



How the European Union's legislation on protecting the environment and its Guidance may support green nephrology

Elena Rho¹ · Franco Bergesio² · Marco Lombardi³ · Giordina Barbara Piccoli⁴

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We are living in times when climate change is causing environmental damage that may be irreversible. If we fail to address this issue, the situation is likely to become even worse in the coming years [1].

Each of us must therefore take action to build a sustainable world for everyone. We all have opportunities to contribute to this fight in our private lives as well as at work. Since about 5% of global CO₂ production comes from the healthcare sector [2], physicians have started to explore approaches that would enable them to reduce the environmental footprint of their work. Realizing that hemodialysis is one of the more costly health care-related procedures in terms of energy and water consumption as well as plastic production, environmentally-aware nephrologists have started to take action to minimize its impact [3]. The idea of “green nephrology”, which started in Australia, has spread to other countries and has become a worldwide “movement” [4].

As always, problems can generate opportunities. This is definitely the case for the environmental impact of hemodialysis: there are several interventions that would reduce water, energy and plastic consumption, and green nephrology experts have identified ways to tackle unnecessary waste (Supplementary material 1; [5]).

To reduce water consumption, whenever clinically sound we should consider recycling reverse osmosis reject water, upgrading to more efficient water treatment plants, promoting incremental dialysis and reducing dialysate flow rate.

To reduce energy consumption and its related CO₂ emissions, we should take into consideration using renewable energy sources and dialysis machines with heat exchangers. To generate less waste, we should also evaluate using central dialysis delivery systems, and appropriate waste management: this would minimize the need for incineration and/or disinfection prior to waste disposal.

Some of these interventions simply require rethinking internal procedures and could easily be implemented in centers with motivated healthcare professionals; others require more structural changes, for example when it comes to designing new “green” hemodialysis units. At present, most public institutions award contracts for projects through tendering, often considering only the financial aspects of the bids submitted (and) ignoring environmental questions and related costs.

Too often, enthusiastic, motivated “green nephrologists” feel left alone in a legislative vacuum, which does not prioritize environmentally-friendly interventions.

This should not be the case: the European Union itself and several individual member countries have passed laws that make it obligatory to evaluate a project's environmental impact. This was well outlined in the Guide to Cost–Benefit Analysis (CBA) published by the European Commission in 2014 [6], which indicates that externalities must be taken into account when evaluating a project. An externality is an indirect cost or benefit to an uninvolved third party that arises as an effect of an intervention. An example of a negative externality is the air pollution caused by manufacturing an item: the consumer does not pay for it, nor does the producer, but a third party, i.e. society, does. The CBA Guidance mentioned above states that project evaluations must

✉ Elena Rho
rho.elena@gmail.com

✉ Giordina Barbara Piccoli
gbpiccoli@yahoo.it

¹ Division of Nephrology, University Hospital of Zurich, Zurich, Switzerland

² Project Group on Green Nephrology of the Italian Society of Nephrology, Florence, Italy

³ Nefrologia e Dialisi Ospedale Mugello, ASL Toscana Centro, Florence, Italy

⁴ Centre Hospitalier Le Mans, Le Mans, France

consider externalities, including acoustic and atmospheric pollution, soil and water contamination and CO₂ production. The impact of environmental externalities such as these has to be estimated on the basis of how many tons of CO₂ are produced. The common problem of assigning a monetary value to CO₂ production is solved by the CBA Guidance, which includes conversion tables for transforming tons of CO₂ into a monetary value, taking expected increases in the cost of CO₂ between now and 2030 into account.

As this Guidance legitimizes the systematic evaluation of positive and negative externalities, it could also be applied to healthcare projects including those related to nephrology, for example, when comparing projects for a new dialysis unit, one with a centralized dialysate delivery system, the other relying on individually packaged dialysate solutions. In this case, the negative impact linked to higher plastic consumption would need to be added to the cost of the second project.

The CBA Guidance was updated in 2022 [7] to clarify and explain the technically complicated laws that were passed after it was first issued.

It is noteworthy that in approving Regulation (EU) 2020/852 [8], the European Union's objective was to reorient capital flows towards investments capable of achieving sustainable and inclusive growth. It is also important to mention that European Union regulations apply both to the EU itself and to individual EU member states, and that this law was enacted to provide a legislative framework so that the goals defined by the United Nations in the 2030 Agenda (Supplementary material 1) and in the Paris Agreement [9] could be achieved. The law was obviously not meant to specifically apply to the healthcare sector or nephrology, but it enunciates important principles, which could also be applied in nephrology. It defines how enterprises should implement circular economy, enhancing efficient production and consumption, reducing their environmental impact, minimizing waste and the release of hazardous substances. It favors the sustainable use of energy and water; it defines what significant harm to the environment is and specifies what technical requirements have to be met in order to evaluate a project from an environmental perspective.

The Italian Ministry of the Environment has integrated the environmental policy suggested by the European Union by issuing a decree establishing minimal environmental criteria (MEC), which have to be respected in every construction/renovation project. Respecting the MEC is mandatory in every tender procedure. Its aim is not only to ensure that the project being considered is environmentally sustainable, but also to force less virtuous economic operators to adapt to the public administration's new demands for sustainability (Supplementary materials 2–5).

The body of law dealing with environmental impact is expanding and evolving quickly, highlighting the importance of interdisciplinary cooperation. If we want to translate

green nephrology concepts into practice, engineers, lawyers, economists, nurses and patients should be involved with physicians in rethinking goals, delivery and shared spaces.

As “green nephrologists” we should not feel that we have no one to turn to for help: we still have a long way to go, but we are not alone. Seeking the advice of competent consultants is an essential part of the implementation process; the law is on our side, it is up to us to have it respected.

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