (CM)

Source: Milken Institute (2022)

CKD Opportunity 5: Invest in Education and Health Communication Platforms to Improve Health Literacy for CKD

Individuals' engagement in CKD prevention and management aims to increase their involvement in their health care ("patient activation"), teach disease self-management strategies, and promote healthy behaviors. People who score higher on measures of patient activation show a greater likelihood of having regular checkups and screenings and engaging in healthy behaviors, such as healthy eating and regular exercise.[92] However, compared to other chronic diseases, CKD awareness, education, and patient activation is limited and inadequately supported, which creates poor patient understanding of their condition. In a health care environment characterized by "complexity and inconsistency," people with CKD feel a distinct lack of engagement in their health care stemming from inadequate self-management support and few readily available opportunities for education about their disease.[93]

Medicare Part B currently covers up to six lessons of kidney disease education if referred by a provider *only* for Medicare beneficiaries diagnosed with Stage IV CKD.[94] Kidney disease education must begin earlier to better prevent or slow the progression of CKD to kidney failure. A lack of services and opportunities, as well as limited funding for peer-to-peer support and other digital knowledge platforms, can make it difficult for a person to engage in health-care/health decision-making in order to address the risk factors and comorbidities of CKD and slow disease progression.

Although health-care providers can leverage technology to expand their reach and opportunities for patient education and engagement in urban areas, it is important to remember that many people in rural and underserved areas lack access to basic infrastructure such as internet and telephones. As a result, requesting that patients use telehealth platforms or online apps, or attend additional appointments may not always helpful. Furthermore, if online and mobile apps lack a

friendly and easy-to-navigate interface, people are less likely to use them.[95] Aside from developing user-friendly applications that provide actionable information, structural improvements and policy changes are required to provide people with the care that they need. Meanwhile, stakeholders can change how health care is delivered by bringing care to places where people receive other services, such as libraries, community centers, and faith institutions.

In addition to promoting health education and providing access to care, it is essential to improve public health literacy as mentioned in the CDC National Action Plan. People should feel empowered to better understand their wellness and have access to accurate health information to make informed decisions. Improving health literacy requires a multisector effort with the support of CBOs, health-care professionals, policymakers, individuals, and families.

Recommended Actionable Steps:

The health-care system must change the way it approaches people rather than expecting people to change. Developing creative ways for people to participate in their health can significantly increase patient knowledge in a short period of time. Each stakeholder must work collaboratively to empower and involve communities in decision-making processes to improve the community's health.

CKD Opportunity 5: Invest in Education and Health Communication Platforms to Improve Health Literacy for CKD

Recommended Actionable Steps	PM	GA	PE	HCP	CBO	CM
23. Host community-based education programs that raise awareness and increase knowledge about kidney disease, risk factors, prevention, and management. • Disseminate materials that are easy-to-read and linguistically, culturally, and age-appropriate and provide community-based resource information such as where to access nutritious foods. Share toolkits that help community members have a conversation with their health-care providers. • Share NKF Brochures and NKF Education Materials. • Encourage tips for maintaining a healthy lifestyle that include regular physical activity, limiting alcohol consumption, managing risk factors and comorbidities, and reducing environmental stress.		●	●	●	●	
24. Identify engaging ways for people to understand and participate in their health. Interact with people impacted by CKD via online platforms such as Responsum Health's Patient Empowerment app.		●		●	●	●

Recommended Actionable Steps	PM	GA	PE	HCP	CBO	CM
25. Develop self-management education programs tailored to an individual's needs, requirements, and goals to help people with or at risk for CKD manage their condition better. Refer to CDC's Managing Diabetes program, which can serve as a model for enabling people with or at risk for CKD to manage their condition better.		●		●	●	●
26. Use the Teach-Back and Show-Me method to ensure that patients have accurately understood the information and CKD care instructions provided by their provider.				●		

Policymakers (PM); Government Agencies (GA); Payers (PE); Healthcare Providers (HCP); Community-Based Organizations (CBO); Members of the Community (CM)

Source: Milken Institute (2022)

CKD Opportunity 6: Leverage Telehealth and Innovative Care Models to Improve Information Exchange and Peer Support

The nationwide shortages of nephrologists and allied health-care practitioners such as renal dietitians contribute to the difficulty for PCPs to refer patients in a timely manner and follow up on patient-specific concerns. The timing of a CKD patient's referral to a nephrologist can have substantial effects on their health outcomes. Working with a nephrologist and allied health-care practitioners can equip both patients and PCPs with the tools, education, and assistance needed to slow disease progression and effectively manage the complex milieu of comorbidities such as hypertension, cardiovascular disease risk, anemia, and bone/mineral health.

However, a 2020 study found that even in patients with severely decreased eGFRs (eGFR <30 mL/min/1.73 m^2), only 45.4 percent were referred to nephrology.[96] According to thought leaders, while barriers such as a lack of information exchange and unclear roles in patient management contribute to this diminished number, access to specialty care also plays a role. Experts in the field have also indicated that in underserved and rural communities, nephrologists are often stretched so thin that they suggest that PCPs refer their patients only when they reach stage G3A+ of CKD, the point where physical symptoms begin to manifest and stopping disease progression proves difficult.

Telehealth and telemedicine have a promising future in increasing and improving health outcomes.[97] Telehealth improves access to specialized care for both people and providers. Particularly in underserved areas, people and providers can use telehealth to connect with specialists such as nephrologists and registered dietitians who can monitor their lifestyle and health management choices, which can help to slow CKD progression, lessen CKD complications, reduce hospital admissions, and lower treatment costs.

Throughout the COVID-19 pandemic, telehealth has been a lifeline for many Americans who do not live near a doctor's office or health clinic, lack access to reliable transportation, are living

with chronic health conditions, cannot afford in-person care costs, and must juggle work and care responsibilities and therefore cannot afford to take time off for appointments. Although there are many logistical, legal, and regulatory barriers to telehealth such as lack of broadband access, coverage and payment issues, privacy and security challenges, licensure, and credentialing to practice among others, it is incumbent that affordable quality telehealth coverage be made a permanent option, especially for patients and providers who need it.[98] This opportunity will ensure that patients receive the care they need when and where they need it *and* that providers receive adequate support and reimbursement for telehealth service delivery.

As mentioned above, the country is dealing with the larger issue of physician shortages, which contributes to an uneven distribution of clinicians throughout the nation. Because physicians in rural and underserved communities frequently have little to no access to specialty care, many PCPs serve as their patients' family physician, OB-GYN, specialty care, and registered dieticians, among others. Innovative care models such as **Project Extension for Community Healthcare Outcomes (ECHO)** can serve as a resource for equipping PCPs with the support and knowledge they need to care for a wide range of patients. Project ECHO connects a team of specialists to PCPs and community health workers to discuss patient cases, providing them care support and education.[99] The University of New Mexico developed the Project ECHO care delivery model to engage PCPs in a virtual community with their peers (including specialty care) where they can receive guidance and feedback on how to provide better care.

This model of peer mentoring can be modified to address the various health issues and challenges that PCPs (especially in underserved areas) face, as it would help them develop the skills needed to adequately care for and manage patients who would otherwise be referred to a specialist. This model is currently gaining traction among policymakers and has been replicated to address a variety of other issues such as health care, education, and climate change. Educating providers, utilizing telehealth, and leveraging community support can not only improve outcomes but also mitigate health literacy as a barrier.

Recommended Actionable Steps

Quality care can be provided if providers use telehealth and peer support platforms to collaborate and gain insights about an individual's health condition from other members of the care team. Therefore, it is crucial that stakeholders collaborate to identify strategies that improve the information exchange process and aid in providing high-quality care and response.

CKD Opportunity 6: Leverage Telehealth and Innovative Care Models to Improve Information Exchange and Peer Support

Recommended Actionable Steps	PM	GA	PE	HCP	CBO	CM
27. Advocate to the appropriate government agencies for telehealth to be integrated into health systems as a permanent option, especially for patients and health-care providers who need it.	●			●	●	●
28. Adopt telehealth and telemedicine strategies to improve access to specialized care for both people and providers, particularly in underserved areas.				●		

Recommended Actionable Steps	PM	GA	PE	HCP	CBO	CM
29. Utilize peer support platforms such as Project ECHO to create pathways linking primary and specialty care to provide PCPs with the knowledge, resources, and tools they need to help reduce health-care utilization and improve health outcomes.				●		
30. Provide nutritional services through telehealth to reduce access barriers.				●		
31. Provide appropriate reimbursement to the originating and distant sites for telehealth services.		●	●			
32. Ensure licenses and certifications for physicians, nurse practitioners, physician assistants, and registered dietitians who treat patients in other states via telehealth/telemedicine.		●		●		

Policymakers (PM); Government Agencies (GA); Payers (PE); Healthcare Providers (HCP); Community-Based Organizations (CBO); Members of the Community (CM)

Source: Milken Institute (2022)

CKD Opportunity 7: Establish and Measure Accountability in CKD Care

As defined by CMS, quality measures are "tools that help us measure or quantify health care processes, outcomes, patient perceptions, and organizational structure and/or systems that are associated with the ability to provide high-quality health care and/or that relate to one or more quality goals for health care. These goals include: effective, safe, efficient, patient-centered, equitable, and timely care."[100] Measures are used to inform us about how the health-care system is performing. According to the American Academy of Family Physicians, measures help to identify weaknesses and prioritize opportunities, and can be used to pinpoint improvement drivers. Measures can also prevent health-care services overuse, underuse, and misuse and can identify disparities in care delivery and outcomes.

Currently, almost 50 percent of kidney care quality measures are related to dialysis management, with a few metrics related to kidney transplantation, and even fewer that pertain to management in earlier stages leading to patient-reported outcomes. The scarcity of these metrics reflects our health-care system's traditional focus on disease treatment rather than CKD prevention or slowing progression toward kidney failure. This scarcity significantly limits assessment of kidney care quality and performance. Lack of measures can result in inadvertent consequences and additional burden to health-care providers.[101] Additionally, the metrics for kidney care apply to both nephrologists and PCPs, which can result in confusion as to who is ultimately responsible for providing the care mentioned in the quality metric.[102]

Thought leaders contributing to this report wholeheartedly support the creation and implementation of kidney health evaluation measures and highlighted two recent milestone developments that will aid in quality improvement, benchmarking, and accountability. In 2020, the National Kidney Foundation collaborated with the National Committee for Quality Assurance

to advance the development of a new Healthcare Effectiveness Data and Information Set (HEDIS) measures to improve kidney disease testing in people with diabetes, a key risk factor for developing kidney disease, by tracking the percentage of adults with diabetes (age 18-85) who received an annual kidney health evaluation including both eGFR and uACR tests.[103] HEDIS is one of the most widely used performance improvement tools in health care that includes more than 90 measures across six domains of care: (1) effectiveness of care, (2) access/availability of care, (3) experience of care, (4) utilization and risk-adjusted utilization, (5) health plan descriptive information, and (6) measures collected using electronic clinical data systems. Nearly 200 million people are enrolled in plans that report HEDIS results.[104]

As one thought leader mentioned during the virtual workshop "Accountability leads to payment, and payment drives activity."

Additionally, as of December 1, 2021, CMS is in the process of reviewing kidney health evaluation and process measures as a part of the Merit Incentive Payment System (MIPS) program, one of two participation tracks of the agency's Quality Payment Program. Under the MIPS track, clinicians must report their performance in four areas: quality, promoting interoperability, improvement activities, and cost that HHS uses to assess MIPS-eligible clinicians and determine their payment adjustment to Medicare reimbursements every year.[105] CMS is also in the process of developing a MIPS Value Pathway (MVPs) for nephrology. The MVPs framework aims to align and connect measures and activities across the four MIPS performance categories for different specialties or conditions. The advancement of kidney health evaluation measures represents a significant step in establishing accountability in upstream kidney care.

Recommended Actionable Steps

Successfully preventing CKD and its progression requires measures that allow health-care providers to demonstrate the efficacy of interventions. Advances such as the availability of new CKD treatments and the gradual rise of value-based payment structures demonstrate the need to establish a greater number of quality metrics around the secondary prevention of CKD. Continually refining these metrics and integrating them into kidney care delivery requires the involvement of multiple stakeholders, including health-care providers, payers, and government entities.

CKD Opportunity 7: Establish and Measure Accountability in CKD Care

Recommended Actionable Steps	PM	GA	PE	HCP	CBO	CM
33. Advocate for new quality measures (in addition to updating existing metrics) around secondary prevention to better reflect kidney care delivery, facilitate upstream person-centered improvements, and promote better implementation of current effective therapies that slow CKD progression and prevent CKD complications.				●	●	●

Recommended Actionable Steps	PM	GA	PE	HCP	CBO	CM
34. Develop CKD specific quality measures to help with fair reimbursement, increase provider accountability, evaluate care/performance, improve health outcomes, and advance health equity.		●				

Policymakers (PM); Government Agencies (GA); Payers (PE); Healthcare Providers (HCP); Community-Based Organizations (CBO); Members of the Community (CM)

Source: Milken Institute (2022)

CKD Opportunity 8: Incentivize High-Quality Care through Value-Based Care Models

Value-based care aims to reward quality over quantity. This model results in reductions in medical errors, an emphasis on high-quality care, and increased patient satisfaction.[106] As value-based care is centered on shared data and information in the form of electronic medical records, patients are more likely to stay informed about their own health. Furthermore, value-based care inherently focuses on prevention. By rewarding people for uptake of healthy behavior, such as smoking cessation, weight management, wellness checks, and lower alcohol consumption, health-plan providers pay less in medical costs and people benefit from having healthier outcomes.[107]

However, there continues to be a dearth of incentives for value-based care despite interest in moving away from traditional FFS to pay-for-performance. A recent study highlights that a lack of good quality measures for non-dialysis CKD providers, coupled with misaligned payment models, are creating barriers to implementing value-based care models.[108]

CKD prevention would benefit from financial incentives or quality measures to encourage providers to slow CKD progression and emphasize prevention. Delaying kidney failure has a significant impact on health-care costs and can help improve the quality of life for many people affected by CKD. Achieving this goal requires payment reform and investment in prevention of CKD progression. Medicare, Medicaid, and health-plan providers have a central role to play in increasing coverage and reimbursement for screening and testing, preventive services, medical nutrition therapy, and patient self-management education in primary and specialty care offices. This model of care is built on the idea of improving care quality for people with a strong emphasis on prevention.

In practice, value-based care takes a proactive approach and promotes care coordination. Many providers believe value-based care is a helpful way to improve relationships between patients and health-care systems. They believe that if there are incentives to provide a specific type of care, health-care institutions are more likely to support their providers in achieving their goals.

Because of the benefits, thought leaders advocate for policies that use savings from value-based care to fund initiatives that address social determinants of health such as transportation, healthy food access, and housing. Providers can implement a holistic approach to care that improves health outcomes by addressing social determinants of health in a value-based model. Utilizing a

multidisciplinary team that includes specialty care, nurses, registered dietitians, pharmacists, social workers, community health workers, and behavioral therapists, among others, can help to slow the progression of CKD, prevent and treat complications, and address mental health issues for people with or at risk for CKD.

There are currently no incentives to consider health issues from a population-based perspective. Therefore, it has been difficult to address the foundational issues that feed into the downstream effects of individuals with early signs of CKD unless the health-care system shifts away from fee-for-service and toward value-based care. The country's health-care spending must be rebalanced by prioritizing activities that improve quality of life rather than waiting until one's health has deteriorated.

CMS has set a **strategic direction** for all Medicare beneficiaries to be treated by a provider in a value-based care model by 2030, an auspicious goal for the nation's largest payer and a pivotal step forward for US payment reform overall. The agency's innovation center, CMMI, is making formidable strides with its launch of CMS's **Kidney Care Choices** model and **Primary Care First (PCF)** model options. KCC must be evolved to address earlier stages of CKD. Although just getting under way, the PCF model is promising because it offers eligible primary care practices more flexibility in customizing care delivery to the unique needs of patient populations and offers rewards for positive patient outcomes.[109]

Although many value-based care models have been associated with improvements in quality, various barriers prevent their broad implementation into the nation's health-care system. To successfully implement value-based care models, leadership buy-in is necessary.

Additionally, it is critical to make changes to the interoperability of technology, financial/revenue streams, practice workflows, limited resources, inaccessible patient data, and policies and regulations. Currently, health-care systems must significantly modify their value-based models to implement them because of the many hurdles that must be overcome, particularly with regulations. Policy can play a significant role in advancing value-based models. There is a pressing need to make policy changes to metrics, infrastructure, and regulations to address CKD in a health-care and public health context.

Recommended Actionable Steps

Achieving high-value and high-quality care for patients must be the goal of all health-care delivery systems. Value-based programs are beneficial in incentivizing providers for the quality of care they provide. To move away from quantity to quality care, it is important to call on stakeholders to reform payment as well as models and to invest in prevention of CKD progression.

CKD Opportunity 8: Incentivize High-Quality Care through Value-Based Care Models

Recommended Actionable Steps	PM	GA	PE	HCP	CBO	CM
35. Develop and endorse policies and regulations to reform payment and delivery to move away from FFS to pay-for-performance.	●	●				

Recommended Actionable Steps	PM	GA	PE	HCP	CBO	CM
36. Evolve CMS' KCC model so that it includes earlier stages of CKD and rewards providers for upstream interventions.	●	●	●	●		
37. Monitor milestones of the PCF model and evaluate the prevention impact potential for CKD.	●	●	●	●	●	
38. Form partnerships to support systems transformation, including establishing interoperable EHRs and data systems, revising revenue streams, and developing robust provider workflows.	●	●	●	●		
39. Encourage health-care providers to adopt a population health mentality that is necessary for value-based care.				●		
40. Identify patient population and design appropriate care management models.				●		

Policymakers (PM); Government Agencies (GA); Payers (PE); Healthcare Providers (HCP); Community-Based Organizations (CBO); Members of the Community (CM)

Source: Milken Institute (2022)

Call to Action

Now more than ever, stakeholders must come together to implement a strong public health response for CKD prevention, early detection, and management. To address this growing public health issue, a collective effort from all sectors of society will be required, and it must be addressed with urgency. This is an opportunity for the public, health care, and private sectors to engage with community leaders and members to develop strategies that combat the root causes of health disparities that contribute to CKD, repurpose the primary care and public health infrastructure, and promote health education and literacy for community members. These opportunities will not be realized unless a solid foundation of structured partnerships, a sustainable health-care and public health workforce, and adequate funding for CKD prevention, surveillance, and management activities are established.

Conclusion

Despite the challenges faced by people at risk for CKD and by health-care providers, the recent interest, funding, and innovation in the CKD space show promising signs that, with the appropriate resources, tools, and incentives, the field can transform its approach to identification and management of the disease through a focused and sustained push toward prevention, earlier detection, and holistic, person-centered management. This report aims to further accelerate collaboration and partnerships across the health ecosystem by engaging the multidisciplinary stakeholders from health-care delivery and public health, which both play central roles in developing and implementing CKD prevention and disease management initiatives that promote high-quality care. Key stakeholder audiences are policymakers, health-care providers, community organizations, and individual community members.

To further this vision of person-centered prevention and management of CKD, federal funding mechanisms for CKD promotion, prevention, and surveillance must be created at the federal, state, and local levels; clinical practices must be augmented and streamlined; CBOs must be engaged; and individual community members must be educated and heard. Additionally, all efforts must consider health equity and the social determinants of health to reach the under-resourced populations that are most vulnerable to this debilitating disease. Further, effectively curbing the ever-increasing rates of CKD requires implementing these efforts now. The Institute's Center for Public Health stands ready to catalyze this public health approach to tackling the shortcomings of CKD prevention and management and ultimately move the field closer to achieving this equitable, effective health care for all.

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