

# Our shared responsibility: the urgent necessity of global environmentally sustainable kidney care

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The recently published Sixth Assessment Report of the Intergovernmental Panel on Climate Change informs that the climate emergency is human caused, is rapidly progressing, will worsen until at least mid-century regardless of future emissions scenarios, and heralds massive, unprecedented, and cascading impacts on planetary and human health.<sup>1</sup> We, an international group of nephrologists concerned about Earth's changing ecology, collectively recognize the threats of climate change as crises of both health and equity, and call on our global community to align health care, and kidney care in particular, in accordance with United Nations 26<sup>th</sup> Conference of the Parties health sector principles. *Herein, we call for the development of climate-resilient kidney care systems that function through accountable, sustainable low carbon health care, and propose a pathway to achieve this goal through a global, collaborative, and inclusive multidisciplinary working group.*

Kidney disease and climate change have a bidirectional relationship: each worsening the other. Excessive heat, through recurrent or severe volume depletion insults, increases risk of both acute and chronic kidney diseases. Particle pollution, of which fossil fuel combustion is a major source, is potentially responsible for a significant attributable burden of prevalent chronic kidney disease and associated morbidity.<sup>2</sup> Treatment of kidney failure, specifically via dialysis' high energy, water, and single-use plastic consumption, has among the highest ecologic footprint across the spectrum of clinical care.<sup>2,3</sup> Specifically, a single hemodialysis treatment's carbon emissions are comparable to that of an average vehicle drive of 100 km.<sup>3</sup> We have not even begun to study the impacts of our treatments on other ecological elements beyond carbon pollution.

Climate crises have been declared in thousands of jurisdictions worldwide; yet, frustratingly, a sense of "business as usual" continues, despite increasingly urgent pleas from climate experts, medical leaders, and a growing

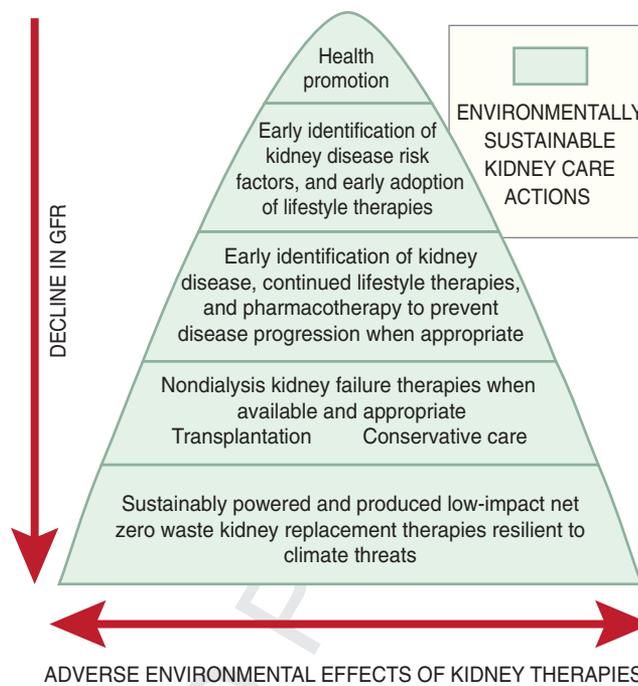
groundswell of public outrage. Experts across the spectrum of clinical care have urged health professionals to aid the transition to environmentally sustainable practice, including via innovations in care pathways as well as societal-level infrastructure upgrades that include renewable energy sourcing for manufacturing, building power, transportation, and supply chain requirements.

A growing number of nephrologists and professional societies have individually acknowledged the environmental impact of kidney disease treatments. Barraclough and Agar have written that "protection of the environment can no longer be seen as an optional extra once the more pressing concern of patient care has been dealt with."<sup>2</sup> We believe the task of redesigning quality kidney care in our era of climate crisis necessitates all aspects of our status quo be "on the table," permitting genuine innovation to deliver better care that is both less costly and less harmful to our environment.

A hierarchical patient-centric approach that permits climate change mitigation and adaptation is necessary (Figure 1). First, recognizing the disproportionately high carbon costs of dialysis and hospital care in high-income countries, the latter responsible for up to half of health care emissions,<sup>4</sup> we propose prioritizing health promotion, early disease recognition, and reinvigorated uptake of existing effective therapies to slow disease progression and prevent the need for hospital visits, including those for treatment of kidney failure. Second, we must work to improve access to transplantation for those with kidney failure, including optimal uptake of preemptive transplantation, as well as expansion of live and deceased donor programs. Third, there is an urgent need for lower environmental impact dialysis therapies. All aspects of kidney care—patient advocacy, clinical care, including patient goal setting, research, and administrative roles—fit in this framework, requiring all members of our collective workforce to locate and align their actions and purposes in accordance with planetary health principles.

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**Figure 1 | Framework of environmentally sustainable quality kidney care.** GFR, glomerular filtration rate.

We announce the “GREEN-K” initiative: Global Environmental Evolution in Nephrology and Kidney Care, with a vision of “sustainable kidney care for a healthy planet and healthy kidneys” and mission to “promote and support environmentally sustainable and resilient kidney care globally through advocacy, education, and collaboration.” This initiative will be inclusive and global, focusing on collaborative action to develop a coordinated plan to achieve low carbon kidney services across our spectrum of care.

Once communication and representation pathways are fully established, a unified GREEN-K working group will proceed to goal setting, which will require engagement with all kidney care stakeholders, including the entire range of health care and dialysis providers, administrators, policy makers, patients, and pharmaceutical companies and medical device manufacturers. Acknowledging the influential contributions of youth in global climate action, the International Society of Nephrology Emerging Leaders Program will engage with GREEN-K. We suggest the following action and focus areas for the GREEN-K initiative, adapted from the UK Kidney Association’s Sustainable Kidney Care programme<sup>5</sup>:

### 1. Education

(a) Declare “green nephrology” a dedicated field and facilitate the development of

environment-oriented teaching curricula for kidney care providers (administrators, technicians, nurses, and physicians) at both undergraduate and postgraduate stages of training

- (b) Promote and profile research in this area in national and international journals and at meetings, including provision of dedicated research funding
- (c) Encourage inclusion of green nephrology sessions in all nephrology congresses
- (d) Promote creation of green kidney care champions in all International Society of Nephrology regions, including through fellowships to expand intellectual development and sustainability workforce, and to promote advocacy
- (e) Encourage education and empowerment of kidney patients to expect and demand sustainable care provision and optimal stewardship of kidney care therapies
- (f) Stimulate national and regional kidney care societies to develop green kidney care action plans
- (g) Develop, disseminate, and iteratively update best practices in sustainable kidney care, starting with a “Top 10” list of sustainable actions for each profession within our kidney care workforce
- (h) Encourage embedding of Sustainability in Quality Improvement (“Sus QI”) within

health care improvement programs and advance practitioner literacy in this field

(i) Promote collaboration with the planetary health community and practitioners in other disciplines who similarly pursue climate-resilient and environmentally sustainable health systems

## 2. Procurement, infrastructure, and innovation

- (a) Develop international procurement pathways and standards for medications, dialysis equipment, and consumables, and communicate these standards broadly. Such “pro-innovation procurement” pathways would aim to provide assured markets such that industry partners are incentivized to develop products that deliver sustainably sourced, produced, and transported kidney care products with an ultimate goal of circularity and zero waste within our supply chains.
- (b) Robustly promote and incorporate full environmental performance transparency from manufacturers to ensure accountability
- (c) Advocate for and promote an industry-aided transition to low carbon and zero waste dialysis therapies via well-publicized green industry challenges
- (d) Achieve a paradigm shift from “single-use” to “circular” economies for kidney replacement therapies (i.e., repairing, refurbishing, remanufacturing, and recycling)

## 3. Sustainable clinical pathways in kidney care

- (a) Promote the patient, cost, and environmental benefits of early diagnosis, prevention of progression, and uptake of transplantation
- (b) Develop a publicly available repository of environmental performance metrics, allowing comparison between units, programs, and regions
- (c) Encourage development of energy and emissions monitoring, and data collection and reporting systems, and promote sharing of these data
- (d) Develop and broadly disseminate high-impact recommendations for low carbon kidney care (prescribing, equipment, and clinical pathways), ultimately in the form of a user-friendly carbon calculator
- (e) Facilitate conversations within the global kidney care community for developing

resilience, adaptation, and mutual aid systems within kidney care pathways in the face of future climate and social shocks

(f) Promote development of new processes, incentives, and competencies for reducing the carbon footprint of clinical trials in nephrology, as well as expanded skills in knowledge and processing of environmental data

As individuals, and as representatives of our worldwide community dedicated to bettering the health of people with kidney diseases, we recognize the necessity, obligation, and opportunity of urgently transitioning our systems and care to this equally ecologically focused and patient-centered framework.

We welcome a “race to zero” in kidney care, and the opportunity to work together in shared accountability to the patients we serve, and the health of Earth’s natural systems, upon which we all depend.

## DISCLOSURE

CES participates on advisory board; 100% of remuneration is donated to a planetary health nephrology trainee education fund. CES serves as Chair of the Canadian Society of Nephrology Sustainable Nephrology Action Planning Committee (unpaid position). KAB has a research grant from Fresenius Medical Care; funds are paid to the institution. KAB sits on a Scientific Steering Committee for AstraZeneca into research on the global environmental burden of chronic kidney disease; payments are made to KAB. NSK participates on the FORTIS Study Safety Group; a Phase 1/2, Open-Label, Ascending-Dose Clinical Study to Evaluate the Safety Preliminary Efficacy of AT845, an AAV8-Delivered Gene Transfer Therapy in Patients With Late Onset Pompe Disease. NSK serves as Clinical Co-Chair of the UK Kidney Association’s Sustainable Kidney Care Committee. NSK is lead author of *AKI Clinical Practice Guideline*, UK Kidney Association. VJ participates on boards for Zydus Cadilla, Baxter, and Bayer; all payments are made to The George Institute for Global Health India. VJ is an International Society of Nephrology volunteer. RCV receives consulting fees for B Braun Avitum, Baxter Healthcare, Kibow, NextKidney, Novartis, Fresenius Medical Care, and Dutch Kidney Foundation. RCV receives payment or honoraria for events from Fresenius Medical Care and Baxter Healthcare. All the other authors declared no competing interests.

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