



Towards sustainable environmental development in nephrology care, research and education

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Health-care professionals in general and nephrologists in particular can and should make clear contributions towards achieving the Sustainable Development Goals. This commitment will require changes in patient care, research and education, which should be carried out in collaboration with relevant stakeholders, such as health-care industries.

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The aim of the [2030 Agenda for Sustainable Development](#), which was adopted by all United Nations member states in 2015, is to provide “a shared blueprint for peace and prosperity for people and the planet, now and into the future”. The Agenda outlines 17 Sustainable Development Goals (SDGs), which comprise an urgent call for action by all countries worldwide. These SDGs “recognize that ending poverty and other deprivations depends not only on strategies that improve health and education, reduce inequality and spur economic growth, but also policies that tackle climate change and work to preserve our oceans and forests.”

From an environmental perspective, translating the SDGs to everyday clinical practice has several consequences. The interaction between the changing environment and health is bi-directional. It is increasingly clear that climate change, which is associated with extreme weather events, global warming and rising sea levels, can have detrimental effects on human health¹. The World Health Organization (WHO) estimates that 23% of global deaths are [linked to environmental factors](#). Climate change and pollution can lead, through various pathways¹, to undernutrition, mental disorders, cancers, and cardiovascular, kidney, respiratory and infectious diseases. However, health-care providers, whose mission is to protect and promote health, are not only major polluters who use large amounts of energy and water, but the production, transport, use and disposal of medication and other medical consumables also have substantial carbon footprints. A 2019 report estimates that, on average, 4.4% of the global carbon footprint is produced by the health-care sector. Importantly, by making such a substantial contribution to global CO₂ emissions, the health-care sector finds itself in direct conflict with one of the key values of the medical profession — ‘primum non nocere’ (first, do no harm). We must therefore move towards more sustainable health care.

Sustainability is often defined as the ability to meet the needs of the present time without compromising the

ability of future generations to meet their own needs. Clearly, we as a global community are not living in a sustainable way and therefore have the ethical duty to make every possible effort to re-establish sustainable development. The medical community in general and we as nephrology professionals in particular are not excluded from this challenge. Medical professionals have both a civilian and a professional role in promoting sustainability. In our professional role, we should ask ourselves: how can our personal contribution to health care, as well as that of our profession in general and/or of our professional organizations, be more environmentally friendly²?

Physicians are often involved in patient care, research and/or education. We can make a meaningful contribution in all three of these areas (BOX 1). Increasing evidence shows that pollution and the extreme temperatures associated with climate change affect the kidneys and the cardiovascular system^{1,3}. Most of these data are based on associations and/or models, but the underlying pathophysiological mechanisms for many of these effects are also starting to emerge. We need to collect more data on these mechanisms and identify approaches to counteract these effects. Funding bodies such as the European Commission are beginning to create opportunities for this research to be conducted. In fact, environmental and sustainability commitments defined by global and regional institutions to tackle climate change now require implementation and represent a considerable task for the health-care sector.

Most physicians do not realize the enormous scale of the environmental impact of medical work and might be overwhelmed by this information, but professional organizations can provide some guidance. The European Renal Association–European Dialysis and Transplant Association (ERA-EDTA), for example, has sought to initiate and support activities that can help with the implementation of sustainability policies and has outlined its proposed action plan^{2,4}. The 2020 ERA-EDTA

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Box 1 | Key actions for sustainable environmental development in nephrology**Care**

Focus on resilience — how to adapt and reduce the detrimental effects of the changing environment on health who and mitigation — to dramatically reduce the environmental impact of the health-care sector.

Research

Learn more about pathophysiological mechanisms underlying the detrimental effects of climate change and pollution on health, and how to counteract these effects.

Education

Implement sustainable health-care education — teaching and learning that prepares future health-care professionals to promote sustainable health and deliver sustainable health care — into the medical curriculum.

annual congress, which was a fully virtual conference due to the coronavirus disease 2019 (COVID-19) pandemic, included sessions that specifically addressed sustainability in health care. Although not systematically assessed, this first ever fully virtual congress must have had a considerably lower carbon footprint than meetings in previous years. The precise format of next year's meeting is not yet established, but a more extensive use of virtual communication technologies will certainly be considered.

Efforts to reduce the environmental impact of nephrology care must obviously address haemodialysis provision, which is associated with high consumption of water, energy and medical consumables³. A 2020 study reported data on water and energy consumption, and waste production per hemodialysis session in a group of private dialysis centres in France⁵. The information obtained from this large data set could be used as a benchmark for future evaluation of changes in practice. This initiative started as an effort to reduce internal costs but is now being promoted as a 'green' initiative. Importantly, green initiatives can often be very attractive economically. Collaboration between nephrology societies and health-care industries (that is, manufacturers and suppliers of medical equipment, consumables and services) should be encouraged to advance these green initiatives. In the dialysis industry, for example, companies should consider themselves at least co-responsible for the fate of their products once they leave their factories and large dialysis providers should share their knowledge and experience on how to reduce the environmental impact of these treatments. Nephrology organizations and societies could provide platforms for training and information exchange.

In addition to patient care and research, nephrologists are often active in education. Sustainable health-care education can be defined as teaching and learning that prepares future health-care professionals to promote sustainable health and deliver sustainable health care. Sustainable health care should therefore be part of the medical curriculum, although this is not yet the case in most universities. As educators, we should start to define learning objectives and develop learning materials⁶. Given the global relevance and urgency of sustainable development, universities and other educational

institutions should work collaboratively on these issues, at national and international levels.

Global institutions stress the need for transition to a more sustainable society. Our goal should be to start that transition within the health-care sector today. This is an enormous task for us and for our many stakeholders. We, as health-care workers, should accept our responsibility, speak up, advocate and show leadership. We should focus on resilience — how to adapt and reduce the detrimental effects of the changing environment on health — and mitigation — how to dramatically reduce the environmental impact of our work. We need to initiate system-level changes that integrate considerations of environmental impact into standard operating practices and into the everyday care that we provide for our patients, as well as our research and education practices. Widespread carbon monitoring and accountability for carbon emissions will likely be implemented in society at large and in health care in particular over the coming years.

However, we must also realize that, for many health professionals on the globe, the everyday priority is to deliver basic health care to patients, with less focus on the associated environmental impact. When expressed as CO₂ emissions per capita of population, the USA, Canada, Australia, Japan, Korea and most European countries are among the (very) high emitters⁷. This observation emphasizes that physicians in these countries should initiate change and lead by example. In some countries, such as the UK⁸ and the Netherlands, nationwide initiatives have already commenced. In Europe and Australia, clear first steps have been taken within the nephrology field^{2–4}. International and national professional organizations also have an essential role in facilitating collaboration with health-care industries. Together, we can make a difference and contribute to making good health and wellbeing, quality education, responsible consumption and production, and climate action — SDGs 3,4,12 and 13 — a reality.

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Competing interests

The author declares no competing interests.

RELATED LINKS

Netherlands' Green Deal: <https://www.greendeals.nl/english>
Sustainable Development Goals: <https://sdgs.un.org/2030agenda>
WHO Environmental impacts on health: <http://www.who.int/phe/infographics/environmental-impacts-on-health/en/>

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