

# Chronic kidney disease and the global NCDs agenda

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**To cite:** Neuen BL, Chadban SJ, Demaio AR, *et al.* Chronic kidney disease and the global NCDs agenda. *BMJ Glob Health* 2017;**2**:e000380. doi:10.1136/bmjgh-2017-000380

Received 22 April 2017  
Revised 21 May 2017  
Accepted 22 May 2017



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2017 is an important year for the international nephrology community. March 9 was World Kidney Day, the theme this year being ‘Kidney disease and obesity: healthy lifestyles for healthy kidneys’, highlighting the crucial link between the kidneys and metabolic and cardiovascular health. In April, the Global Kidney Health Atlas, one of the largest health-related country capacity reviews in history, was launched at the World Congress of Nephrology in Mexico City. The Atlas, a first for the nephrology community, is a multinational cross-sectional survey designed to assess need and capacity for kidney care worldwide and provide the foundation for a global surveillance network for chronic kidney disease (CKD) care.

CKD is an enormous public health issue, the tide of which continues to inexorably rise. In the 2015 Global Burden of Disease Study, kidney disease was the 12th most common cause of death, accounting for 1.1 million deaths worldwide.<sup>1</sup> Overall CKD mortality has increased by 31.7% over the last 10 years, making it one of the fastest rising major causes of death, alongside diabetes and dementia.<sup>1</sup> In the same study, CKD ranked as the 17th leading cause of global years lost of life, an 18.4% increase since 2005, and the third largest increase of any major cause of death.<sup>1</sup> This is in stark contrast to other non-communicable diseases, for example cardiovascular disease and chronic obstructive pulmonary disease, where global years lost of life fell during the same time period (−10.2% and −3.0%, respectively).<sup>1</sup>

Unabated growth in the incidence of diabetic kidney disease, underpinned by a global imbalance between overnutrition and inadequate physical inactivity causing overweight and obesity, is the key driver of CKD burden. Between 2005 and 2015, the prevalence of diabetic kidney disease increased by 39.5% globally.<sup>1</sup> In Mexico, the country with the highest CKD death rate in the world, more than half of all cases of end-stage

kidney disease were attributable to diabetes.<sup>1</sup> Similar patterns have been reported in China and India, signifying epidemiological shifts in metabolic and cardiovascular risk factors, particularly in middle-income countries.

At the same time, the rising burden of CKD disproportionately impacts low-income and middle-income countries where growth in obesity and diabetes is greatest. The hard outcomes of CKD, namely premature cardiovascular death or progression to end-stage kidney disease, are more likely to occur in people with CKD in India than in North America due to inadequate risk factor management, for example treatment with ACE inhibitors and/or oral hypoglycaemic agents.<sup>2–3</sup> Latin America has the highest CKD death rate in the world.<sup>1</sup> For those who reach end-stage kidney disease, dire consequences await them, with serious global inequities in the availability of renal replacement therapy, primarily due to cost.<sup>4</sup> In 2010, according to conservative estimates, over half of all people requiring renal replacement therapy worldwide died due to a lack of access to dialysis or transplantation. The largest disparities in access to renal replacement were in Africa, particularly middle and eastern Africa, where less than 3% of people requiring renal replacement therapy receive it.<sup>4</sup> The growing burden of CKD therefore falls on countries least equipped to provide the costly but life-saving therapies of dialysis or transplantation. As a result, people with end-stage kidney disease continue to die in spite of established treatment options. The huge cost associated with providing renal replacement therapy provides a compelling economic incentive for improving the prevention, detection and management of CKD in low-income and middle-income countries.

Efforts to do this must be developed, tested and incorporated into existing national non-communicable diseases (NCDs) programmes. While three-quarters of countries have an overarching NCDs policy or

strategy, more than half (53%) have no management guidelines or strategy for improving the care of people with CKD (either specifically or within a broader NCDs strategy).<sup>5</sup> Population screening for CKD has been shown to be cost-effective in some studies when taking into account incident end-stage kidney disease, and fatal and non-fatal cardiovascular events.<sup>6</sup> Targeted screening for CKD in people with hypertension and diabetes is a more economically viable strategy and occurs in many countries, but less than a quarter (24%) have a CKD detection programme based on national guidelines or policies.<sup>5</sup>

As highlighted by World Kidney Day, obesity is a significant marker of risk for CKD, independent of hypertension and diabetes, and therefore represents another important target for CKD screening and early detection.<sup>7</sup> There is evidence that weight reduction in CKD reduces proteinuria and blood pressure and may slow decline in renal function.<sup>8</sup> Population strategies aimed at curbing the rise in obesity or assisting individuals in losing weight are therefore likely to have beneficial effects on the incidence and progression of CKD, as well as simultaneously improving other aspects of cardiometabolic health.

For people with CKD, there must be a focus on implementing proven, cost-effective treatments for as many people as possible, taking into account local needs and human and economic resources. In the majority of low-middle-income countries, management of risk factors to prevent CKD progression and the treatment of its complications are excluded from public funding (55% and 58%, respectively).<sup>2</sup> Monitoring of CKD using estimated glomerular filtration rate and urinary albumin creatinine ratio is available in less than 20% of low-middle-income countries.<sup>9</sup> Strengthening primary care services will be essential, given most CKD is managed in this setting and global shortages in nephrologists (35% of low-income countries lack a nephrology training programme<sup>5</sup>). Successful examples include Cuba, Uruguay and Chile, where programmes to integrate CKD

screening, detection and treatment in primary care have been introduced.<sup>10</sup>

Evaluating practice patterns and current health system capacity to deliver kidney healthcare is also critically important. The Global Kidney Health Atlas provides important information on CKD risk factors (biological, behavioural and sociodemographic including obesity and diabetes), the burden and consequences of CKD, and gaps in specific kidney care areas in different countries around the world based on the six health system building blocks.<sup>5,9,11,12</sup> It also provides the foundation for a global CKD surveillance network to facilitate the development and evaluation of implementation strategies for including CKD in the global health agenda. For the first time, the Atlas clearly details the significant inter-regional and intraregional variability and gaps in kidney care across countries and regions, which are summarised in [tables 1 and 2](#).

The data contained within the Atlas have significant policy implications. Particularly across low-income and middle-income countries, the Atlas provides both evidence and opportunities for advocacy: improving access to affordable essential medications, and establishing health information systems (eg, renal registries) to capture reliable information on the burden of CKD, and to promote more investment and a targeted research agenda to improve understanding of kidney disease burden, process of care, outcomes monitoring and testing of novel interventions.<sup>5,12</sup> It provides advocacy organisations and health workforces with the data to engage key government and non-government stakeholders to support countries in improving the quality of kidney care and to hold countries to account by measuring country and region progress over time.

More generally, rapid urbanisation, resulting in obesity and physical inactivity, is driving changes in CKD risk factor prevalence worldwide. Poor diet is now the leading risk factor for deaths and disability worldwide, a fact recognised by the United Nations Decade

**Table 1** Variations in kidney care worldwide by World Bank income groups (adapted from ISN Global Kidney Health Atlas<sup>5</sup>)

	Low-income (%)	Low-middle-income (%)	Upper-middle-income (%)	High-income (%)
Access to serum creatinine and eGFR in primary care	–	18	40	68
Access to quantitative urinalysis in primary care	–	32	43	71
Governmental recognition of CKD as a health priority	59	50	17	29
Government funds all aspects of CKD care	13	21	40	53
Availability of CKD management and referral guidelines (international, national or regional)	46	73	83	97
Existence of current CKD detection programmes	6	24	24	32
Availability of dialysis registries	24	48	72	89
Availability of academic centres for renal clinical trial management	12	34	62	63

CKD, chronic kidney disease; eGFR, estimated glomerular filtration rate; ISN, International Society of Nephrology.

**Table 2** Physician awareness of CKD, guideline awareness and adoption across World Bank income groups (adapted from ISN Global Kidney Health Atlas<sup>5</sup>)

	World Bank income group	Extremely low (%)	Low/below average (%)	Moderate/average (%)	High/above average (%)
Awareness of CKD by primary care physicians	Low-income	29	35	35	–
	Low-middle-income	13	44	34	9
	Upper-middle-income	14	55	31	–
	High-income	8	58	26	8
Awareness of CKD guidelines by non-nephrologists	Low-income	25	63	–	13
	Low-middle-income	17	57	22	4
	Upper-middle-income	13	42	42	4
	High-income	–	46	46	8
Adoption of CKD guidelines by non-nephrologists	Low-income	38	50	–	13
	Low-middle-income	36	41	18	5
	Upper-middle-income	21	46	29	4
	High-income	5	49	38	8

CKD, chronic kidney disease; ISN, International Society of Nephrology.

of Action on Nutrition 2016–2025.<sup>13 14</sup> Addressing these environmental, behavioural and metabolic risks directly through population strategies is likely to achieve the best outcomes, but will require determined advocacy and sustained political commitment. Interventions must be multifaceted and could include using differential taxation to make healthy food more affordable, with revenue used to support education and health services. Mexico's 'soda tax' introduced in 2014 is one such example.<sup>15</sup> Therefore we believe the nephrology community has an important role in advocating for policies that have the potential to reduce the burden of preventable kidney disease and associated cardiovascular disease.

The broader global health community now must capitalise on momentum from World Kidney Day and the Global Kidney Health Atlas to ensure CKD is not relegated to a secondary priority within the spectrum of cardiometabolic health. Only then will we be able stem the tide of CKD and achieve high-quality universal healthcare for all who need it.

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**Competing interests** DWJ is Co-Chair of the International Society of Nephrology Global Kidney Care Atlas. AD is currently a staff member of the World Health Organization. The authors alone are responsible for the views expressed in this publication and they do not necessarily represent the decisions, policy or views of the World Health Organization.

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## REFERENCES

1. Wang H, Naghavi M, Allen C, *et al*. GBD 2015 Mortality and Causes of Death Collaborators. Global, regional, and national life expectancy, all-cause mortality, and cause-specific mortality for 249 causes of death, 1980–2015: a systematic analysis for the Global Burden of Disease Study 2015. *Lancet* 2016;388:1459–544.
2. Tonelli M, Agarwal S, Cass A, *et al*. How to advocate for the inclusion of chronic kidney disease in a national noncommunicable chronic disease program. *Kidney Int* 2014;85:1269–74.
3. Anand S, Kondal D, Montez-Rath M, *et al*. Prevalence of chronic kidney disease and risk factors for its progression: a cross-sectional comparison of Indians living in Indian versus U.S. cities. *PLoS One* 2017;12:e0173554.
4. Liyanage T, Ninomiya T, Jha V, *et al*. Worldwide access to treatment for end-stage kidney disease: a systematic review. *Lancet* 2015;385:1975–82.
5. Bello AK LA, Tonelli M, Okpechi IG, *et al*. Global Kidney Health Atlas: A report by the International Society of Nephrology on the current state of organization and structures for kidney care across the globe: International Society of Nephrology, Brussels, Belgium. 2017.
6. Thomas B, Matsushita K, Abate KH, *et al*. Global Cardiovascular and Renal Outcomes of Reduced GFR. *J Am Soc Nephrol* 2017;ASN.2016050562. [Epub ahead of print].
7. Herrington WG, Smith M, Bankhead C, *et al*. Body-mass index and risk of advanced chronic kidney disease: prospective analyses from a primary care cohort of 1.4 million adults in England. *PLoS One* 2017;12:e0173515.
8. Navaneethan SD, Yehner H, Moustarah F, *et al*. Weight loss interventions in chronic kidney disease: a systematic review and meta-analysis. *Clin J Am Soc Nephrol* 2009;4:1565–74.
9. World Health Organization. 2010. Monitoring the Building Blocks of Health Systems: A Handbook of Indicators and Their Measurement Strategies. Geneva: World Health Organization.

10. Jha V, Garcia-Garcia G, Iseki K, *et al*. Chronic kidney disease: global dimension and perspectives. *The Lancet* 2013;382:260–72.
11. Bello AKJD, Feehally J, Harris D, *et al*. Global Kidney Health Atlas (GKHA): Design and Methods. *Kidney International*. In Press. 2017.
12. Bello AK, Levin A, Tonelli M, *et al*. Assessment of Global Kidney Health Care Status. *JAMA* 2017;317:1864–81.
13. Forouzanfar MH, Alexander L, Anderson HR, *et al*. Global, regional, and national comparative risk assessment of 79 behavioural, environmental and occupational, and metabolic risks or clusters of risks in 188 countries, 1990–2013: a systematic analysis for the Global Burden of Disease Study 2013. *The Lancet* 2015;386:2287–323.
14. United Nations Decade of Action on Nutrition. World Health Organization, Geneva, 2016. [http://www.who.int/nutrition/GA\\_decade\\_action/en/](http://www.who.int/nutrition/GA_decade_action/en/).
15. Colchero MA, Popkin BM, Rivera JA, *et al*. Beverage purchases from stores in Mexico under the excise tax on sugar sweetened beverages: observational study. *BMJ* 2016;352:h6704.