



National Institute for Public Health
and the Environment
Ministry of Health, Welfare and Sport

The win-win effect of sustainable health care: *measures and their health effects*

Introduction

Within 50 years, the habitats of 1/3 of the world's population will be just as warm as the hottest parts of the Sahara¹. This will have severe consequences for public health. However, this scenario need not become a reality when global greenhouse gas emissions are significantly reduced. In line with several international targets, the Dutch Climate Act aims to reduce greenhouse gas emissions by 95% by 2050. Reductions in emissions are required in all sectors to achieve this goal.

The Dutch health care sector contributes 6-7% to national greenhouse gas emissions^{2,4}. Measures to reduce these emissions serve two purposes: to contribute to the climate goals, and to contribute to people's health locally and in the rest of the world. After all, climate change entails, for example, more heat stress, the spread of diseases such as malaria and parallel effects such as air pollution (smog). Most people want to contribute to solutions to these problems. But where do you start? How can we make well-informed choices about this issue?

This article¹ introduces **three process steps** and **four types of measures** that can help to reduce the health care's greenhouse gas emissions.

¹ <https://www.medischcontact.nl/nieuws/laatste-nieuws/artikel/duurzame-zorg-komt-dubbel-tot-zijn-recht.htm>

Step 1: Choose a focus

Organisations that have ambitions to become more sustainable may come up against a barrier when trying to convert these ambitions into practice. After all, there are many possible measures. Moreover, implementation of these measures often requires collaboration with and dialogue between various (internal) stakeholders. Any capacity for this can only be used once. It follows that sustainability requires attention and focus. That is why it is wise to start by analysing where your organisation currently has the greatest impact on the climate.

Two recent studies show that the greatest climate impact of hospitals is the result of: 1. the energy use of buildings; 2. transport of persons and 3. medication use^{4,5}. You may not have expected medication use, but greenhouse gas emissions occur during medication production. Prescribing or not prescribing medication, as well as the choice of the category or type of medication, directly affects the emission of greenhouse gases. In addition, strong greenhouse gases are used in medical practice, such as HFCs in inhalers. The 690 million inhalers used worldwide each year, together account for 0.03% of global greenhouse gas emissions.

The same is true for anaesthetics, such as desflurane, which together account for up to 50-60% of the climate footprint of an operation room (OR)¹⁴. Using regional anaesthetics instead of general anaesthesia can therefore be a measure to drastically reduce that footprint¹⁵.

In addition to insight into where the highest climate impact occurs, you could also consider other effects when choosing your focus, such as: with which processes do we create the most waste? Or: for which issues can I exert the greatest influence on sustainable development? For RIVM this applies, for example, to making laboratories more sustainable⁶. The bottom line is: make sustainability a focused effort.

Step 2: Selecting measures

Once the care institution has chosen what it wants to focus on, four types of measures can be considered in combination. The types of measures differ from each other depending on the role you have as an organisation (Figure 1):

Organisational responsibility: your own organisation can reduce the emissions caused, such as by turning off air treatment when an OR is not in use⁷, or reducing the number of patient travel movements by combining examinations and the use of digital consultations. Another example is for specialists, such as surgeons in the OR, to coordinate the use of instruments so that the number of instrumentation sets can be reduced, re-used or shared more efficiently. This prevents waste, such as ‘out of date’ items, which means that fewer materials are needed and therefore less greenhouse gas emissions will occur. Other examples and inspiration can be found in the [green deal sustainable care](#)⁸ and are made available through various websites, such as road maps of Care and Cure institutions to reduce their greenhouse gas emissions⁹.

Sustainable procurement: purchase existing products and services that are associated with lower greenhouse gas emissions during production, use and disposal. This could include switching to renewable local energy¹⁰, but also purchasing more sustainable equipment or consumables. It is important to work together within the sector: making the demand for new sustainable products sizeable enough to become interesting for suppliers.



Figure 1: The four types of measures to contribute to climate goals; awareness, organisational responsibility, sustainable procurement, chain dialogues and cooperation.

More examples, tools and ideas for purchasing can be found on the [PIANOO website](#)¹¹.

Chain dialogue: some impacts of healthcare, such as medication in waste water and the environment, cannot be solved by a single organisation, but requires cooperation. These situations need initiators who pull the value chain together in order to enter into dialogue and make plans for sustainable development together. One example of this is the Dutch national chain approach to pharmaceutical residues, which jointly explores measures throughout the entire chain regarding ways to prevent pharmaceutical residues in the environment¹².

Awareness: healthcare professionals play an important role by pointing out the health effects of our actions and setting a good example³. The more drastic the measures are for the organisation, the more important it becomes to create that awareness for the necessary support, for example, if you want to make commuting more sustainable by offering electric bicycles as an alternative to cars.

Step 3: Estimate and adjust effects

Contributing to achieving the climate goals is a learning process. A learning trajectory requires sharing successes as well as remaining open to points for improvement: feedback. Has the measure actually reduced our footprint? If not, why not? And if so, where are the greatest effects still to be had (back to step 1)? Therefore, it is necessary to be able to estimate the effect of the measures.

Take purchasing, for example. A study from 2018 showed that two thirds of government purchasing, in which sustainability was included in the tender, ultimately did not lead to the purchase of a product or service that was more sustainable than the market standard¹⁰. Is that a bad thing? It is certainly not effective, but it only becomes bad if we continue to do so year after year without being aware of it learning from it and being able to make adjustments.

By measuring effects, we can continue to do what works and adjust what does not. In the same study on purchasing, the area in which the effect could be demonstrated proved to be so inspiring that various organisations also decided to

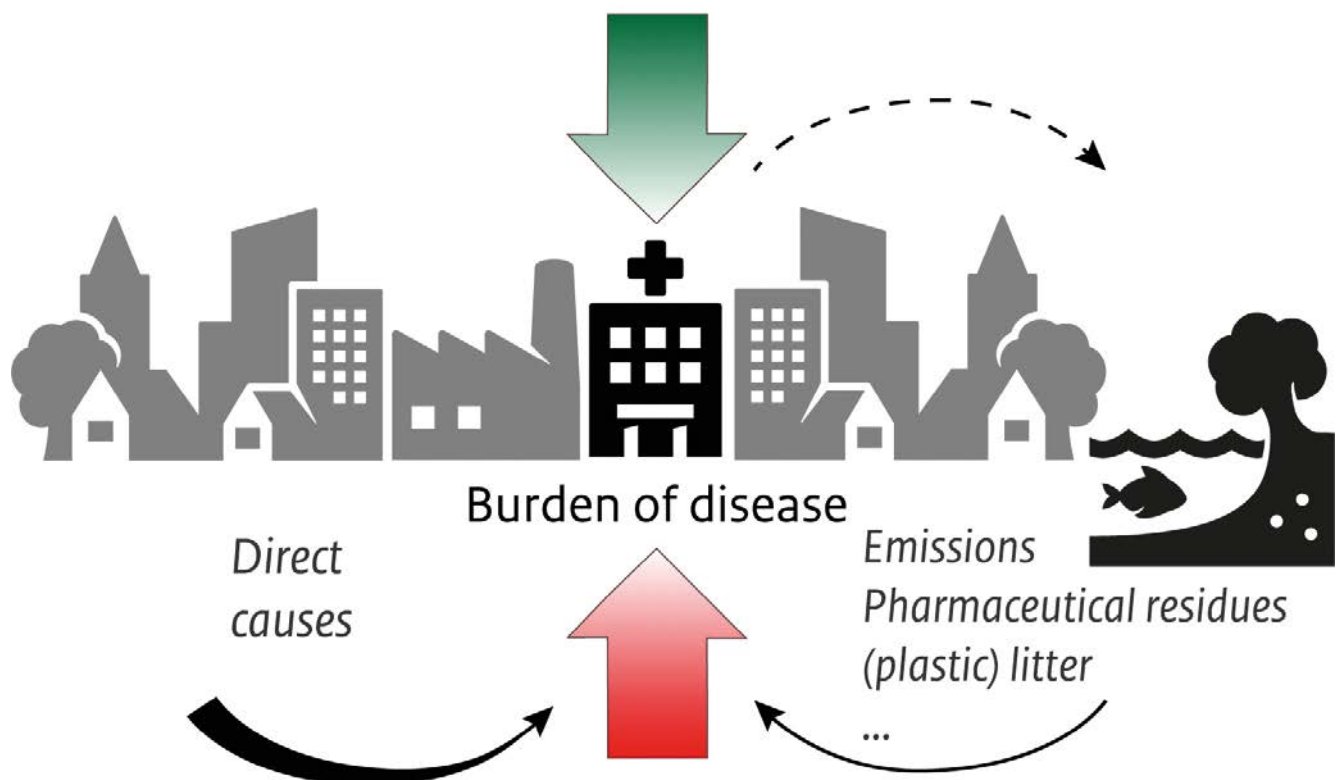


Figure 2. Cause-effect chain of emissions and burden of disease. Emissions can be indirect causes of an increased burden of disease. Green House Gas emissions induce climate change, which, for example, leads to more heat stress, the spread of diseases such as malaria and parallel effects such as air pollution (smog). The health care and cure sector can strengthen their positive impact (green arrow) on lowering burden of disease (red arrow) by, while providing care & cure, simultaneously lowering emissions to the environment. Thus creating a positive impact on health in a sustainable manner, the win-win effect.

do more work on sustainable procurement on this basis. In other words, providing insight into the effects contributes to support and decision-making, in addition to optimisation. For more information on measuring effects, see Textbox, on page 5.

In decision-making, costs and benefits are weighed up, including social costs and benefits. For the healthcare sector, it may be useful to show these effects in health gains as well, such as Disability Adjusted Life Years (DALY). A DALY is the number of man-years lost due to death or illness and is used, for example, in calculations of the burden of disease. The aim of care is to reduce this burden of disease. We want to avoid increasing this burden of disease via a back door, such as through climate change.

If the effectiveness of measures is converted into or expressed in terms of emissions, this can then also be used to estimate potential effects on public health. For example, we can express greenhouse gas and particulate matter emissions in DALY¹³. This gives an indication of the degree to which health is linked to climate change, or air quality.

Three examples to illustrate this:

- LUMC indicates that renovation of the ORs can reduce the footprint by 25-30% through smarter air treatment, which results in an estimated reduction of 375 tons of CO₂-eq per year⁷. Over a 10-year period, this yields a gain of 3.5 healthy life years (DALY).

- A hospital decides to focus on electric transport, with green electricity as its source: 250 (shared) cars with which 50,000 km are driven annually under a 5-year lease contract. This results in an estimated reduction by 2,500 tons CO₂-eq per year and 63 kg less particulate matter. For the entire lease contract, this amounts to 11.8 healthy life years gained (DALY).
- A hospital in New York (Hospital for Special Surgery) performed hip and knee arthroplasty under regional rather than general anaesthesia in 2019¹⁵. General anaesthesia was replaced by regional anaesthesia in 7,427 patients. This saved 1,630 tons of CO₂eq. (750 kg desflurane and 60 kg nitrous oxide) and thus 1.5 DALY.

Expressed in medical expenses, these measures together yield € 1.3 million.

In other words, there are both climate and health gains to be made when implementing the measures to be more sustainable. The connection between our health and the climate is plain to see here. By contributing to the climate goals, we can increase the number of healthy life years and thus also prevent a higher burden on the health care system (Figure 2). This is what we call the win-win effect of sustainable care. If you are keen to continue working on this, please keep an eye on the activities of the green deal sustainable health care (iso care) via <https://www.rivm.nl/green-deal-duurzame-zorg>.

Text box: Emissions in the chain

When determining our impact on climate change, it is important to include the contributions from the entire chain. In other words, we should consider the effects that occur throughout the life cycle of a product or service. This includes mining the necessary raw materials, transport of those raw materials to the factory, the energy required to make the product and to dispose of and process it when it is discarded.

Including the effects in the chain is important because otherwise they may get passed on, resulting in a kind of (unconscious) false sustainability or greenwashing. A typical example is a car dashboard made from recycled material. When producing this dashboard, fewer greenhouse gases are released than for a dashboard made of new, virgin, materials. But if this dashboard with recycled material is heavier than the alternative, the car consumes more fuel or electricity

per kilometre in the usage phase, resulting in additional greenhouse gas emissions. Whether the dashboard made of recycled material ultimately leads to more or less greenhouse gases therefore also depends on its final weight and not only on the material.

The most commonly used method to investigate these chain effects for a product is life cycle analysis (LCA)¹³. This method considers, for every phase in the life cycle of a product, which raw materials are used and which emissions to water, soil and air take place (Figure 3). Databases exist with emissions and raw material use data (iso date) for many production processes.

The emissions during the different life stages are then added up and translated into the different types of effects they have, including climate change, toxicity and resource depletion.

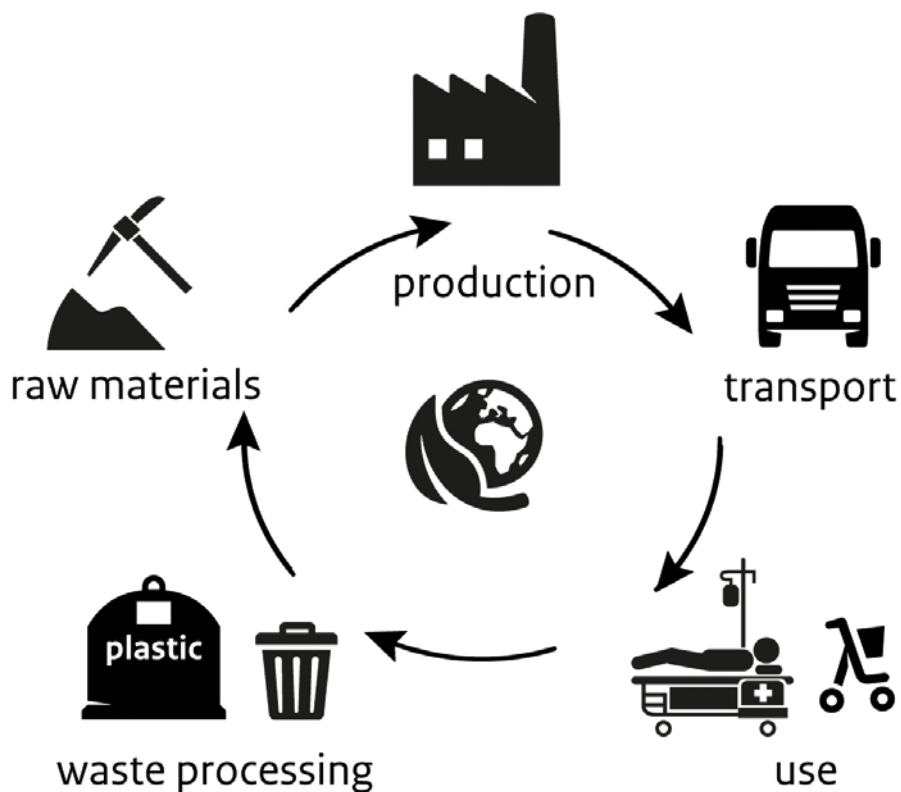


Figure 3. Schematic representation of the life cycle of a product.

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