Green Pharmacy Toolkit

Tips and tricks

KNMP | Royal Dutch Pharmacists Association

Green pharmacy toolkit

This toolkit, developed by the Royal Dutch Pharmacists Association (KNMP), offers essential guidelines for a sustainable and green approach in the pharmaceutical sector. Originally available in Dutch, the toolkit is now also provided in English to reach a broader audience.

Visit www.knmp.nl and switch the language settings in your browser to English to view the latest version of the toolkit directly on our site.

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This toolkit provides pharmacists with guidance on making their pharmacy more sustainable: the building, the interior, the operations, and the (pharmaceutical) care. The goal is to deliver high-quality care with the least impact on people and the environment by reducing energy consumption, resource use, CO2 emissions, water use, and water pollution. The toolkit is regularly updated with new topics.

Practice Building

Sustainable improvements to a building are often combined with renovation or new construction. However, it is also possible to implement sustainability measures outside of these scenarios. The most significant gains are logically achieved by making older buildings more sustainable.

Energy Saving

To reduce energy consumption, there are measures that can be taken quickly and without large-scale renovations (quick wins) and measures that are preferably combined with a major renovation.

Quick Wins

- Take basic insulation measures (draft strips, radiator foil).
- Detect drafts with a blower door test and then specifically target heat loss.
- Implement sun shading measures. This will reduce the use of air conditioning and lower energy consumption.
- If necessary and possible, adjust the entrance of the building. A lot of heat (in winter) and cool air (in summer) is lost through open doors. Install self-closing doors, an airlock, or a revolving door to reduce this loss.
- Proper placement of an air curtain can also save energy.
- Choose an energy supplier that provides green electricity.
- Properly regulate the heating or climate system: set the correct temperature for day, night, and weekend, and keep the water temperature of the boiler at a maximum of 60°C.
- Install radiator fans to distribute warm air more effectively throughout the space.
- Replace incandescent bulbs, fluorescent lamps, and halogen lamps with LED lighting.

Sustainable Building through Insulation

To prevent unnecessary heat loss and save energy, insulation can be applied in:

- The cavity wall.
- The facade, on the outside or inside (larger renovation, more disruption).
- The roof, on the inside or outside. A special form of an outside measure is the green (grass or sedum) roof. A green roof filters CO2 and particulate matter from the air, extends the life of the underlying roof, and provides water retention, but has a limited insulating effect (and only in the summer), and is insufficient as an insulation layer. Read more information and view subsidy opportunities on the Milieu Centraal website.
- The floor, below or above the floor.
- The windows. The difference in energy loss when replacing large single-glazed windows with double glazing (HR+++) is significant. Also, consider the type of frame as much heat is lost there too. PVC frames are much more energy-efficient than wooden frames.

An explanation of the different forms of insulation (floor, roof, cavity wall, facade, glass) and an overview of the possibilities within each form can be found on the Vereniging Eigen Huis (VEH) website, in various VEH e-books, and on the Stichting Stimular website, where a rough indication of the payback period is also provided.

By installing insulation, drafts are sealed, and ventilation is reduced, which can make the building more humid. Therefore, ensure good ventilation.

Sustainable Building by Adjusting the Heating System

Installing a new heating system depends on the building and specific application (functional requirements). Always consult an expert for this.

→ See tips for proper (regulation of) ventilation.

Subsidy

For sustainability projects, it is possible to obtain subsidies (for advice) to make the building more sustainable and thus reduce energy consumption and CO2 emissions. Examples in the Netherlands:

- The Ontzorgingsprogramma Maatschappelijk Vastgoed: a provincial program where owners of small public buildings are supported through advice and customized support from a sustainability coach. The sustainability measures themselves are not included in the program, only the advice.
- The Subsidieregeling Verduurzaming Mkb (SVM), which provides compensation for hiring an advisor for tailored energy advice and possibly for implementation.
- There are also schemes where the applicant receives tax benefits, such as the EIA (for insulation) and MIA\VAMIL (for, for example, an electric cargo bike or electric delivery van). For an overview of the measures under these schemes, see the Milieu- en Energielijst 2024.

→ More information on current subsidy opportunities.

Practical Tips

- Turn off the heating (on antifreeze mode) and only turn it on when needed. In practice, less (additional) heating is needed.
- Be aware of your energy consumption. Check your energy meter and energy bill.
- However, saving energy remains the most environmentally friendly option.

Green energy

Green energy is sustainable energy, generated using clean, inexhaustible sources such as wind, sunlight, or heat from the earth. Green energy can be supplied by a green energy provider or generated by oneself. Energy can be generated using solar panels (to generate electricity) or solar collectors (to generate hot water); the latter are less commonly used in primary care. Grey energy is dirty energy, produced by burning fossil fuels (oil, natural gas, or coal); the extraction and conversion of grey energy are harmful to the environment.

Generating your own energy with solar panels

- Pay attention to the return on investment and the necessary investment. The individual situation determines what is possible and what the payback period is.
- Choose a reliable supplier.
- Consult with your insurer about whether (and under what conditions) solar panels are allowed and whether (and under what conditions) the solar panels are covered by fire insurance.

Purchasing green energy

- Every year, the Consumers' Association, Greenpeace, Natuur & Milieu, and WISE evaluate all energy companies in the Dutch market. They assess the investments in power generation, the purchase of electricity, and the delivery of electricity. Check the ranking on the Consumers' Association's website. Or check an energy supplier through the "Green Power Checker" to see if the supplied electricity is truly green.

→ More information about green electricity and the Guarantee of Origin.

Instruments

There are various instruments that can be used for CO2 reduction, especially intended for larger institutions:

CO2 Reduction Tool:

This is an Excel-based tool designed for long-term planning to make a building more sustainable. The tool visualizes the effects of sustainability measures and includes legally required recognized measures. Key figures automatically estimate investment costs and energy savings, providing insights into the payback period of different measures and indicating progress towards the target CO2 reductions of 55% by 2030 and 95% by 2050.

Environmental Barometer:

This (paid) online tool allows for the annual entry of various data such as energy consumption, transportation kilometers, and waste usage. It helps monitor whether the implemented sustainability measures are achieving the desired effects.

Renovation or new construction

Sustainability efforts for buildings are often combined with renovation or new construction. However, sustainability improvements can also be implemented outside of these contexts. The most significant gains are understandably achieved by making older buildings more sustainable.

GDDZ 3.0 Theme III Reducing CO2 Emissions from Buildings, Energy, and Transport

By making buildings, energy systems, and transport more sustainable, healthcare providers can significantly influence the reduction of greenhouse gases in line with the Climate and Energy Agreement. Therefore, parties aim to:

Reduce direct CO2 emissions by 55% by 2030 compared to 2018 and achieve climate neutrality by 2050.

During renovation or new construction, attention should be given to environmentally responsible building practices, such as material circularity and minimizing CO2 emissions from transportation. National Association of General Practitioners (LHV) Construction Advice has published a book on renovating practice spaces, which also offers valuable information for pharmacists. Discuss these aspects with the building developer or a construction advisor.

When converting an old or historic building into a healthcare practice (building transformation), consider:

- The purpose: Check with the municipality whether a healthcare practice can be established in this building.
- The suitability of the building for a healthcare practice (location, accessibility, and functionality).

→ **For more tips on making historic buildings more sustainable, see additional resources.**

2 Practice Design

Equipment

When designing a pharmacy, attention must be paid to the impact on the environment. This starts with smart choices for equipment, lighting, and furniture. Important considerations include reducing energy consumption and reusing materials. Additionally, selecting products whose production is less polluting and whose transportation is less burdensome is crucial.

When purchasing (computer) equipment, consider the environmental impact of the device throughout its entire lifecycle, from raw materials to usage and lifespan, including the necessary transportation and waste. This is known as a Life Cycle Assessment (LCA).

The following questions can help in making a decision to purchase.

1. Do I really need this device? Or: do I really need a new device? (Step 1 in the R-ladder: Refuse/Rethink). And can I perhaps rent the device?
2. Raw materials: where do the raw materials for this device come from? Is it permissible to use these raw materials? Is there a variant with less environmental impact?
3. Transportation: is this product also produced closer to home?
4. What is the lifespan? And the warranty period?
5. Can the product/materials be reused?

Repair and reuse old equipment unless a new device consumes significantly less energy than the old one; return old devices to the seller or the municipal waste station. Avoid using battery-operated or rechargeable equipment. Choose the more environmentally friendly option and use (green) electricity. If you use batteries (or a rechargeable battery), make sure to always dispose of them separately. The materials in batteries and rechargeable batteries are well recyclable.

When purchasing equipment, pay attention to energy consumption and check the energy label. In 2021, the energy labels were updated; the new scale ranges from A (dark green, most energy-efficient) to G (red, least efficient). This makes it easy to choose an energy-efficient device. On average, you save 10-20% electricity per energy label step. For energy consumption, it is not only important how efficient the device is, but also how it is used. By being aware of (standby) consumption and switching off devices in a timely manner, a lot of energy can be saved.

For computer equipment, the CO2 emissions from production are many times higher than the emissions during use. Therefore, it pays to use this equipment for as long as possible and postpone new purchases, unless usage, data security, or innovation requires earlier replacement. Computer equipment and computer usage also contribute significantly to energy consumption. Here are some tips to reduce this energy consumption and promote energy-efficient ICT behavior.

Quick Wins for Energy Consumption

- **Reduce the number of devices:** For example, use a central energy-efficient printer to replace multiple decentralized printers, each consuming energy in standby mode. Consider how many local devices need to be replaced to save energy with one larger central printer.
- **Use an energy meter or energy consumption manager** provided by an energy supplier. This will show which device is causing high consumption or which room is using a lot of energy, allowing you to target your energy-saving efforts more effectively.
- **Replace high-energy-consuming devices:** When considering replacement, also take into account the expected lifespan and the environmental impact of purchasing a new device (materials, production, origin, and transportation, waste). For example, if a replacement product needs to be shipped from Asia, the transport may have a larger environmental impact than the higher energy consumption of the 'old' device.
- **Choose devices with efficient energy labels** (label A is the most energy-efficient) when purchasing. Adjust the size to the usage. For example, do not get a refrigerator larger than necessary.
- **Turn off as much equipment as possible at the end of the day**.
- Reduce standby power consumption caused by the standby mode of devices. Install timers or power switches on equipment if necessary, for example, on the printer.
- **Replace incandescent bulbs**, fluorescent lamps, and halogen lamps with LED lighting. Ensure that the new lighting fits the old fixture; otherwise, the fixture must also be replaced.
- **Regulate lighting smartly**, for example, with a dusk setting for outdoor lighting. Use motion detection so that the lighting only turns on when someone is in the room.

Water Saving

There are several simple measures to take to save water in the pharmacy. Water usage can be reduced by installing:

- Water-saving faucets: A flow restrictor, volume flow restrictor, or electronic faucets with detection.
- Water-saving toilet reservoirs: This can be done by making adjustments to the existing reservoir, for example, by setting the float lower or by installing a new (smaller) reservoir. Using rainwater to replace tap water in toilets requires major adjustments and can be considered during renovation or new construction.

Practical Tips

Use temperature registration to determine the optimal settings for cooling equipment (refrigerator, freezer, and air conditioning) to meet the required storage temperatures. A small adjustment, setting the temperature slightly higher but still within the required limits, can significantly save on energy consumption.

Depending on the building's characteristics (such as size and insulation), the outside temperature, and the desired indoor temperature, it may be more efficient to not turn off the air conditioning or heating at night, as reheating or cooling after switching off may require more energy. Monitor energy consumption to determine which approach uses the least energy in the specific situation.

Furniture

When purchasing furniture, pay attention to sustainability, such as the circularity of materials and limiting CO2 emissions (production, transportation).

Discuss these points with the architect or interior builder during new construction or renovations.
When replacing furniture, consider the following criteria:

- opt for furniture with a long, guaranteed lifespan;
- made from sustainable raw materials (look for certifications like FSC for wood and sustainable textiles);
- locally or regionally produced (also consider the origin of raw materials);
- repairable;
- and made from materials that are reusable after use.

Life Cycle Assessment

A Life Cycle Assessment (LCA), also known as a life cycle analysis, examines the ecological impact throughout the entire lifespan of a product, starting from raw material extraction, through production, transportation, (re) use, and ending with disposal. In other words, from cradle to grave.

The result is an environmental profile, essentially a scorecard of environmental impacts. This profile provides producers with insights to make their products more sustainable, while also offering customers information about the product's sustainability. While not yet mandatory, customers can always inquire with producers about the availability of environmental impact data for a product.

3 Practice Management

This concerns sustainable choices in the organization of a pharmacy and pharmacy processes. Think about mobility, waste management, data management, procurement and inventory management, as well as choosing sustainable financial partners (for example, a 'green' bank).

Mobility

A substantial portion (22%) of CO2 emissions in the entire healthcare sector stems from the travel activities of healthcare workers (3/4) and patients (1/4); the majority of which is caused by car traffic. Reducing car usage by healthcare workers is therefore the primary focus for decreasing CO2 emissions. Starting in July 2024, healthcare providers with more than 100 employees are legally required to map out the CO2 emissions from employee transportation. Healthcare providers must also develop a mobility plan with goals and measures to reduce CO2 emissions and make transportation more sustainable, as stipulated in the Work-Related Personal Mobility Reporting Obligation (WPM). It is also important for smaller healthcare organizations to focus on making mobility more sustainable.

Options for employees

- Encourage the shift from car usage to public transportation, (electric) bicycles, or electric cars. Provide covered bicycle racks and storage, as well as charging points, also for visitors.
- Utilize schemes that promote cycling, such as a bike plan with reimbursement (up to a maximum) by the employer for the purchase of an (electric) bicycle within their own WKR (work-related cost scheme).
- Provide a shared or service bike, for example, for the delivery of medications.
- Participate in the annual Bike-to-Work Day.

Options for patients

- Take into account the patient's travel movements, and preferably have them visit when they are already nearby.
- Combine the dispensing of medications into a single pickup moment.
- For the choice of whether or not to deliver, weigh considerations for the patient (is delivery necessary?), the pharmacy (costs), and the environment (can it be integrated into the delivery route; what is the likelihood of the patient not being home, requiring additional trips?).
- Deliver by (electric) bicycle or electric car.
- Optimize the delivery route, or use a delivery service.
- Consider joint delivery for multiple pharmacies in the area; this saves on transportation movements. See practical example.
- Encourage sustainable visitor traffic, for example by providing information on the accessibility of the pharmacy by public transport.
- Only replace a physical appointment with a telephone or digital consultation if possible (make a risk assessment) and if the patient wishes. Carefully consider if this is the best option for this particular patient.

Purchasing and inventory

A sustainable inventory management system is based on two pillars: sustainable purchasing and appropriate stock management. The inspiration guide "Don't Waste a Pill" describes the challenges in the medicine supply chain: it is a balance between having enough medicines available and preventing waste. This balance is influenced by many factors, such as current drug shortages.

Sustainable Procurement of Medicines

Sustainable procurement of medicines involves choosing the least environmentally damaging medicine, in collaboration with prescribers (formulary agreements). This section focuses on the procurement itself, not on the choice of medicine. Consider the sustainability of the manufacturer's production, the environmental impact of transportation, and the presence of manufacturers nearby or within Europe.

Currently, the price of medicines often drives procurement decisions. The existing drug shortages and the preference policy limit the options in public pharmacies to choose the most sustainable manufacturer during the procurement process. In surrounding countries, more attention is already being paid to weighing criteria other than just price. For example, Sweden and Norway have set environmental requirements for drug procurement. In England (Greener NHS) and Germany, there is attention to procurement criteria and supplier requirements.

Wholesalers also aim to become more sustainable (building, production, and logistics). For example, by bundling deliveries, the number of transport kilometers can be reduced, and less 'air' is transported. Pharmacies can contribute by limiting the number of suppliers and reducing the number of (extra) orders. Wholesalers are also looking for solutions to reduce waste in this part of the chain. From 2025, the CSRD directive will require them to report on sustainability aspects.

CSRD Directive

The Corporate Sustainability Reporting Directive (CSRD) is a European directive for sustainability reporting. This directive requires companies to report on their sustainability using various sustainability criteria and includes disclosure requirements for numerous Environmental, Social, and Governance (ESG) aspects.
This directive applies from 2025, initially for large companies (including those with more than 250 employees) and is intended for greater transparency and better quality of sustainability information.

Appropriate Inventory

At all levels in the medicine supply chain (from producer to patient), the balance between availability and waste plays a role. For example, if a patient receives medication for too long a period and the medication is adjusted in the meantime, unused medication remains.

In the pharmacy, there are several possibilities to prevent wastage of pharmacy stock:

- Agreements between pharmacist and prescriber: pharmacist and prescriber can make agreements about formularium and quantities to be delivered in the FTO (Pharmaceutical Therapeutic Consultation) or at the regional level. For instance, at first dispensing, a maximum of 15 days' medication is provided. A shorter delivery period at the end of life or for a planned hospital appointment can also reduce waste. Agreements can also be made about changes in the medication roll; let these changes take effect from the next roll whenever possible.
- Optimize working stock: This can be done by estimating the required quantity for common medications and considering their shelf life. Avoid unnecessary 'hoarding' of medication; this could lead to surplus (and potentially a shortage elsewhere) and waste.

- Automated stock and assortment management system: Use an automated inventory and assortment man agement system linked to the AIS, which automatically provides advice.

Practical tip: Utilize an automated inventory and assortment management system that is linked to the AIS and provides automatic recommendations.

- Active expiration date system: Use PharmaSwap or a regional collaboration for the supply or demand of medicines nearing their expiration date and are not expected to be used in time. PharmaSwap is a market place for pharmacists and wholesalers that ensures better use of available stock and reduces waste.

Practical tip: Take a close look at what you discard in the pharmacy (awareness: what do I throw away and what causes it) and then adjust your purchasing accordingly.

- Policy changes by health insurers: The health insurer should allow the old pharmacy stock to be used up before a policy change (so that medication no longer preferred does not have to be destroyed) and make long-term predictable agreements with suppliers, avoiding changing policies and thus less remaining stock.

Hospitals and Care Institutions

Returning Hospitals and healthcare institutions are exploring ways to reduce medication waste within their facilities. This can be achieved, on one hand, by returning unused medications to the pharmacy or department inventory; on the other hand, by making changes to the dispensing process. These adjustment options depend on the logistical processes of the hospital or institution. Additionally, changes in product selection or production processes may lead to extended shelf life and thus potentially less waste. Below are examples of successful adjustments that help prevent medication waste:

- Returning returned medications to the inventory of the dispensing station (Hospital Pharmacy Isala in Zwolle).
- Dispensing medication not in the patient's name if necessary, but from the department's stock to the patient (Hospital Pharmacy Tjongerschans in Heerenveen).
- Considering the possible discharge of clinical patients with a 'Provisional Discharge Date' when dispensing medication (Hospital Pharmacy St. Jansdal in Harderwijk).
- Using home medication (DGTM) in the hospital, possibly combined with medication managed internally (MIEB); this leads to less waste and a more efficient care process. However, separate financing of medications in primary and secondary care, and the inability to check barcodes currently hinder further implementation. Initial research indicates that the risk of double funding with DGTM is minimal and that the implementation of DGTM does not need to be restricted. Because of significant variation between departments and hospitals, more data is needed to develop a broadly applicable and cost-neutral approach to (re)stocking with DGTM.
- Adjustment in product selection/production process:
  - Using pre-filled sterilized syringes instead of aseptically prepared syringes leads to longer shelf life and less waste (Research by Gelder et al. 2023). Heat sterilization is not possible for all products. However, if the medication can withstand it, this presents an opportunity to reduce waste, especially for medications with unpredictable usage, leading to more waste. The price difference between pre-filled and aseptically pre pared syringes remains a barrier.

- If possible, use a syringe (bolus dosing) instead of an infusion bag to reduce the amount of waste (infusion bag and line).
- If possible, use oral paracetamol instead of intravenous: paracetamol challenge.

→ **Take a look at the website of the Green ICU for more tips.**

Materials and waste

In the pharmacy, products are used whose usage can be reduced or replaced with more environmentally friendly alternatives; think about the use of paper, packaging (and choice of materials), and cleaning products.

Paper

Although it seems attractive to replace all paper with digital options (digital prescriptions, data storage, information for patients), it should be noted that data storage and exchange also have a significant environmental impact. For example, if you download a document three times, it's better to print it the first time. Many factors play a role in the decision to go paperless (retention period, storage, retrievability). Here are some quick wins:

- Only print when absolutely necessary and print double-sided and in black and white. Tip: Set double-sided and black-and-white as the default choice.
- Use paper with an eco-label;
- Replace paper patient information with digital information, preferably via a link (and not as an attachment).
- Encourage the use of a patient portal.
- Use secure email or the Siilo app for communication with doctors, such as for approval prescriptions.
- Identify where labels are unnecessarily printed automatically and adjust if possible.
- Critically review what arrives by post. Cancel subscriptions or replace them with digital subscriptions if possible.

Packaging material

Reducing plastic packaging material has been a focus for some time. Plastic bags have disappeared from public pharmacies due to a 2015 ban on free plastic bags. The use of paper bags can be limited by encouraging patients to bring their own bags. Increasingly, pharmacists are paying attention to the packaging of products received from wholesalers and are asking for more efficient packaging with less waste by reducing the amount of packaging material and using recyclable cardboard/plastic. Especially medication supplied through central filling generates a lot of (recyclable or non-recyclable) packaging waste.

Hospitals also pay attention to the amount of plastic waste. This is caused by packaging material and the high use of disposable products. A consortium of Dutch hospitals and knowledge institutions, led by Erasmus MC, receives funding from the National Science Agenda to research how they can use fewer disposable products and transition to circularity.

Cleaning

During cleaning in the pharmacy, cleaning agents end up in wastewater. Use environmentally friendly cleaning agents, for example, those that meet the European Ecolabel. Check all environmental labels for cleaning prod-

ucts on Milieucentraal. Limit the number of cleanings where possible; daily cleaning is generally unnecessary. Here are some tips for a good cleaning method.

For pharmacies that prepare their own medications: ensure that when cleaning preparation equipment, as few medicine residues as possible end up in the sewer by first wiping the equipment with a tissue and then thoroughly cleaning it.

Waste

Pharmacy waste can be divided into waste from the pharmacy itself and returned medication from patients.

By properly separating waste, materials such as paper, glass, plastic, and batteries can be recycled. This contributes to the circular economy: the amount of residual waste is reduced, and raw materials, energy, and money are saved. For paper, glass, organic waste, and textiles, waste separation at the source is necessary (these cannot be separated afterward); for PMD (plastic, metal, drink cartons), it varies by municipality whether this is collected separately or with residual waste. Check tips for better waste separation.

Practical tip: implement 'reverse collection': place separate waste bins close to the workspace where the waste is generated (next to the desk or counter) and place the residual waste bin further away (for example, by the printer or coffee machine). Often, it's the other way around. This makes it more effort to throw something away as residual waste, leading to better waste separation.

Pharmacies play an important role in collecting leftover medication from patients (returned medication). Medication residues are classified as small chemical waste (kca). Municipalities are responsible for collecting and processing waste (including returned medication collected in pharmacies) from their residents based on the Environmental Management Act. It is therefore common for municipalities to cover the costs of disposing of returned medication collected in pharmacies. During the Dutch campaign Week van Ons Water, this pharmacy service is highlighted annually.

When returning medication, consider the following points:

- Place a return box in the pharmacy with clear instructions for the patient.
- Ask patients to remove paper boxes, package inserts, and labels (due to privacy) from unused medications before returning them to the pharmacy, and to dispose of this paper and cardboard with old paper.
- Empty glass vials can go into the glass bin (do not empty or rinse first).
- Used needles must always go into a needle container.
- Empty blisters and empty medication rolls (pay attention to privacy) that are thrown away at home should go into residual waste.

Practical tip: use the patient's return moment as a contact moment. Have an open and easy conversation with the patient to find out why they have leftover medication.

The goal of collecting excess medication in the pharmacy is to ensure that medication residues are disposed of responsibly and do not end up in the environment (via the sewer). An example of this is reducing the discharge of contrast agents for X-rays. This can be done in various ways, such as reducing usage, reusing leftovers, giving patients urine bags in hospitals, source purification, and/or using special toilets in the hospital.

Data management

Digitization plays a positive role in the climate issue on the one hand (for example, fewer travel movements due to working from home and e-consultations; paperless working) but also makes a significant contribution to environmental damage. For instance, the storage and exchange of data have a considerable impact on the environment. Large data centers are needed, which use enormous amounts of energy to transmit, process, and store data. Moreover, these centers also need to be cooled. Additionally, ICT significantly contributes to environmental damage due to the intensive use of non-renewable resources.

One way to assess the impact of ICT on the environment is to look at its life cycle. This includes all steps, from design and production to the use and disposal of ICT when it is no longer in use:

1. The environment is heavily polluted by the production of equipment.
2. Non-renewable resources are used, such as materials for ICT equipment.
3. A lot of energy is consumed, both during the production of equipment and during its use.
4. When devices are discarded, they also cause pollution (electronic waste or e-waste).

Quick Wins

By making small changes in daily data management, you can significantly contribute to reducing the impact.

1. Delete data that is not (or no longer) used, but be mindful of the legal retention period. Instead of using secure emails, the Siilo app can be used for communication with healthcare providers; this app automatically deletes messages after 30 days.
2. Avoid data duplication. Often, the same data is stored in multiple places (copies). Keep only one backup if necessary.
3. Use an eco-friendly search engine like the CO2-negative Ecosia, which offsets more CO2 than it uses.
4. Hold online meetings without video to reduce CO2 emissions.
5. Lower the resolution of streamed videos from HD to standard quality for a 20-fold reduction in CO2 emissions.
6. Be mindful of email usage:
   - Unsubscribe from newsletters that you find little or no value in.
   - Make files you send less heavy: compress large files; send a link instead of an attachment.
   - Sending an email with a large attachment can cost up to 50 grams of CO2 per email. A normal email costs about 4 grams. Therefore, limit sending attachments. Compress (zip) large photos and files before sending.

The Green Team Dermatology of Radboudumc has developed a Digital Detox with tips to reduce unnecessary data traffic and storage efficiently.

→ Digital detox

Financial parties

A pharmacy deals with banks, insurers, and pension funds that invest money. Money that is invested sustainably causes less environmental damage (and can also be fiscally advantageous). In 2021, the European Commission issued a European Regulation regarding the disclosure of information about sustainability in the financial sector: the Sustainable Finance Disclosure Regulation (SFDR). The SFDR applies to all financial market participants, including banks, investment firms, and pension funds. View more information about sustainable investing and the SFDR classification here.

Sustainable Bank

To provide insight into how banks handle money, Oxfam Novib and organizations such as Friends of the Earth Netherlands initiated the Fair Bank Guide, a part of the Fair Money Guide. The Fair Bank Guide shows the assessment of a bank on aspects such as animal welfare, climate change, and human rights. Choose a sustainable bank. Switching banks takes time (not a quick win), but it can result in significant CO2 savings. View the 7-step plan for switching to a sustainable bank.

Pension Funds

Pension funds must also comply with the SFDR rules and indicate the extent to which the pension schemes are sustainable. Sustainable investors can use the Environmental, Social, and Governance (ESG) score for their choices. The ESG score is a measure of how sustainably and responsibly a company operates. ESG investing explicitly considers the impact of business operations on the environment, people, and society, alongside financial returns.

The pension funds PMA, SPOA, PFZW, and ABP provide information about their investments and ESG policies on their websites. Participants in a pension fund are represented by an accountability body. This accountability body ensures that the board represents the interests of all participants in a balanced manner. It has an advisory role towards the board on various subjects. In the new pension legislation (2023), this accountability body will also have advisory rights in the field of ESG.

A participant in a pension fund can provide feedback on the investment policy, either solicited (via a survey) or unsolicited; for example, a survey by SPOA revealed that a large part of SPOA participants no longer want investments in fossil fuels, and the fund will reduce these investments in the coming years.

4 Sustainable healthcare

Pharmacists contribute to sustainable healthcare by preventing the wastage of medications and by advising prescribers, where possible, to choose the least environmentally harmful medications, and by jointly establishing this in policy.

Preventing waste

The pharmacist is committed to minimizing the environmental impact of activities under their responsibility (Professional Code). Preventing the use of care through prevention and focusing on appropriate care yields the most environmental benefits: there is no (unnecessary) treatment, which saves on materials, energy, and travel to the care provider; this results in reduced medication use, less waste, and lower CO2 emissions.

When medications are needed, efforts should be made to ensure that dispensed medications are used (fully) as much as possible. Whereas earlier programs focused mainly on reducing healthcare costs, there is now a clear emphasis on reducing environmental impact. Care aimed at prevention (lifestyle), proper use of medication, and appropriate quantities of medication can reduce waste.
Pharmacists play an important role in preventing medication waste by making agreements on appropriate prescribing, dispensing properly, and promoting good use.
As part of the Green Deal, medication waste is being mapped in hospitals, institutions (including long-term care and mental health care), and public pharmacies. The Green Deal is a Dutch government initiative, launched in 2011, that supports the execution of innovative sustainable projects. It focuses on various sectors, including energy, climate, water, resources, biodiversity, mobility, biobased economy, construction, and food. In relation to the distribution model, the causes of this waste are being identified. Successful initiatives to combat medication waste are being inventoried, shared, and their implementation is being facilitated.

→ Check out the inspiration guide 'Verspil geen Pil' (Don't Waste a Pill) for a comprehensive overview of all the players and their roles in combating waste.

Appropriate prescribing

Pharmacists and prescribers can make agreements within the context of a therapeutic drug committee (T(T)DC) about the formulary and quantities to be dispensed, for example, dispensing for a shorter period near the end of life, for scheduled hospital appointments, or for acute pain. Regional agreements can also be made among all involved healthcare providers.
By tailoring medication as closely as possible to the individual patient, waste resulting from premature discontinuation or switching of medications is reduced. If medication dosage needs to be adjusted, consider whether the current medication can be split (or doubled) rather than prescribing a new dose.
Be critical when implementing changes in a multi-dose drug dispensing system (MDD): make agreements with prescribers to implement changes in the medication roll as much as possible at the start of a new roll. Also, make agreements with hospitals and institutions about communication regarding admissions, to stop the medication roll upon admission and restart it upon discharge.

Sometimes, medication is no longer needed. A medication review aims to optimize pharmacological treatment; this can lead to the reduction or discontinuation of drugs in patients, thus contributing to reducing environmental impact and waste. The STOP-START-NL criteria can help identify potentially inappropriate medications in the elderly. In the Informatorium Medicamentorum (IM), a subcategory 'Tapering and Discontinuation' is included under the 'Dosage' section for certain drug groups.
A medication review also contributes to the proper use of medications that a patient continues to take: adherence improves, leading to more sustainable medication use. However, medication reviews often fall under the patient's deductible. For financial reasons, patients may forgo care that could support the appropriate and proper use of medications.

Appropriate dispensing

NHL Stenden University of Applied Sciences conducted research on how citizens handle unused medications. The research report "Quantitative Behavioral Research on Unused Medications" shows that a majority of respondents had unused medications in the past two years.
The main reasons for having leftover medications were: stopping the medication (no longer needed, too much/too long prescribed, switched to another medication, side effects) and expiration dates. This argues for dispensing an appropriate amount of medication.
When assessing the appropriate amount, the pharmacist follows the agreements described in the Prescription Regulation that parties (ZN, FMS, LHV, NHG, NVZA, KNMP, VPTZ, Patients' Federation Netherlands, and V&VN) collectively made about prescribing and dispensing medications.

→ **Check the KNMP Guideline on Dispensing**

Regulation Dispensing for 12 months is discouraged. Practical experience shows that this leads to a lot of waste. Appropriate dispensing can be hindered in practice by the packaging size of the designated preferred medication: in many cases, too few small packages are designated as preferred to be dispensed according to the prescription regulation.

When prescribing and dispensing, consideration is given to the possibility that the patient's prescription may need to be changed over time. Consider a planned appointment or hospital admission that could change the treatment, or a patient in the terminal or palliative phase; intensive support, for example by a Pharmabuddy, leads to less waste by tailoring care to the patient.
Also, consider the inclusion of medication in the repeat service; only include medication if you expect that the medication (dosage) will not be changed quickly. And regularly evaluate whether there is a stockpile at home and postpone the repeat service if necessary.

Examples of successful initiatives for appropriate prescribing and dispensing:

Efficient Prescribing Agreements – Asten Pharmacy

With agreements established in the Electronic Prescription System (EVS), the patient receives the agreed medication and no more than the necessary amount. The result is 20% fewer medications dispensed and less medication residue in surface water. Click here for more information. For its efficient and patient-oriented care, this pharmacy has a special contract with health insurer CZ.

Appropriate Use of Opioids

- Sensible Opioid Prescribing - Cooperative Pharmacists Association Arnhem (CAA). Through interdisciplinary collaboration between general practitioners, specialists, pharmacists, and addiction care, the number of initial prescriptions of short-acting oxycodone has been significantly reduced.
- Tapering Opioids - The guideline contains points of attention for the guidance and tapering schedules for patients who want to reduce opioid use when there is inappropriate opioid use.

Tapering Sleep Medication – Orion Pharmacy

The "Benzomoe" project aims to make the use of sleep medication a topic of discussion and provide support for sleep and tapering off sleep medication.

Stopping Contraceptives

> 52 years From the age of 52, the advice is to stop taking the contraceptive pill due to increased risks and because many women are already in menopause. This is included in an MFB (National Set of MFBs, MFB 26. Hormonal Contraception > 52 years).

Limited Medication Dispensing in Relation to Possible Hospital Discharge – St. Jansdal Hospital Pharmacy in Harderwijk When dispensing medication, the possible discharge of clinical patients with the 'Provisional Discharge Date' is taken into account.

Continued Use of Home Medication (DGTM) in the Hospital (see paragraph on purchasing and inventory), if possible, in combination with medication in self-management (MIEB) leads to less waste and a more efficient care process.

Practical tip: In consultation with the prescriber, set an evaluation or end date for the medication.

Proper use of medicines

Improper use of medication is a form of waste. Various underlying causes may contribute to a patient being consciously or unconsciously non-compliant with therapy. Proper use starts with tailored support from the beginning of medication therapy. In the pilot projects of the Make-It consortium, proven adherence interventions such as telephone start-up support, annual consultations, and the refill reminder method are being implemented.

Based on dispensing data, pharmacies can identify patients (e.g., using the SFK adherence report) who may not be using their medications optimally and who require attention.

Increasing patient awareness about sustainable medication use is crucial as it has a direct impact on reducing medication waste and promoting sustainability in healthcare.

Practical tip: Instruct the patient to wipe their hands (with a tissue, disposing of it in the general waste) after applying creams or ointments, before washing their hands. This reduces the amount that goes directly into the wastewater.

Redispensing

Under current European legislation (see Berenschot report, page 21), returned medications must be destroyed for reasons of quality and safety. The Falsified Medicines Directive (FMD) with its unique coding and deactivation also prevents any re-dispensing. The Dutch Healthcare and Youth Inspectorate (IGJ) maintains that re-dispensing of previously provided medications is not permitted under current legislation.
In response to the petition 'Save Lives, Do Not Destroy Usable Medicines' (2023), the Minister of Health, Welfare and Sport (VWS) indicated in a letter to Parliament that he wants to work with pharmacists to combat medication waste and has promised to seek support in Europe for amending this European regulation. The Minister has also granted permission to extend the research into the re-dispensing of oral oncology drugs: to investigate whether re-dispensing is safe and feasible and what cost savings it may yield, Radboudumc has conducted research on the re-dispensing of (expensive) oral oncology drugs to a patient.

The research has received pilot status with the agreement that during the study period, the IGJ will not need to enforce. In addition to Radboudumc, UMC Utrecht, Sint Antonius Hospital, and Jeroen Bosch Hospital also participated in this research. Results indicate that this approach saves costs and reduces waste. The study has now been expanded to include 10 additional hospitals.
Based on this research, the NVZA developed a Position Paper on the Re-dispensing of Oral Oncology Drugs in 2023. It is intended to incorporate this position into the forthcoming Guidelines for Sustainable Pharmaceutical Specialist Care of the NVZA.
Further research results and European regulatory support are awaited for exploring the opportunities and necessary conditions for the re-dispensing of (inexpensive) medication in primary care.

Medication choice

When prescribing medication, the least environmentally harmful option is chosen whenever possible, provided it offers effective treatment for the patient and is well-researched. An article in the Dutch Journal of Medicine (NTvG) on reducing the environmental impact of medication discusses various ways to prescribe with environmental awareness, such as opting for oral administration instead of intravenous administration.

Choice of Inhalers

A commonly cited example is the prescribing of dry powder inhalers instead of metered-dose inhalers to patients for whom it is safe (initial prescription, age ≥ 7 years, adequate inhalation strength, sufficient hand-mouth coordination). While this choice significantly reduces the emission of harmful greenhouse gases, dry powder inhalers may be less favorable in other environmental aspects compared to metered-dose inhalers (e.g., toxicity, resource use, waste). The consideration should account for the total environmental impact over the entire product lifecycle.

NHG guidelines already include some information on environmental impact (e.g., NHG guideline on Menopause) and some guidelines also consider environmental aspects in their recommendations (e.g., NHG guidelines on Anemia and Asthma). The Farmacotherapeutisch Kompas incorporates this environmental information.

Abroad

Particularly in Scandinavian countries, there has been a longer focus on the environmental impact of medications. In Sweden, Fass (Farmaceutiska Specialiteter i Sverige) collects drug information, including, if available, information about the environmental impact of a medication. Classification considers environmental hazards (e.g., persistence) and environmental risk. This information is used to make recommendations on whether or not to include a drug in the Wise List, a formulary in the Stockholm region. For the Dutch context, this information is not readily applicable. The environmental impact of the production process is also not included, resulting in an incomplete picture of the environmental impact.

In Sweden, a label has also been introduced for OTC products (Valvald: 'well-chosen'), indicating that an OTC product is responsibly produced. Criteria have been developed to obtain this label and logo for an OTC product.

Official product information (SmPCs) sometimes provides brief environmental information, but this information is often incomplete. A collaboration between pharmaceutical companies, universities, research institutes, The National Institute for Public Health and the Environment (RIVM), and the European Medicines Agency is working on a database (Premier, Prioritisation and Risk Evaluation of Medicines in the Environment) that will provide information from environmental risk assessments.

The RIVM has investigated the risks of drug residues from over-the-counter painkillers in surface water. Environmental effects depend on the amount used, the behavior of the substance in the environment, and its harmfulness. In particular, the use of NSAIDs in gels was found to be the most harmful. It should also be noted that for most medications, data on the total environmental impact are still lacking to make a proper comparison and informed choice for the least environmentally harmful option. Not only the environmental impact of the product during use but also the consequences of production, transport, and waste must be considered.

In choosing medication, the patient plays the most important role. An exploratory study by Nivel found that 40% would choose a more environmentally friendly treatment, provided that the care they receive is of high quality. More than half (over 57%) of people with a chronic illness or physical disability prefer care that is best for themselves, even if it is not environmentally friendly.

Research by the Patient Federation indicates that about 60% of respondents would consider sustainability in treatment choices, but this should not come at the expense of the quality of and access to care.

Health insurer and sustainability

Zorgverzekeraars Nederland (ZN) and individual health insurers have signed the GDDZ 3.0 and are committed to the sustainability of their healthcare procurement practices.
For instance, health insurer VGZ has announced plans to engage with suppliers of preferred medications about making the production of medicines more sustainable and to request sustainability declarations that clarify the origin of the medications. They are also discussing sustainability with healthcare providers.

Starting in 2025, health insurers will need to comply with the CSRD directive, which requires them to report on the impact of their activities on people and the environment, and they will need data from their entire supply chain, including from healthcare providers.

For more information on sustainability in the ZN vision and healthcare procurement policy, see the relevant sections.

→ **Check information about sustainability in the ZN vision and the healthcare procurement policy.**

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