

GUIDELINES AND BEST PRACTICES

IMPLEMENTING CIRCULAR
MANAGEMENT MODELS IN HEALTHCARE

CAPACITY BUILDING AMONG
HEALTHCARE WORKERS

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INTRODUCTION

Circle Health is a cross-sectorial and bilateral alliance of actors in Sweden in Poland supported by the Erasmus+ Programme for education, youth, and sport. The project contributes to the sustainable transformation of healthcare sectors by increasing the green skills of non-medical staff through providing the systematization of practices and tools that will be accessible material in complex issues such as circular management models in healthcare.

The project has the objective of a more effective engagement of healthcare workers in the sustainable transformation of healthcare while improving their employability and green skills. The urgency of such a project is due to the pressure on the healthcare sector to transform into a more sustainable one. This is not limited to the materiality and value chains related to the sector, but also to how healthcare is provided, and the work related to its provision.

The staff and workers find themselves in a situation where they must increase their skills related to green jobs as the climate crisis and digitalization can be accounted as the main driving forces that influence the definition of the future of work.

To address this challenge, the **Nordic Center for Sustainable Healthcare** (NCSH) partnered with the **Association of Non-**

Medical Healthcare Managers (SNKOZ). The consortium represents two networks with high impact and experience to achieve the objectives of the project. The NCSH is a cross-sectorial global network that implements training and develops specialized material about sustainable healthcare. The SNKOZ in Poland provides an impressive network that will contribute to achieving the above-mentioned goal with the maximum impact by including hospitals and healthcare workers in Poland.

Circle Health uses the learnings and practices collected not only in these two countries (Poland and Sweden) and provides material that will help to adjust to the demands of the sector, and at the same time, will contribute from daily activities to the acceleration of sustainable transformations within healthcare.

There are two main products of this project, which are parts of this document. The first Guidelines, that will systematize in practical steps within some of the most challenging practical areas within healthcare facilities. The second one is the Catalogue of best practices. It compiles the existing models and daily practices that could contribute to the improvement of the green skills of the healthcare workers.

The texts in English and Polish differ slightly, as they were adapted to meet the needs of target audiences.

1. GUIDELINES FOR HEALTHCARE WORKERS



The project contributes to the acceleration of sustainable practices by strengthening the green skills of healthcare workers. As mentioned in the introduction, Circle Health has developed a **Catalogue of Best Practices** that gives a framework for circular economy and circular management models, as well as real-life practices that are in place in hospitals in Sweden and Poland. That material is preceded with these guidelines on specific topics, providing practical steps to take actions that from daily life activities could impact the advance of circular management models.

The objective of both complementary materials and the project is to collect different pieces that can constitute a basic syllabus for healthcare workers. Green skills appear to be one of the ways that vocational and technical education could not only improve efficiency and mitigate the impact on the environment but also maintain and increase employability, as climate crisis and digitalization can be accounted as the main driving forces that

influence the definition of the future of work.

The guidelines are meant to provide practical steps that can be used by every healthcare worker by incorporating the learnings that are more suitable for their area of responsibility. The circular models, as they are circular, are difficult to present in sequential steps as they must be read from a systemic perspective. It is possible to consider previous steps related to awareness, planning and tools, as well as a regular step on revision and permanent improvement. They all constitute a way of thinking/strategy about how one can turn his/her environment to be more sustainable.

In this sense, there are elements that should be part of each of the topics of the Guidelines and that is:

- The **importance** of having **accessible information**
- The **existence** of internal **manuals and protocols**
- A **continuous revision** and update
- And **cross-sectoral collaborations**



1.1. What Circular Management Models really are?

The presented concept is derived from the **circular economy**,

a model of production and consumption that strives to maintain the usability of existing materials and manufactured products as long as possible through sharing, leasing, reusing, repairing, and refurbishing.

In the case of the healthcare sector, this will have the particularity of engaging with different areas and processes that are not limited to the use and disposal of products, but also to practices, behaviour and management models that change and adapt according to the specific healthcare facilities (hospital, clinic, surgery speciality, laboratory, and others). A circular approach reduces the lifecycle impacts of products, curbs climate emissions, and minimises the use of harmful chemicals in healthcare.

- **Collaboration:** Circular management encourages collaboration and active participation of all actors involved in healthcare delivery. It promotes teamwork, interdisciplinary communication, and the exchange of knowledge and ideas.
- **Shared decision-making:** Instead of top-down decision-making, circular management promotes shared decision-making processes where all stakeholders have a voice. It values diverse perspectives and seeks consensus in decision-making to ensure the best outcomes for patients and the healthcare organization. It also “forces” seeing one problem from different perspectives, which allows for considering different ways to solve the problem and gives a chance for innovation and out-of-the-box thinking about ways of solving it.
- **Continuous learning and improvement:** Circular management emphasizes a culture of continuous learning and improvement. It encourages feedback, reflection, and the use of data and evidence to drive decision-making and improve the quality of care.

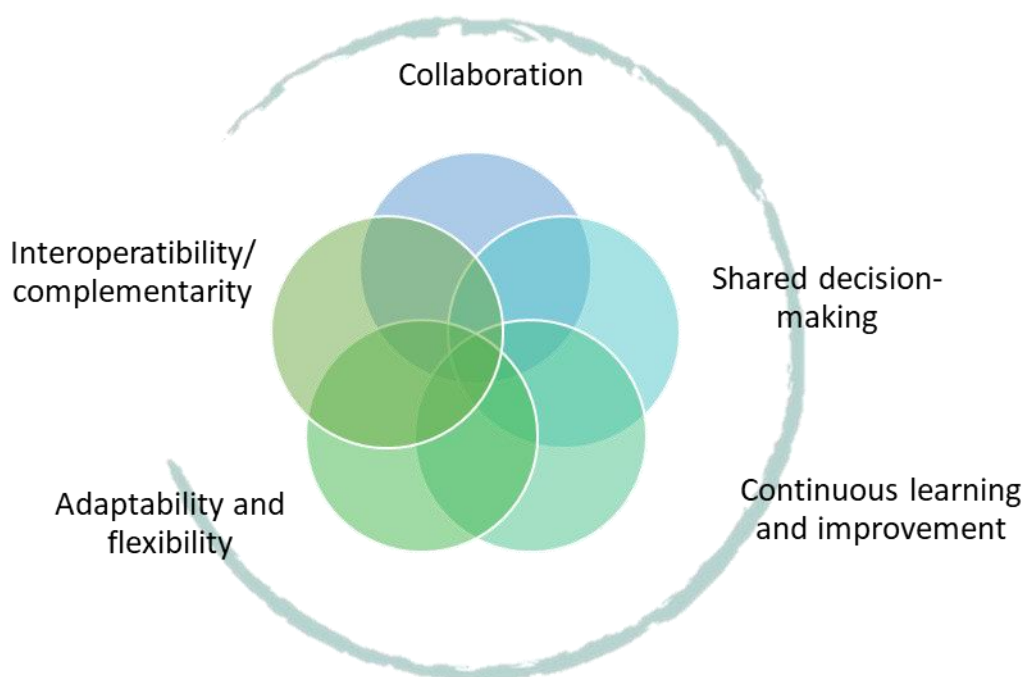
The concept of Circular management models refers to a specific approach to management that emphasizes collaboration, shared decision-making, and a holistic perspective in healthcare organizations. It is based on the principles of circular economy, which focuses on minimizing waste, maximizing resource efficiency, and promoting sustainability.

Circular management models relate to reducing the environmental impacts of the healthcare sector without affecting the provision of healthcare services to the patient.

To implement these kinds of models is necessary to keep in mind the **Key principles for Circular Management Models** presented in the figure below (the next page) which includes:

- **Adaptability and flexibility:** Circular management recognizes the complex and dynamic nature of healthcare. It promotes adaptability and flexibility in response to changes in healthcare systems, patient needs, and technological advancements.
- **Interoperability/complementarity:** The different areas and topics cannot be considered from an individual perspective. The systemic perspective recognizes the interdependence and interoperability of the different parts of a healthcare facility and should be considered by the staff. One of the best examples of such an approach can be seen in the “Pharmaceuticals” section below. It’s not “just drugs”. Topics like energy, procurement or logistic are on one hand topics covered in this document separately. On the other – they constitute a high proportion of issues that need to be covered when one thinks about circular approach to pharmaceutical management.

Figure 1. Principles for Circular Management Models



1.2. How can one benefit from adopting circular management models?

The healthcare sector represents a complex system where many stakeholders, functions and responsibilities interlink. The technological advances, especially regarding the environmental impact of the sector, as well as the interconnectivity with other sectors, represent an extra load in the number of activities and topics that the non-medical staff should know about. At the same time, skilled and informed healthcare staff, who are empowered are key to addressing environmental challenges.

As healthcare worker, Circular management models are an opportunity for you to increase your knowledge and abilities, and create more possibilities to improve your performance, impact, and your employability.

There are several topics in which healthcare facilities could develop the concept of circular management. This includes, though is not limited to:

- Waste management
- Energy efficiency
- Food systems
- Maintenance
- Cleaning
- Transport and logistics
- Procurement
- Water use

All of them are interrelated and complementary, so there are no clear borders among the areas.

In the following pages, we describe the solutions, which may already be of use by some healthcare units. We decided to keep them as they are presented now, to provide the reader with a systematic overview of the tools to be used. So, if you already use the solution described, that is good news. Try to adapt to other ones now.

1.3.WASTE MANAGEMENT



Waste management could be considered as the pillar of the circular models. The circular economy concept is about using less and making better use of the resources. Hospitals face various waste management challenges due to the nature of their operations and the diverse types of waste generated. In the Figure 2 you can find the basic types of waste generated within healthcare.

Figure 2 Waste in healthcare	
Medical Waste	Hospitals generate a significant amount of medical waste, which includes items contaminated with potentially infectious materials, such as used needles, syringes, dressings, gloves, and biological waste. Proper segregation, handling, treatment, and disposal of medical waste are crucial to prevent the spread of infections and protect public health.
Pharmaceutical Waste	Pharmaceutical waste, including expired medications, unused drugs, and hazardous pharmaceuticals, presents challenges for hospitals. Proper disposal of pharmaceutical waste is essential to prevent environmental contamination and the unintended exposure of people or wildlife to potentially harmful substances.
Hazardous Waste	Hospitals produce hazardous waste, including chemical substances, solvents, disinfectants, and laboratory chemicals. Disposal of hazardous waste must adhere to strict regulations and protocols to ensure the safety of staff, patients, and the environment.
Non-Hazardous Solid Waste	Non-hazardous solid waste, such as packaging materials, food waste, paper, plastic, and other general waste, is generated in significant quantities in hospitals. Proper waste management practices, including recycling, composting, and waste reduction initiatives, can help minimize the volume of solid waste sent to landfills.
Electronic Waste	Hospitals rely heavily and will rely even more on medical equipment, computers, and other electronic devices. As technology advances, the disposal of obsolete or non-functional electronic equipment, known as electronic waste or e-waste, becomes a fast-growing concern. E-waste contains hazardous materials and requires appropriate recycling or disposal methods to prevent environmental pollution and recover valuable resources. It also contains a lot of minerals, some of them scarce, that can and should be recycled.
Energy and Resource Waste	Operating 24/7, hospitals consume significant amounts of energy and resources, such as electricity, water, and materials. Inefficient energy management, excessive water usage, and wasteful procurement practices can contribute to unnecessary waste and increased environmental impact. Implementing energy-efficient systems, water conservation measures, and sustainable procurement practices can help mitigate these issues
Source: WHO, available in https://www.who.int/news-room/fact-sheets/detail/health-care-waste	

There are several ways in which circular management models can make hospitals to improve waste management, and the average worker can play a significant role in contributing to these efforts.

Circular Management Models can facilitate concrete ideas in which the healthcare workers can play a fundamental role, at the time they engage in the topics and improve their own skills. Two very concrete and easy to implement are:

- **Recycling programmes:** As has been mentioned, Hospitals generate a lot of waste, including medical waste, food waste, and packaging waste. Usually, it is possible to have disposing systems to facilitate waste management. It is not the case this could be an initiative that will require a wide participation from the staff, as well as be a space for sharing the responsibilities and learning among staff and the areas of the Hospital.
- **Plan to Reduce unnecessary waste:** It is possible with smart solutions such as using reusable cups and plates instead of disposable ones and ordering products in packaging that can be minimized.

You can contribute by bringing reusable water bottles, coffee mugs, and lunch boxes instead of using disposable items.

There are other themes that requires more coordination and knowledge sharing between the areas within a hospital, such as the case of the reuse and reprocessing of medical devices. This implies the collection in a safe manner, with clear roles, disposal places and instructions. Followed by a sorting and labelling process. The process includes cleaning and disinfection, up to the high-level sterilization and then reprocessing to be returned to the hospital for its use.

Another complex topic that would benefit from a circular management approach is the infectious waste management. In this case, it is waste that cannot be reused, but depending on the risk, it can be used for other purposes such as energy generation. This includes mainly pharmaceutical waste, cytostatic and other pharmaceuticals with permanent toxic effects, low-radioactivity waste, cutting/sharp/infectious waste, biological waste (can also be infectious), animals and parts of humans.



1.4.ENERGY

Healthcare facilities require a permanent supply of energy, not only to maintain illumination and power equipment but also in the form of heating/cooling systems. This has multiple effects, such as higher emissions, and costs for the providers of the services.

The role of the healthcare workers is multiples, as are the main users of the energy systems. From the perspective of **circular management models**, energy efficiency is a collaborative effort between all the areas of the facility.

A concrete activity is to set an energy efficiency strategy with the participation of all the members of the staff, following the principles of representativity and shared decision making. This can include aspects such as the daily practices to increase energy efficiency in your healthcare facility, such as turning off lights and electronics when not in use, or maximising the use of windows and insulation, this is always an efficient way to save energy. To these can be added the strategies of waste management that can facilitate the use of some of the waste for the generation of energy.

A hospital is a 24/7 operation and therefore always requires sufficient lighting arrangements. This is also why it is important to have energy efficient lighting solutions, with a long-life cycle and low maintenance cost. Lighting arrangements in hospitals and other healthcare buildings can save energy, create a better working environment, and provide an optimal colour reproduction, which is important in a setting where operations and medical examinations take place, and even have several health benefits for the patients.

One of the tools that can be used is to share the information and increase the knowledge among all the areas about energy certification. Energy efficiency starts with the compliance with regulations. In case that there are no regulations strong enough, it is always possible to use specific certifications that can be prove that the hospital has the best standards regarding energy efficiency.

Some of these certifications start with the certified building. There are some methodologies and methods which can be used such as the Total method Belok, developed by the Chalmers Industriteknik (CIT) in Sweden (The method can be view at <https://belok.se/>).



1.5. FOOD SYSTEMS

The food is key in achieving better health for staff and patients. The food system within a hospital is a major topic in the daily practices with multiple impacts for environment and for the quality of the health care provision. The impact of this area starts from the moment that the menu is designed, looking for a balanced diet. The topic also involves the procurement phase, the delivery of food to the patient and the waste disposal once are served.

The engagement of the healthcare workers is fundamental, more in the case that the facility has the service of kitchen also for the staff. In these cases, the circular management models can be achieved from the moment of the design of the menu which can follow seasonal characteristics of the area where the hospital is placed, to reinforce the demand for local food, reducing the impacts regarding energy and transport. Healthier, locally produced ingredients can have major impact in the wellbeing of staff and patients, as well as have an impact in the reduction of emissions.

Healthcare workers can increase their sustainability skills by small changes as part of daily practices. One of the most effective is to plan meals and orders carefully to avoid over-ordering or over-preparing food. This includes using first-in, first-out (FIFO) rotation to ensure that older food items are used before newer ones. Once the food has been served, the next step is the disposal and waste management. In that case hospitals can improve waste management by implementing composting programmes and encouraging staff to compost their food waste. If this is in place, you can contribute to it by disposing of food waste in composting bins. By this strategy circular management models can be reinforced and contribute to the generation of skills that then can be shared to other sectors.



1.6. MAINTENANCE

Circular management models are based on the possibility to reduce at maximum the use of resources and to reuse at maximum of the possibilities the material resources used in a process. In this sense, the maintenance and to maximize the life span of machines and installations became a crucial aspect in terms of strengthening circular management models and the engagement of healthcare workers.

Proactive and timely maintenance in a hospital is essential for providing a safe, comfortable, and efficient environment for patients, healthcare professionals, and all other staff. By ensuring the proper functioning and upkeep of the hospital's infrastructure and equipment, maintenance activities contribute to the overall quality of care and support smooth hospital operations.

Maintenance in a hospital encompasses a wide range of activities aimed at ensuring the proper functioning, safety, and upkeep of the hospital's infrastructure, facilities, and equipment. It involves both preventive and corrective measures to maintain a suitable environment for patient care, staff productivity, and operational efficiency.

Here are some key areas of maintenance in a hospital that can be part of a circular management model with a broad participation of the staff.

- **Building Maintenance:** This includes the upkeep of the hospital's physical structure, including the building exterior, roofing, walls, windows, doors, flooring, and plumbing systems. It involves regular inspections, repairs, and maintenance of the building's infrastructure to ensure a safe and comfortable environment for patients, staff, and visitors.
- **Electrical Systems:** Hospital maintenance includes the maintenance of electrical systems, such as lighting, power distribution, emergency backup systems, and electrical equipment. This involves periodic inspections, testing, and maintenance of electrical components to ensure reliable and safe operation and compliance with electrical safety standards.
- **HVAC Systems:** The maintenance of heating, ventilation, and air conditioning (HVAC) systems is crucial for maintaining proper temperature, humidity, and air quality within the hospital. Regular servicing, filter replacements, duct cleaning, and calibration of HVAC equipment are essential to provide a comfortable and healthy environment for patients and staff.
- **Medical Equipment:** Hospitals rely on a vast array of medical equipment for patient care, diagnosis, and treatment. Maintenance of medical equipment involves regular inspections, calibration, preventive maintenance, and repairs to ensure their accurate functioning, reliability, and compliance with safety standards.
- **Plumbing and Water Systems:** Maintaining clean and functional plumbing and water systems is vital for infection control and patient safety. This involves routine inspections, maintenance of pipes, fixtures, and water supply systems, and the implementation of water management programmes to prevent contamination, ensure water quality, and prevent the spread of waterborne diseases.
- **Fire Safety Systems:** Hospitals have stringent fire safety requirements to protect patients, staff, and assets. Maintenance of fire safety systems involves inspections, testing, and maintenance of fire alarm systems, sprinklers, fire extinguishers, emergency lighting, and other fire suppression equipment to ensure their readiness and compliance with fire safety codes.
- **Grounds and Landscaping:** Hospital grounds and outdoor areas require regular maintenance, including landscaping, lawn care, tree maintenance, snow removal, and maintaining pedestrian walkways and parking lots. A well-maintained exterior enhances not only the overall aesthetic appeal, but also safety, and accessibility of the hospital.
- **General Facility Upkeep:** This includes day-to-day maintenance tasks like painting, repairs, carpentry work, pest control, housekeeping, waste management, and general upkeep of common areas, corridors, waiting rooms, and restrooms. Equipment maintenance and repair: By ensuring that equipment is regularly maintained and repaired, maintenance staff

can extend the life of the equipment and reduce the need for replacement, which helps to reduce waste and conserve resources.



1.7.CLEANING

The process of cleaning the equipment, and installations is part of the safety of the patient and the staff. This process correctly implemented prevent from the expansion of diseases or the presence of contagious bacteria or viruses, the so-called Healthcare associated infections. At the same time, from the sustainability point of view, and using a circular management system, the cleaning will allow to extend life span of the facilities and can have an impact in the use of water, as well as the impact on water bodies.

The decision regarding cleaning can have an impact also in the generation of toxic waste into water streams if are chosen harmful substances, that could be effective for the elimination of bacteria and viruses of surfaces but also damage the local environment and ecosystems health by affecting natural processes.

The cleaning procedures includes the use of cleaning and disinfectant products, the cleaning equipment, and the personal protective equipment for the cleaning staff.

The cleaning is strongly related with selection of materials, furniture, and surfaces, such as floors, to avoid hard-to-clean features, or materials that hold moisture and that could facilitate the persistence of microbial growth.

A circular management model can engage healthcare workers in plans for:

Efficient use of cleaning products: This means have clear guidance and common information to ensure the use of cleaning products according to instructions and avoid overuse, which can result in waste and unnecessary expenses.

Green cleaning practices: Maintenance staff can use environmentally friendly cleaning products, promote the use of microfiber mops and cloths, and use equipment that conserves water and energy during cleaning.

Practical recommendations that can be included in cleaning procedures from circular management within a hospital are:

1. **Reduce water consumption:** Turn off taps when not in use and avoid leaving them running unnecessarily. Use the system to automatically close the water flow if water is not being used wherever possible. Use mops and cloths instead of hoses or sprays when cleaning, as this reduces water consumption.
2. **Waste management:** Make sure that waste is sorted and disposed of correctly. Follow hospital guidelines for the disposal of hazardous waste, and separate recyclable materials from non-recyclable waste.

3. Energy conservation: Switch off lights and other equipment when not in use, introduce a system switching it automatically, when the light is not needed, and report any equipment that is malfunctioning or using excessive energy to hospital maintenance staff.
4. Reuse and recycle: Look for opportunities to reuse or recycle items that are normally discarded. For example, you could reuse plastic bags, cardboard boxes, or old cleaning cloths.

At the same time, circular management models include organizational elements as well as training procedures for the engagement of all staff areas into an effective and less damaging cleaning process, as well as monitoring, feedback, and audit procedures.



1.8. TRANSPORT AND LOGISTICS

The transport and logistics behind the functioning of a healthcare facility can have big impacts regarding sustainability. All the items, food, and others are transported to the healthcare facility and imply several impacts that can be considered from the point of view of circular management models. These include not only the transport of medicines, equipment and/or patients, this also the personal transport of the personal.

According to the WHO (2021), sustainable transport systems can protect and promote health, by reducing risks from vehicular air pollution, physical inactivity, and traffic injuries, and by providing climate and environmental benefits for urban areas.

From a circular management model approach this could be supported by engaging healthcare workers in discussing and planning practices that could lead to the reduction of unnecessary journeys and the support of healthy methods such as walking or cycling. This includes a permanent consultation with the personnel to evaluate the realism of these choices, as well as the participation in bigger agendas with local authorities or representatives to support the development of infrastructure around the healthcare facilities that facilitates this shift.

At the same time, should be discussed the possibilities and implications for the electrification of official vehicles including ambulances and delivery trucks with the less environmental impact possible.

Topics that can included in a circular management model planning for transport and logistics
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- | |
|---|
| <ul style="list-style-type: none"> • How to choose the best transport system for the hospital? electric – hybrid – biogas • How to improve our transport means in a sustainable way? • It is possible to include other technologies such as drones or ehealth for reducing the use of transport? |
|---|



1.9. PHARMACEUTICALS

The hospitals are key point sources for specialised pharmaceutical residues entering the environment, a serious source of pollution that can threaten ecosystems and the environment, as well as drive the development of antimicrobial resistance (AMR) a serious public health threat.

The management of pharmaceuticals involve the participation of all members of the staff. The most important is to have updated and complete information about the substances with more impact to the environment. One concrete action that can be taken as part of a circular management model could be the design of models for recovery of non-used medicines for being redistributed to other healthcare facilities.

The engagement of healthcare workers is very important as Hospitals are considered as key point-sources for specialised pharmaceuticals, such as cytostatic drugs, some antibiotics, and X-ray contrast media, which typically hold a much higher environmental risk for aquatic ecosystems. There is no easy fix to the complex problem of pharmaceutical residues in hospital wastewater, but alongside or as an alternative to point-source treatment, there are many actions that hospitals can take to significantly reduce the number of high-risk pharmaceuticals and metabolites entering aquatic ecosystems.

But hospitals can significantly reduce the environmental impact of their pharmaceutical practices and promote sustainability while maintaining high standards of patient care and safety. Additionally, hospitals can serve as role models for other healthcare facilities and contribute to the broader movement toward eco-friendly healthcare practices.

Hospitals can work more sustainably when it comes to pharmaceuticals by implementing environmentally responsible practices and making informed choices in medication management.

Topics that can included in a circular management model planning for handling pharmaceuticals:

- Medication Procurement: How can we influence and know more of the medication procurement process.
- Inventory Management: Jointly implement efficient inventory management systems to minimize overstock and expired medications, which can lead to unnecessary waste.
- Medication Disposal: Proper Disposal: Establish safe and environmentally responsible disposal practices for expired or unused medications. Avoid flushing pharmaceuticals down the drain or disposing of them in the trash, as this can contaminate water sources.
- Hazardous Waste Disposal: Properly manage hazardous pharmaceutical waste to ensure it is disposed of safely and in accordance with environmental regulations.
- Medication Packaging: Hospitals can advocate for the pharmaceutical industry to reduce the amount of packaging material used and to make packaging more recyclable or reusable.

- **Staff Training:** Educate healthcare staff about the importance of sustainable pharmaceutical practices, including proper disposal and administration techniques.
- **Interdisciplinary Collaboration:** Foster collaboration between healthcare providers, pharmacists, and environmental specialists to address sustainability concerns in medication management.
- **Regulatory Compliance Study group:** Ensure that pharmaceutical practices adhere to all relevant environmental regulations and requirements.
- **Pharmaceutical Return Programmes:** Explore opportunities to return unused, unexpired medications to manufacturers or programmes that can redistribute them to individuals in need.



1.10. TEXTILES

Textiles play a critical role in healthcare ensuring the safety of patients and staff. Their use is along the facility including the so-called medical textiles which include protective clothing, hospital bedding, operating towels, bandages, artificial ligaments, and others. These groups should be added disposable products such as diapers and cleaning products and consider the combination with chemical substances to preserve some of the characteristics of the materials.

Textiles in healthcare	
Patient Bedding	Bed linens, including sheets, pillowcases, and blankets, are used in patient rooms. These textiles need to be comfortable, durable, and easily cleaned. Hospitals often use specialized, antimicrobial fabrics to minimize the risk of infection transmission.
Patient Gowns	Gowns worn by patients are typically made from textiles that are easy to don and doff, and they provide modesty and comfort. Infection control is a significant consideration when choosing these textiles.
Staff Uniforms	Healthcare professionals wear uniforms made from textiles designed for comfort, ease of movement, and infection control. Many healthcare facilities opt for scrubs made from breathable and moisture-wicking fabrics
Privacy Curtains	Privacy curtains in patient rooms and around beds are essential to provide privacy and separate patients. These curtains should also be durable and easily washable due to the risk of contamination.
Surgical Textiles	Surgical gowns, drapes, and sterile covers are used in operating rooms. These textiles are made from specialized materials that prevent contamination and maintain a sterile environment.
Medical Textiles	Bandages, wound dressings, and compression garments are made from specialized textiles designed to promote healing, prevent infections, and manage various medical conditions.

There are several textile materials used in healthcare, the most common being cotton, viscose, polyester, polypropylene, polyethylene, and elastomer, among many more. The choice of textiles and their maintenance are essential aspects of healthcare facility management.

Following the general principles of circular management models, a key component will be collaboration and knowledge sharing. This includes knowledge management on sustainable textile practices, including proper disposal, recycling, and the benefits of sustainable choices; and working with textile suppliers who prioritize sustainability and can provide eco-friendly options.

The role of the healthcare workers is key in several actions that contribute to a circular management model. Working with textiles in a sustainable manner within healthcare facilities is essential to minimize environmental impact, reduce costs, and ensure long-term viability.

Topics that can included in a circular management model planning for Textiles:
<p>Engagement of the staff for knowing the differences of textile materials regarding the prevention of holding of bacteria, the best and easy to clean, and in case of need to be wasted to have the less possible impacts, imply setting dialogues about topics such as:</p> <ul style="list-style-type: none"> • Minimize Packaging: Request suppliers to minimize packaging for delivered textiles, reducing the generation of waste. • Look for textiles with environmental certifications, such as OEKO-TEX Standard 100 or Global Organic Textile Standard (GOTS), which indicate compliance with certain sustainability and safety standards. • Regularly assess and report on the environmental impact of textile use in your facility. This information can help identify areas for improvement and track progress. • Consider the long-term cost savings that sustainable textile practices can offer. While some eco-friendly options may have a higher upfront cost, they often provide savings over time through reduced replacement and maintenance expenses. • Cleaning Textiles: Healthcare facilities require a significant amount of cleaning textiles, such as towels, mop heads, and cleaning cloths. These textiles should be durable and easy to sanitize. • Recycling – The correct disposal and information regarding the best way to ensure recycling and reuse of textile materials for different products. • Innovative materials – Create laboratories for innovation within the healthcare facilities for the use of new materials, without compromising the health of the patient and staff.



1.11. PROCUREMENT

Procurement refers to the process of obtaining goods, services, or works from external sources, typically through purchasing or acquisition, to meet the needs of an organization. It involves the identification of requirements, supplier selection, negotiation, purchasing, and contract management.

In a broader sense, procurement encompasses various activities such as market research, supplier relationship management, logistics coordination, quality control, and payment processing. The objective of procurement is to ensure that the organization acquires the right goods and services, of the desired quality, at the best possible price, and within the required timeframe.

Effective procurement practices involve strategic planning, analysing market conditions, assessing supplier capabilities, evaluating risks, and optimizing the overall procurement process. It plays a critical role in managing costs, mitigating supply chain risks, fostering supplier collaborations, and supporting organizational objectives.

The primary focus in healthcare procurement is on obtaining medical supplies, pharmaceuticals, medical equipment, and services required for patient care, diagnosis, treatment, and operational support. These can include medications, surgical instruments, imaging equipment, laboratory supplies, personal protective equipment (PPE), on one hand and goods and services like information systems, maintenance services, construction, catering and more on the other.

Due to the critical nature of healthcare, procurement in this industry often requires additional attention to factors such as quality control, regulatory compliance, patient safety, and ethical sourcing. Healthcare organizations must ensure that the products and services they procure meet stringent quality standards, adhere to applicable regulations and guidelines, and contribute to overall patient well-being.

Healthcare procurement may also involve unique challenges such as managing specialized suppliers, navigating complex supply chains, dealing with medical device regulations, addressing infection control measures, and considering the rapid advancements in medical technology.

Furthermore, healthcare procurement often requires close collaboration with various stakeholders including clinicians, nurses, administrators, and procurement professionals who work together to identify specific needs, evaluate suppliers, negotiate contracts, and ensure the availability of essential resources for patient care.

Some of the positive effects of an effective sustainable procurement strategy are:

- **Environmental Impact:** Healthcare organizations have a considerable environmental footprint due to their energy consumption, waste generation, and use of resources. Sustainable procurement practices can help reduce this impact by prioritizing

environmentally friendly products and services. For example, procuring energy-efficient medical equipment, opting for renewable energy sources, selecting eco-friendly cleaning supplies, and packaging as well as implementing waste management strategies can contribute to a greener healthcare system.

- **Reduction of Waste:** Healthcare facilities generate substantial amounts of waste, including medical waste, packaging materials, and single-use products. Sustainable procurement involves seeking alternatives that minimize waste generation and promote recycling or reuse. By procuring products with reduced packaging, and recyclable materials, or by adopting circular economy principles, being compliant with all hygiene regulation at the same time, hospitals can significantly reduce their waste output and promote a more sustainable waste management system.
- **Ethical Sourcing:** Sustainable procurement in healthcare needs to include ethical sourcing practices. This means considering the environmental and social impacts of the supply chain, avoiding suppliers engaged in unethical practices or human rights violations, and supporting fair trade initiatives. By selecting suppliers that adhere to ethical standards, healthcare organizations can contribute to positive social and environmental outcomes.
- **Improved Health Outcomes:** Sustainable procurement can directly impact patient health outcomes. By prioritizing the procurement of safe, high-quality, and sustainable medical products, healthcare organizations can enhance patient safety, reduce the risk of medical errors, and improve overall healthcare quality. For instance, procuring environmentally preferable products, such as non-toxic cleaning agents or low-emission materials, can reduce exposure to harmful chemicals and contribute to better patient and staff well-being.
- **Cost Savings:** Sustainable procurement practices can lead to long-term cost savings for healthcare organizations. By selecting energy-efficient equipment, reducing waste generation, and optimizing resource utilization, hospitals can achieve operational efficiencies and lower their energy and waste management costs. Moreover, sustainable procurement can help minimize potential financial and reputational risks associated with non-compliance with environmental regulations or unethical sourcing practices.

What can you do?

And here, the first question to ask is if the service or product to be procured is really required. This question should be answered first, looking into patient safety and then into the sustainability aspect from a systemic perspective (its role in the whole healthcare process), which includes the possibility to reuse or recycle it, and finally the economic argument.

- **Prioritize environmentally certified products:** Choose products that have been certified as environmentally friendly by third-party organizations, such as the Nordic Swan Ecolabel or the EU Ecolabel.
- **Choose products with a low carbon footprint:** Consider the carbon footprint of the products being purchased, including the raw materials used, transportation, and manufacturing processes. Choose products with a lower carbon footprint whenever possible.

- **Choose reusable products:** Whenever possible, choose products that can be reused instead of disposable products. This includes items such as surgical gowns, instruments, and containers.
- **Consider the entire life cycle of the product (LCA):** When making purchasing decisions, consider the entire life cycle of the product, from production to disposal. Choose products that are designed to be sustainable and have minimal environmental impact.
- **Consider the supplier's sustainability practices:** When selecting suppliers, consider their sustainability practices, such as their energy use, waste reduction practices, and use of environmentally friendly materials.
- **Encourage local sourcing:** When possible, prioritize products that are locally sourced to reduce transportation emissions and support the local economy.
- **Healthcare workers can have an impact on influencing the purchase, by generating reports that include sustainability aspects, durability, and aspects that support the strengthening of circular management models.**

2. THE CATALOGUE OF BEST PRACTICES

As part of the project Circle Health practices in place in hospitals in Sweden and/or Poland, which facilitates the understanding on circular management models in healthcare have been identified and documented.

Each practice allows to identify and visualize how a healthcare worker can engage and integrate new behaviour in the daily activities, as well as provide with inspiration for innovations within healthcare facilities.

As mentioned above, circular management in healthcare refers to an approach to management that emphasizes collaboration, shared decision-making, and a holistic perspective in healthcare organizations. It is based on the principles of circular economy, which focuses on minimizing waste, maximizing resource efficiency, and promoting sustainability. In the case of healthcare, circular management models refer to a model that promotes the reuse, repair, and recycling of toxic-free products and materials. A circular approach reduces the lifecycle impacts of products, curbs climate emissions, and minimises the use of harmful chemicals in healthcare.

Circular management aims to break down traditional hierarchical structures and foster a culture of inclusiveness, transparency, and empowerment. It encourages interdisciplinary collaboration and the involvement of various stakeholders, such as healthcare providers, administrators, patients, and community members, in decision-making processes.

By implementing circular management principles, healthcare organizations can enhance patient-centred care, improve organizational performance, foster innovation, and create a more inclusive and empowering work environment for healthcare professionals.

Some of the topics that are associated with this and will be included in this catalogue in combination with the Guidelines can contribute to reduce waste generation, use energy-efficient practices, and choose medical products with a lower environmental impact. Additionally, it will inspire and encourage staff and patients about the importance of sustainability.



2.1. WASTE MANAGEMENT

Hospitals can focus on waste reduction by strategies such as recycling programmes, implementing environmentally friendly practices, and promoting staff and patient education on waste management and sustainability. Collaborating with waste management companies and adhering to relevant regulations and guidelines are vital for effective waste management in hospitals.

2.2. ENERGY



I. Use of infrastructure as an instrument for energy efficiency



SKARABORG HOSPITAL

Skaraborg Hospital in Skövde, Region Västra Götland has one of Sweden's largest solar cell plants with two different types of installations, one on the rooftops and one with so-called canopies in the hospital's parking lot. The roof-mounted solar cell system consists of 1,328 solar cell panels with a total installed power of 0.332 MWh (expected to produce 300 MWh of solar electricity per year).

The canopies consist of approximately 7,000 square meters of solar cell panels in the hospital's parking area. The hospital has also installed energy efficient windows, walls and ceilings, and heating and cooling of the building is adapted to the needs of the business. The building uses a quarter as much energy as an average hospital building.

SUCHA BESKIDZKA HOSPITAL

A concept similar to the one described above was implemented by a hospital in Sucha Beskidzka in Poland.

In this case, however, the starting point was the desire to ensure thermal comfort for patients and staff. The problem of excessive heat build-up in summer is becoming more acute due to climate change.

As a result of an innovative public procurement (co-funded by the European Commission as part of the EcoQUIP project), the hospital created a photovoltaic installation consisting of awnings that protect patient rooms from excessive exposure to the sun's rays in summer. In winter, on the other hand, they do not shade the rooms.

Between 2017 and 2022, the described installation not only reduced the temperature in the patients' rooms, but also generated 722 258 kWh of electricity.

More: <https://www.ecoquip.eu/resources/>



FORENSIC PSYCHIATRIC CENTRE IN TRELLEBORG

The Forensic Psychiatric Centre in Trelleborg in Sweden has been built as a so-called passive and plus energy house, which means that the building has the capacity to produce more energy than it consumes. Wind turbines on the site, solar cells and solar heat collectors on the roof produces electricity and hot water. The building covers an area of around 11900 square meters in total.

130 square meters of solar heat collectors and 1282 square meters of solar cell panels are mounted on the roof. The solar heat collectors cover the hot water demand between March and September. They produce approximately 30 MWh of hot water per year and any overproduction can be dumped into the geothermal wells for future use. The solar cells produce approximately 170 MWh of electricity per year. The wind turbine is 25 meters high with a wing diameter of 14 meters. It produces approximately 65 MWh of electricity per year and has a power of 0.025 MW. Overproduction of electricity from wind turbine and solar cells is sold to the grid.



2.3. FOOD SYSTEMS

I. Standards



KRAV A SWEDISH CERTIFICATION

One of the most common standards used in hospital kitchens is the Krav certification. Krav is a Swedish certification organization founded in 1985 that focuses on organic and sustainable food production. Krav certification means that the kitchen has met Krav's requirements for organically grown and GMO-free ingredients, reduced use of chemical pesticides and antibiotics and that the kitchen works to reduce its environmental impact and increase sustainability. The benefits of having a Krav-certified hospital kitchen are several. Firstly, it can contribute to increased safety for patients and staff. By serving organic food that does not contain chemicals and antibiotics, the risk of health problems and allergies can be reduced. Secondly, it can also contribute to more sustainable healthcare, where consideration is given to the environment and efforts are made to reduce climate impact. Additionally, a Krav-certified hospital kitchen can also have positive effects on the health and well-being of staff, by offering healthy, nutritious food that contributes to energy and well-being. In summary, Krav certification of hospital kitchens can contribute to increased food safety and quality, reduced environmental impact, and increased health and well-being for patients and staff. It can also be a step towards more sustainable healthcare, where consideration is given to the health and well-being of both people and the environment. <https://www.krav.se/>

II. Internal procedures

CUTTING FOOD WASTE A MONEY SAVER

In 2017, Södersjukhuset in Stockholm wasted 40 per cent of its food, which ended up costing the region 10 million kronor. However, with the introduction of a new kitchen and meal concept, the hospital has successfully decreased food waste by 70 per cent. This new concept has garnered attention and interest throughout the country, particularly due to its use of chilled portions with a long shelf life. As a result, Region Skåne has decided to implement a similar system.



<https://www.sjukhuslakaren.se/sodersjukhuset -minskade-matsvinnet-med-70-procent/>

III. Workers as the engine of innovation

STATISTICS A WAY TO ENSURE LESS FOOD WASTE

The employees at KAVA in Skaraborgs Hospital Skövde in Sweden are passionate about reducing food waste. They conduct annual measurements and keep their own statistics to ensure that as little food as possible is wasted. "Our patient kitchen has provided us with statistics from measurements, and I am constantly thinking about how we can improve. It's essential to examine every aspect of our operations that we can influence, and reducing food waste is one such area," explains unit manager Åsa Lastra.

<https://www.skaraborgslanstidning.se/2019-11-01/sa-jobbar-sjukhuset-for-att-minska-matsvinnet>

2.4. MAINTENANCE



I. Internal networks and coordination for maintenance



Hållbarhetsprogram Karolinska 2023-2027

*Tillämpningsanvisning av:
Region Stockholms Hållbarhetsstrategi 2022-2027,
med inkludering av Region Stockholms Medarbetarpolicy, Karolinskas Vägvisare
Region Stockholms Folkhälsopolicy*



HEALTHCARE STAFF LEADING THE SUSTAINABILITY STRATEGY

At Karolinska Hospital, the sustainability work is driven forward by the Sustainability Unit, environmental coordinator, hospital staff, environmental coordinators, and the hospital's approximately 500 environmental informants/ communicators. Together, everyone contributes to help us achieve our goals.

<https://www.karolinska.se/om-oss/om/miljo-hallbarhet/>

INCREASE ENVIRONMENTAL AWARENESS

In the various operations of the hospital, there are approximately 400 environmental representatives. The environmental representatives are tasked with supporting their immediate supervisor in the environmental work of the operation, as well as inspiring and disseminating environmental information. The environmental representatives also contribute to the development and continuous improvement of Sus environmental work.

<https://vard.skane.se/skanes-universitetssjukhus-sus/om-oss/miljoarbete/>



2.5. PHARMACEUTICALS



I. Redistribution of pharmaceuticals for avoid disposal

SHARE DEMAND AND SUPPLY

PharmaSwap prevents the waste of medicines that are approaching their expiry date. Pharmacists can use this unique sharing marketplace to share supply and demand for medication.

<https://www.pharmaswap.com/en.html>





2.6. TEXTILES

I. More durable hospital uniforms



RAWICZ HOSPITAL

In 2012, Rawicz Hospital, as part of the LCB-Healthcare project co-funded by the European Commission, purchased hospital uniforms made of a then new fabric - tencel. Although the purchase price was higher than usual, it turned out that the life-cycle costs were lower. It was assumed that the above uniforms would be worn for three years (compared to traditional cotton uniforms, which had a warranty of two years). The projected saving from this purchase was estimated to be around 18%, excluding changes in the price of the energy required to wash and dry the uniforms. However, the uniforms proved to be so durable that the hospital used them 6 years after purchase.



2.7. PROCUREMENT

The activities related to procurement and the selection of components that will be used in daily activities could be the first part of the sustainable healthcare process or any circular management model. Independently of the main activities included in the healthcare provision and the wide range of activities from a circular perspective, in general, the process to impact sustainability in the daily activities starts with the procurement processes.

The non-medical staff operates in different specific activities in this area especially regarding the reception of the material, warehouses, the efficient distribution of the purchased goods along the facilities, and the disposition of waste related to the packaging of the purchased goods to mention some of those.

Healthcare workers can have an impact on influencing the purchase, by generating reports that include sustainability aspects, durability, and aspects that support the strengthening of circular management models.

There are good practices that could contribute to the engagement of healthcare workers in the procurement process as well as in the development of more efficient and sustainable processes regarding procurement.

I. Sustainable procurement as part of the public sector strategy.

SUSTAINABLE PROCUREMENT IDENTIFIES AND MINIMIZE RISKS TO PEOPLE AND THE ENVIRONMENT

The website “**Hållbar upphandling**” (Sustainable procurement) provides information and guidance on sustainable procurement for public organizations in Sweden. The website offers tools, templates, and best practice examples to help organizations integrate environmental and social considerations into their procurement processes.

The project is on reducing negative environmental impacts and promoting social responsibility throughout the supply chain. The website also provides information on relevant legislation and policies related to sustainable procurement in Sweden.

<https://www.xn--hllbarupphandling-8qb.se/>

Hållbar UPPHANDLING
Et samarbete mellan Sveriges regioner

Hållbar upphandling Organisation Prioriterade inköpskategorier Nyheter in

Sök...

Ett samarbete mellan Sveriges regioner

Sedan 2010 samarbetar Sveriges regioner i ett nationellt arbete med hållbar upphandling. Regionerna har en gemensam uppförandekod för leverantörer som omfattar områdena mänskliga rättigheter, arbetares rättigheter, miljö och affäretik. Arbetet med hållbar upphandling syftar till att identifiera och minimera risker för människor och miljö under produktens eller tjänstens hela livscykel.

VAD?

VARFÖR?

HUR?

VAD?
Upphandlingsarbetet i Sveriges regioner syftar till att säkra tillgången till de produkter och tjänster som krävs för att bedriva samhällsviktiga verksamheter som hälso- och sjukvård och kollektivtrafik. Upphandlingsarbetet ska också leverera bästa värde för medborgarna. Värde omfattar, utöver ekonomiskt värde även att främja en hållbar utveckling. Därför verkar ...
[Läs mer](#)

VARFÖR?
Upphandling är ett viktigt styrmedel för att nå samhällspolitiska mål. Svensk offentlig upphandling omsätter över 800 miljarder kronor årligen och genom regionernas samarbete kring hållbar upphandling finns stora möjligheter att snabba på omställningen till ett mer hållbart samhälle genom att efterfråga socialt och miljömässigt hållbara produkter och tjänster. Den nationella...
[Läs mer](#)

HUR?
Varje år utses riskprodukter inom vilka nationellt prioriterade leverantörer följs upp. Förväntningarna som följs upp återfinns i regionernas gemensamma uppförandekod för leverantörer. Dessa krav omfattar bland annat både riskanalyser, uppföljning och åtgärdsplanering. Regionernas uppföljningar består av både självskattingsenkäter, dialoger och ...
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Nyheter

Utmaningar och risker i bomsindustri - upphandling av textiltjänster

Bomull är en råvara som ingår i många av de produkter som används för att bedriva hälso- och sjukvård...

Två genomförda revisioner inom riskområde sårsvård och kompression

Den 9 november 2022 genomfördes en kontorsrevision hos 3M. Urval för stickprov: Sårbehandlingsartiklar 3...

Så ska Sveriges regioner arbeta för att harmonisera miljökrav i offentlig upphandling

I december beslutade stygruppen i regionernas kanal för hållbar upphandling att anta en nationell...

[Nyhetsarkiv](#)

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Ett samarbete mellan Sveriges regioner
Medlemsregioner: Dalarna - Gästrikland - Gävleborg - Halland - Jämtland Härjedalen - Jönköping - Kalmar - Kronoberg - Norrbotten - Södermanland - Stockholm - Sörmland - Uppsala - Värmland - Västerbotten - Västermanland - Västmanland - Västra Götaland - Örebro - Östergötland

II. Local partnerships for local and sustainable procurement

RE:SOURCE A PROCUREMENT PROGRAM

Karolinska University Hospital in Stockholm, has implemented a circular procurement programme to reduce waste and promote sustainability. The hospital has partnered with a local organization called Re:Source, which works to promote circular economy practices by connecting businesses with circular solutions for waste reduction and resource efficiency. Through this partnership, the hospital has been able to identify opportunities to purchase more sustainable and environmentally friendly products, such as reusable textiles and equipment, and to reduce waste by implementing recycling programmes and

RE:SOURCE Aktivitet Projekt Finansiering Om RE:Source Medlemskap

För hållbar användning av material inom planetens gränser

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resursetekniker

RE:Source är ett strategiskt innovationsprogram som fokuserar på cirkulära, resourcetekniska innovationer, utifrån framkänning, innovation och projekt och är en ledningsstruktur för att förbättra och hålla resursetekniker.

[Läs mer](#)

inifrånvaras

Har du ett innovativt idé som kan bidra till en hållbar utveckling? Vi vill se din idé om upp till 500 000 kr för att förverkliga den.

[Läs mer](#)

Nyheter

Projekt som möter behov av resursetekniker på regional och lokal nivå

RE:Source deltar i ett avsnitt i RE:Source

Upplysning om RE:Source

Event

Hur kan vi designa produkter som inte går att göra till återvinning?

27 september 2022 - 18 november 2022

Miljöutställningen

27 september 2022 - 18 november 2022

RE:Source deltar i ett avsnitt i RE:Source

27 september 2022 - 18 november 2022

reducing
<https://resource-sip.se/>

packaging.

III. Certified products and guidelines for sustainable procurement

ENVIRONMENTAL REPORTING TO HELP YOU REACH YOUR GOAL

Region Skåne healthcare authority, has set a goal of reducing its carbon footprint by 80% by 2030. To achieve this goal, the authority has implemented a range of sustainable procurement practices, such as purchasing environmentally certified products, prioritizing products with a low carbon footprint, and promoting the use of recycled and recyclable materials. [Region Skånes miljöredovisning 2020 \(exakta.se\)](https://www.exakta.se)



V. Marketplace and exchange as part of the procurement strategy

INTERNAL EXCHANGE MARKET

Sahlgrenska University Hospital has set a goal to increase the usage time for office furniture, as well as to reduce food waste that occurs in hospital departments. One initiative is an 'internal exchange market' called Tage, where surplus office furniture can be exchanged between users.”



Useful tools

- The Swedish Environmental Protection Agency provides a database of eco-labelled products called “Svanenmärkt”. This database can be used to find environmentally certified products, which often have a lower carbon footprint than non-certified products: <https://www.svanen.se/en/>
- The Nordic Ecolabel “Svanen” also has a product database that can be used to find environmentally certified products: [Search for Ecolabelled products and services \(svanen.se\)](https://www.svanen.se)
- The Carbon Trust has developed a tool called “Footprint Expert” that can be used to estimate the carbon footprint of products and services: [Carbon footprinting software | The Carbon Trust](https://www.carbontrust.com)
- The Global Ecolabelling Network provides a list of ecolabels from around the world, which can be used to find environmentally certified products: <https://www.globalecolabelling.net>
- In addition, there is the EU Ecolabel, [EU Ecolabel - Home \(europa.eu\)](https://ec.europa.eu/euro-ecolabel/)

3. CONCLUSIONS

Circular Management in Healthcare is one on many strategies to overcome the sustainability challenges within healthcare systems face. To introduce in practice the topic could be perceived as almost impossible, but the truth is that it has been the same with any major transformation. Despite of that, the systems has been consistently advancing in standardize processes, learnt how to plan, and even has been able to adapt a wide range of managerial tools used in other sectors of the economy.

It seems that now we need to do the same with Circular Health. We can't just copy and paste what has been developed in the above-mentioned other sectors. Hopefully nobody will make claims that we can use the same syringe again and again. We need to learn how to adopt the way of thinking which constitutes the base for the re-use of things.

Let us finish this document with the old Chinese story.

Once upon a time there was a shoemaker, who felt ill and was unable to work. Despite of that, his wife came daily to the local market and kept buying goods. The wife of the calendar-maker was curios how this was possible. So, she approached the shoemaker wife and asked:

"How is this possible, that your husband doesn't work, and you keep buying things? Where do you have your money from?"

"Well...", responded the shoemaker wife, "Every week my husband was always making an extra pair of shoes. We stored them and now, when he is unable to work, I sell them, and we can afford to buy essential goods".

"That's an excellent idea!", shouted the wife of a calendar-maker. "We will do the same.".

And so did they.

Some years later a calendar-maker got sick. He and his opened the chest in which they stored their calendars, which he made. But nobody wanted to buy them.

This story illustrates the concept – as it was stated above – we can't just copy & paste solutions that work well in other sectors. We need to adapt. Learn, how to manage our resources more wisely. First – re-think our purchase strategy. It will, surely, means that we spend some more time on procurement, but is there any other way? If we don't start demanding something different to what we buy now – we will keep buying the same things again and again. And once we do it, we need to follow other suggestions described in this document.

We hope that this document will help the readers in adopting other philosophy of everyday managing their healthcare facilities.

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