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SCREENING FOR CHRONIC KIDNEY DISEASE

Addressing the
Gathering Global Storm

A Policy Paper from the Medical Advisory Council
of the Global Patient Alliance for Kidney Health



GLOBAL PATIENT ALLIANCE for
KIDNEY HEALTH

ABOUT THE COUNCIL

The Global Patient Alliance for Kidney Health's Medical Advisory Council lends clinical perspective to the organization's advocacy programming and helps identify unmet needs that can be addressed through heightened awareness and policy solutions.



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The Global Patient Alliance for Kidney Health envisions health care systems that treat chronic kidney disease as a public health priority. By ensuring at-risk patients can access comprehensive screening and early treatment, disease progression can be slowed, and mortality prevented.

KEY POINTS



Chronic kidney disease poses a growing threat, with dire consequences for individual patients and caregivers, economics, global health, and the environment.



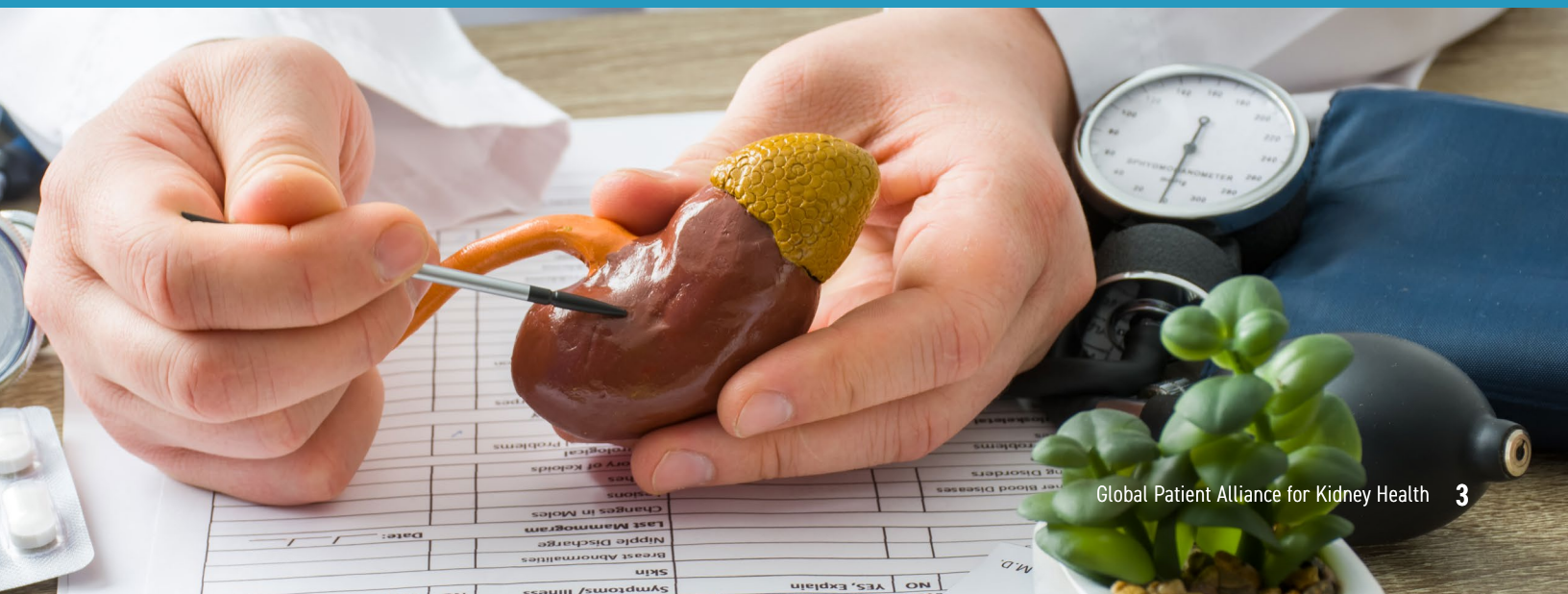
Treatments are available, but they are most effective at reducing or preventing the devastating and costly consequences if begun before the disease reaches an advanced stage.



Most patients with chronic kidney disease are unaware of their condition, so screening strategies are essential to identify those affected.



Policymakers worldwide have an opportunity to reduce the burden of chronic kidney disease by ensuring greater access to screening and earlier treatment.



A GATHERING GLOBAL STORM

Global Health Impact

Chronic kidney disease affects approximately 850 million people worldwide—more than 10% of the population.¹

Chronic kidney disease (a reduction in kidney function lasting 3 months or longer) is characterized by the progressive loss of kidney function that can lead to kidney failure, a devastating condition that requires long-term dialysis or a kidney transplant to avoid death. Chronic kidney disease is a disease-risk multiplier that increases the potential for cardiovascular disease, heart failure, and premature death.^{2,3} In 2017 alone, 1.2 million people worldwide died directly from chronic kidney disease and an additional 1.4 million people died from its impact on cardiovascular disease.⁴ Chronic kidney disease is also one of the greatest risk factors for death from COVID-19.⁵

The prevalence of chronic kidney disease, and the deaths it causes, are growing worldwide due to aging, population growth, and an increase in risk factors such as diabetes and hypertension.^{4,6} In 1990, chronic kidney disease was the 18th leading cause of death worldwide, increasing to 9th in 2019,⁷ and projected to be 5th by 2050.⁸

The burden is particularly evident in low- and middle-income countries. The age-standardized rates of death from chronic kidney disease were twice as high in countries with low-to-middle sociodemographic status as in countries with high-middle or high sociodemographic index as in 2017.⁴ Chronic kidney disease is already among the top 5 causes of death in certain regions of Latin America.⁴

“Chronic kidney disease as a cause of mortality is increasing strikingly.”

DR. ROBERTO PECOITS-FILHO

Chronic kidney disease is also a significant driver of disability worldwide. It results in 36 million years lost annually due to illness, disability, or early death.⁴

The burden of disability is heavy in Latin America, Africa, the Middle East, and southeast Asia/Pacific, as well as in areas where concentrated populations of younger people are afflicted, as more productive life years are lost.

Impact on Patients and Caregivers

People with chronic kidney disease are generally asymptomatic at first, and fewer than 10% are even aware of their condition.⁹ Moreover, most of the symptoms are not specific to the disease. The “hidden” nature of chronic kidney disease means that it is often in an advanced stage by the time it’s diagnosed. The result is major morbidity and mortality, and the need for invasive, costly treatments.

“Nearly 80% of people with chronic kidney disease in under-developed countries are unaware that they have the disease.”

DR. MING-HUI ZHAO

SYMPTOMS OF ADVANCED CHRONIC KIDNEY DISEASE

- Fatigue (*often severe*)
- Nausea and vomiting
- Daytime drowsiness
- Poor sleep
- Swollen legs
- Sexual dysfunction
- Muscle cramps
- Itching
- Dry skin
- Heartburn
- Poor mobility
- Bone and joint pain
- Depression
- Infection

People become less able to work as chronic kidney disease progresses. This often leads to reduced productivity, fewer work hours, or an inability to work altogether.¹⁰ This can be personally and financially devastating for people of working age, leading to many years of productive life lost.

Younger people with chronic kidney disease face a lifetime of complications and a higher risk of premature death.¹¹ Even after dialysis is initiated, their life expectancy is up to 44 years shorter than that of the general population.¹² For kidney transplant recipients, it's up to 22 years shorter. Women with chronic kidney disease face a shorter life expectancy than men.

Chronic kidney disease places a heavy burden on caregivers.^{13, 14} As extreme fatigue sets in, people with chronic kidney disease are less able to cook, shop, and perform other everyday activities. They require more and more support from caregivers as the disease progresses.¹⁵

Patients also need frequent transportation to and from the hospital, which is costly and disruptive not only to their work, but also to that of their caregivers. Caregivers miss more time at work and experience reduced productivity.¹⁶ Reduced work leads to lost income for both patients and caregivers, which is compounded by the costs of managing chronic kidney disease.¹⁵

MOST CAREGIVERS FOR PATIENTS WITH CHRONIC KIDNEY DISEASE REPORT:¹⁶



>33 hours of care per week



Severe or very severe care burden



Reduced ability to work

A Case of Progressive Limitations and Financial Hardship

At 58, Mrs. B was referred to a nephrology clinic for persistent fatigue and leg swelling, exacerbated by her unhealthy lifestyle. Initial assessments showed significant proteinuria and fluid overload. Diagnosed with type 2 diabetes and chronic kidney disease, she started a comprehensive regimen to manage her blood sugar and blood pressure, alongside a tailored diet and exercise plan.

Despite these efforts, her kidney function declined to advanced chronic kidney disease over the course of 3 years, profoundly impacting her life. This progression worsened her hypertension and led to signs of heart failure. The burden of cardiovascular complications accelerated by chronic kidney disease severely limited her physical capabilities and quality of life.

Frequent medical appointments and the need for ongoing treatment adjustments and frequent clinic visits, lab tests and hospitalizations added emotional and logistical stress for her family. Financial challenges were significant, as many of her medications were not covered by insurance and were too costly to afford out-of-pocket, further complicating her care.

Mrs. B's experience highlights the critical importance of early lifestyle changes in managing diabetes and hypertension to prevent CKD progression. It also underscores the challenges of healthcare coverage and the interplay between physical health, emotional well-being, and financial stability in managing chronic conditions.

Case contributed by Dr. Roberto Pecoits-Filho

Economic Impact

The global economic impact of chronic kidney disease is staggering. And it is poised to grow in the coming years.

Annual direct costs of diagnosed chronic kidney disease and kidney replacement therapy across 31 countries and regions are projected to increase from \$372 billion in 2022 to nearly \$407 billion by 2027.¹⁷

Direct costs of diagnosed kidney disease and treatments for kidney failure could reach \$407 billion by 2027.

As chronic kidney disease progresses, it requires more frequent and complicated medical care, which dramatically increases costs. According to a recent estimate, the mean cost of chronic kidney disease care across 31 countries and regions, per patient per year, is:

- **>\$3,000 for stage 3a** (mild chronic kidney disease with protein in urine)
- **>\$5,000 for stage 4** (moderate)
- **>\$8,000 for stage 5** (advanced)
- **>\$57,000** for kidney failure requiring treatment with hemodialysis
- **>\$75,000** for the first year after successful kidney transplantation.¹⁸

Chronic kidney disease also places huge financial burdens on patients and their families. It is the disease with the highest number of people experiencing catastrophic health expenses in low- and middle-income countries.¹⁹

Meanwhile, kidney replacement therapy (ie, dialysis or kidney transplantation) carries a high cost and often lacks dedicated public funding. Many people who need this treatment simply cannot access it. In SubSaharan Africa, where dialysis is available, even where partial government subsidies exist, many patients stop treatment and die once their resources are depleted.²⁰

But the costs of chronic kidney disease itself are only part of the equation. Comorbidities such as diabetes and cardiovascular complications directly attributable to excess risk caused by chronic kidney disease, including heart failure, require treatment that further increases costs.²¹

Then there are indirect costs that result from reduced work productivity, absenteeism, early retirement, and inability to work. Indirect costs associated with chronic kidney disease have been estimated at >705 euros (\$786 USD) per patient per year,²² adjusted for inflation. Fewer than 25% of patients starting dialysis are employed.²³ The lost productivity is caused not only by disease-related symptoms but also by time-consuming dialysis treatment and physician visits.

Environmental Impact

Treatment of chronic kidney disease with hemodialysis requires large amounts of water and power. And it generates a disproportionate amount of carbon emission and medical waste.

For instance, in the United Kingdom, hemodialysis requires 94,000 liters of water and 3000 kWh of electricity per patient per year.²⁴ The carbon emissions associated with three-times weekly treatment at hemodialysis centers are more than seven times as high as the average patient in the UK healthcare system.²⁵

Peritoneal dialysis has been less thoroughly studied, but it requires transporting plastic-packed fluid across and between countries and is therefore expected to have a substantial environmental impact.²⁶



RISK FACTORS & TREATMENT

Risk Factors

Age is an important risk factor for chronic kidney disease, with people aged >65 years having nearly five times the risk of those aged 18-44 years.²⁷ Other common risk factors are diabetes, family history, cardiovascular disease, obesity, hypertension, HIV, hepatitis B and C, smoking, and previous acute kidney injury.^{6, 28}

Geography can also play a role. Chronic kidney disease of unknown etiology affects people in rural, agricultural areas

who work long hours outside in tropical conditions.²⁹ It is also linked to pesticide use among farmers.³⁰

Kidney stones as a cause of chronic kidney disease are also common in tropical regions, especially in hot weather. People in low- and low-middle income countries face additional risks. These stem from environmental change, air pollution, declining biodiversity, use of insecticides, and high rates of infectious diseases.⁶

Risk factors for chronic kidney disease

TYPE OF RISK FACTOR	EXAMPLE
Common health-related risk factors	Hypertension, diabetes, cardiovascular disease, prior acute kidney injury
Geographic area	Areas with endemic chronic kidney disease of unknown cause, high prevalence of selected genetic variants, environmental exposures (eg, in Australia First Nations Aboriginal and Torres Strait Islander, etc.)
Chronic inflammatory conditions/ multisystem diseases	Systemic lupus erythematosus, vasculitis, HIV, hepatitis B and C viruses, cancer, repeated urinary tract infections, kidney stones, glomerular diseases
Medication- or procedure-related	Kidney toxicity induced by drugs or contrast medium use
Family history or genetics	APOL1 gene in Black people, Family history of kidney failure, genetic abnormalities (e.g, polycystic kidney disease, Alport syndrome, sickle cell disease)
Pregnancy complications	Preterm birth, small gestational size, pre-eclampsia/eclampsia

Adapted from KDIGO Guidelines²⁸ and Francis et al, 2024⁶

Effective Treatments

People diagnosed with chronic kidney disease can benefit from a comprehensive strategy.²⁸

LIFESTYLE CHANGES. Altering one's diet, increasing exercise, and maintaining a healthy weight can help. So can smoking cessation.

MEDICATIONS. Renin-angiotensin-aldosterone system inhibitors and, more recently, sodium-glucose cotransporter-2 inhibitors (SGLT-2is), are established treatments to delay progression of chronic kidney disease in suitable patients. These medications may be additive.³¹

Additional novel drugs with additive kidney protective effects may include mineralocorticoid receptor antagonists (MRAs) and glucagon-like peptide-1 receptor agonists (GLP-1RA) in people with type 2 diabetes mellitus.³²⁻³⁵

COMPLICATION MANAGEMENT. Many people also need treatment for diabetes, high blood pressure, cardiovascular disease, anemia, acidosis, bone disease, or potassium abnormalities.²⁸

ADDRESSING THE PROBLEM THROUGH SCREENING

Screening and Targeted Screening

Increased detection in the early disease stages could substantially alleviate human suffering and reduce the adverse impact on society.³⁶

Chronic kidney disease can be detected using two strategies:

- 1. SCREENING:** the routine testing of everyone based on a broad criterion such as older age,
- 2. TARGETED SCREENING:** an approach in which people with more selective risk factors such as diabetes or hypertension are tested. Due to the differences in resources and at-risk populations globally, strategies for increased detection of chronic kidney disease must be tailored to each country or region.

Studies conducted worldwide indicate that screening for chronic kidney disease is expected to be a cost-effective strategy in a variety of populations.^{37, 38}

Current testing, however, fails to diagnose most patients early enough for effective treatment.³⁹ This is likely due to lack of prioritization, information, and supportive policies.

Tests for Chronic Kidney Disease

Two simple tests should be done to evaluate chronic kidney disease:

- 1. BLOOD TEST** to assess estimated glomerular filtration rate (eGFR). The eGFR is calculated using serum creatinine and other simple factors such as age and gender. A blood test for eGFR can be done at the point of care.
- 2. URINE TEST** to determine urine albumin to creatinine ratio (uACR). The method of testing for urine albumin varies and can be quantitative or semi-quantitative (eg, dipstick). The method of urine testing depends on the healthcare setting.

“ABCDE” INTEGRATED APPROACH TO CARDIOVASCULAR-KIDNEY-METABOLIC HEALTH^{45, 46}

The ABCDE approach helps identify the risk for kidney failure and cardiovascular diseases. This approach recognizes the complex interactions between the heart and kidneys, leading to integrated screening and treatment. Knowing the 5 alphabetical factors, **A=albuminuria, B=blood pressure, C=cholesterol, D=diabetes, and E=eGFR**, helps physicians categorize patients according to cardiovascular disease risk.

eGFR=estimated glomerular filtration rate

The Case for Community-Based Screening

Mr. X is a 60-year-old man who smokes and drinks alcohol regularly. He has had diabetes for 20 years and hypertension for 11 years, for which he takes regular medication.

Mr. X stopped by a second category hospital on kidney screening day for testing. His blood pressure and blood sugar levels appeared high and his urine dipstick indicated proteinuria. Upon further testing, Mr. X had blood and urine markers indicative of chronic kidney disease, most likely diabetic nephropathy. His medications were adjusted and new medications such as SGLT2 inhibitors added. After medical and dietary counseling, Mr. X stopped smoking and drinking alcohol and became engaged in his new life-changing habits.

After 6 months of follow up, his proteinuria regressed and his kidney function improved. He is particularly grateful that, even though he was asymptomatic, he stopped by that day for screening, which led to the diagnosis of altered kidney function.

Case contributed by Dr. Victorine Bandolo Nzana

Strategies for Improving Screening and Targeted Screening

Strategies for improving the screening and targeted screening of chronic kidney disease are urgently needed worldwide.

Some countries and regions have initiated programs to better identify and treat chronic kidney disease. These programs may be adapted to different situations worldwide. In addition, existing institutions and approaches may be integrated or leveraged to encompass chronic kidney disease.

1 LEVERAGING EXISTING SCREENING PROGRAMS.

In some countries, extensive screening programs are already in place for diseases such as colon cancer. Modeling urine and blood screening programs for chronic kidney disease on these existing programs could improve early detection.

"We have initiated an exploratory program in Madrid that is modeled after or linked to colon screening programs. In these programs, everyone over age of 50 receives an offer for colon cancer screening...."

DR. ALBERTO ORTIZ

2 LEVERAGING CLINICAL LABORATORIES.

Clinical laboratories may serve as clinical decision support systems,⁴⁰⁻⁴² prompting healthcare providers to notify them that testing for chronic kidney disease may be advisable for certain patients.

"Chronic kidney disease is a laboratory-based disease. If we can develop programs with large labs, we can affect many healthcare providers."

DR. NAVDEEP TANGRI

3 INITIATING EMPLOYER-BASED SCREENING.

Employer-based screening has potential benefits for both employers and employees. In particular, it could enhance continuity of screening and monitoring and reduce costs associated with advanced-stage chronic kidney disease, which is costly for employer-run healthcare plans.

"In China, we have a lot of intra-country migration, with people moving from one region to another for work every year. These moves can result in loss of monitoring by the healthcare system. Local employer-based screening may help improve this situation."

DR. MING-HUI ZHAO

4 HUB AND SPOKE MODEL.

A hub and spoke model for screening of chronic kidney disease is successfully used in India. This model capitalizes on the large countrywide network of dialysis centers, which act as act hubs that oversee screening for the surrounding rural areas—the spokes. In this model, all relatives of patients who come for dialysis are screened for chronic kidney disease.⁴³

5 PROVIDING COMMUNITY OUTREACH PROGRAMS.

Community outreach programs for chronic kidney disease involve proactive screening and have been successful in traditionally underserved regions.

6 INTEGRATION INTO A HOLISTIC APPROACH FOR CARDIOVASCULAR-KIDNEY-METABOLIC HEALTH.

Chronic kidney disease is a cardiovascular risk factor on par with diabetes and high cholesterol.⁴⁴ This recognition has led prominent professional societies to propose an ABCDE approach to screening for treatable contributors to cardiovascular risk: Albuminuria, Blood pressure, Cholesterol, Diabetes, and Estimated glomerular filtration rate (eGFR).^{45,46} This approach emphasizes the critical interactions between the heart and kidneys, such that cardiovascular and kidney conditions are diagnosed and treated in tandem. Given the link among these conditions, integration of their screening and management is a sound approach.

"Prevention remains the mainstay in Cameroon because we don't have the finances for treatment. On World Kidney Day, nephrologists conduct free screening for blood pressure, fasting blood sugar, and kidney function via urine dipstick free of charge in some hospitals and schools. The media promote this screening, and many people participate."

DR. VICTORINE BANDOLO NZANA

POLICY SOLUTIONS FOR CHRONIC KIDNEY DISEASE

With screening tests and effective treatments available, chronic kidney disease is an addressable problem. But for widespread screening and early treatments to be implemented worldwide, chronic kidney disease must first be deemed a global priority. At present, the major obstacles to early treatment are a lack of awareness among primary care physicians and the public and low prioritization by global and national policymakers.

To remedy this situation, policymakers should:

- 1 Treat chronic kidney disease as a public health priority** alongside other non-communicable diseases.
- 2 Ensure that at-risk people can access comprehensive screening and early treatment** by promptly taking the necessary actions at global and national levels.

Strategies tailored to individual countries and regions can promote increased detection of chronic kidney disease. In particular:

- **For upper middle and high income countries,**⁴⁷ **screening for chronic kidney disease should be done on a national level** similar to that of other major non-communicable diseases. Screening may be based on age (eg, 45 or 50 years and older³⁷) but should also be routine for those with related conditions such as hypertension and diabetes.
- **For middle, lower middle, and low income countries,**⁴⁷ **targeted screening for chronic kidney disease should be done on a national level,** with testing cohorts determined by major regional/local risk factors such as diabetes, hypertension, endemic chronic kidney disease, agricultural areas, or other geography-specific risk factors.

Screening for chronic kidney disease is simple and can be integrated within existing programs that vary by country and region. Testing can be done at home or at the point of care with hand-held devices, including dipsticks for testing urine ACR and fingerstick kits for testing blood creatinine. These devices enable the integration of screening for chronic kidney disease with ongoing programs or health checks. For instance, screening for chronic kidney disease may be integrated with infectious disease screening or maternal health programs in low-income countries and with blood pressure or diabetes screening in higher-income countries.

But such strategies will require increased disease awareness and commitment from policymakers. Only then can the global community avert the escalating impact of chronic kidney disease on global health, economics, patient and caregiver lives, and the environment.



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