Health Care Without Harm

LEADING BY EXAMPLE

Climate-smart Healthcare Solutions in Europe

CONTENTS

INTRODUCTION

THE HEALTHCARE SECTOR FACES AN URGENT CALL TO ACTION TO SUBSTANTIALLY REDUCE ITS CARBON FOOTPRINT AND BUILD RESILIENCE AGAINST THE GROWING IMPACTS OF CLIMATE CHANGE.

With the healthcare sector responsible for 4.6% of global emissions, the transition to sustainable healthcare models is both necessary and urgent, and it requires efforts from different fronts within health systems - from healthcare management to public authorities and individual staff.

With this transformation already underway, existing best practices and sustainability leaders offer themselves as inspirations to promote broader change in the sector, preserve and advance public health, and create a healthier planet.

This catalogue is a resource for healthcare and sustainability professionals striving to build climate-resilient and net-zero healthcare systems. By sharing these success case studies, we provide examples of sustainable practices that can reduce emissions, improve resilience, and inspire the sector to take climate action.

Central to these efforts is the framework provided by the Global Green and Healthy Hospitals (GGHH) network, the largest sustainable healthcare network in the world, coordinated by Health Care Without Harm.

Each case study in this catalogue represents a unique journey showcasing goals, challenges, strategies, and outcomes. In particular, these seven examples highlight how healthcare providers have tackled critical areas such as energy, anaesthethic gases, pharmaceuticals, food systems, and infrastructure.

Together, they offer scalable, impactful solutions and serve as a resource for health systems aiming to lead the way in sustainable practices.

CASE STUDIES

This catalogue provides a summary of the original case studies. The full version of each case study is available exclusively for GGHH members at the GGHH Connect.

The SENTINEL project: Improving asthma care while reducing environmental impact

Hull University Teaching Hospital NHS Trust, United Kingdom

- Country: United Kingdom
- Region: East Riding of Yorkshire
- Type of institution: NHS Hospital Trust
- Number of staff: 8,000
- Number of beds: 1,300

THE SENTINEL PROJECT IS A COLLABORATIVE INITIATIVE DESIGNED TO IMPROVE ASTHMA CARE OUTCOMES WHILE REDUCING THE ENVIRONMENTAL BURDEN OF ITS TREATMENT.

Short-Acting Beta Agonist (SABA) inhalers, commonly referred to as "blue inhalers", are generally used to relieve the symptoms of this disease. However, they have a more significant carbon footprint and poorer performance than other inhalers. Their overuse significantly increases the risk of asthma attacks and death while substantially contributing to greenhouse gas (GHG) emissions.

In the UK, SABA overuse is among the highest in Europe. The project, therefore, aims to support the adoption of a Maintenance and Reliever Therapy (MART)-based approach, which foresees the use of a single inhaler for both maintenance and symptom relief.

At Hull University Teaching Hospitals NHS Trust, this initiative was integrated into the hospital's Zero Thirty Strategy, which commits to achieving net-zero emissions by 2030. The project was delivered across six primary care networks in England, encompassing 21,000 asthma patients. It combined healthcare professional training, targeted patient reviews, patient education, and real-time monitoring of care metrics. As a result, SABA prescriptions dropped by 44,275 units compared to baseline, preventing approximately 1,239,700 kg of CO_2e emissions. The initiative also led to fewer inhalers being used overall, significantly reducing plastic waste. Additionally, asthma exacerbations decreased, and MART was identified as a suitable treatment for half of the reviewed patients.

SENTINEL Plus, a quality improvement package based on the SENTINEL Project, was also developed to support the scaled implementation of this approach. Complemented by the SENTINEL Plus UK Champions network to share and drive the project, it highlights its replicability and potential for broader impact.

Modular building: A green approach to healthcare infrastructure

Health Care Center for Lung Diseases and Tuberculosis Wolica, Poland

Country: Poland

Region: Wielkopolska Province

Type of institution: Hospital/Healthcare Center for Lung Diseases and Tuberculosis

Number of staff: 120

Number of beds: 137

FOR OVER A DECADE, THE WOLICA HEALTHCARE CENTRE HAS BEEN IMPLEMENTING SEVERAL SOLUTIONS TO REDUCE GREENHOUSE GAS (GHG) EMISSIONS, IMPROVE PATIENT WELL-BEING, AND PROTECT THE SURROUNDING ENVIRONMENT.

One of the main activities to achieve these goals was the modernisation and expansion of the hospital infrastructure by assembling a modular building based on modules made of steel frames built from 90% recycled materials.

A flagship initiative under this strategy was the construction of a modular rehabilitation pavilion in 2023, part of the Wolica Hospital – Green Hospital No. 1 in Poland project. This 970 m^2 facility incorporates energy-efficient design, photovoltaic panels, and advanced insulation, significantly minimising energy use for heating and cooling while reducing carbon emissions and construction waste. Compared to traditional construction, this approach has drastically cut CO_2e emissions and waste while optimising time and resources.

Furthermore, the installation of 458 photovoltaic units across rooftops and grounds enabled the hospital to achieve 80% energy self-sufficiency in 2022, with a target of 100% by 2025.

Complementing these efforts, green spaces surrounding the pavilion promote the therapeutic benefits of nature, enhancing patient recovery and staff well-being.

Further contributing to its green initiatives, the hospital has implemented a rainwater management system that collects up to 900 m^3 of water annually for irrigation.

By deciding to expand exclusively using modular technology and investing in renewable energy and resource management, the hospital has achieved cost efficiency and environmental stewardship, positioning itself as a model for innovative and sustainable infrastructure development.

Centre for Sustainable Healthcare: Looking at healthcare from a green perspective

Amsterdam University Medical Center

- Country: The Netherlands
- Region: Amsterdam, Noord Holland
- Type of institution: University hospital
- Number of staff: 19,000
- Number of beds: 1,700

AMSTERDAM UNIVERSITY MEDICAL CENTER IS SETTING AN EXAMPLE IN SUSTAINABLE HEALTHCARE BY INTEGRATING ENVIRONMENTAL CONSIDERATIONS INTO ITS DAILY OPERATIONS AND FOSTERING A CULTURE OF SUSTAINABILITY AMONG ITS STAFF.

In 2022, Amsterdam UMC established the Centre for Sustainable Healthcare to centralise and amplify sustainability efforts across its facilities. This Centre serves as a structured platform for aligning bottom-up actions led by the hospital's Green Teams with the hospital's overall sustainability strategy.

As a result, Green Teams – small groups of 4 to 8 employees dedicated to implementing sustainability initiatives within their departments – have grown significantly under the Centre's guidance from 15 in 2022 to over 50 in 2024.

The Centre facilitates their efforts by providing training, resources, and opportunities for collaboration through workshops and an online community.

By fostering communication and sharing best practices, these teams have become a driving force for change across the hospital.

In addition to supporting Green Teams, the Centre translates the Dutch national Green Deal into local policy through targeted working groups and monitors progress towards national sustainability targets.

Tangible achievements include reduced emissions from anaesthetics and enhanced engagement in sustainable practices. Initiatives such as the Blik op Groen ("Look at Green") campaign in 2023 emphasised the hospital's commitment to education and awareness.

During this campaign, sustainable, inspirational messages on waste, food, mobility, and building were displayed through a large pair of glasses installed in the central hall of the hospital.

Amsterdam UMC also integrates planetary health into its affiliated universities' academic missions, encouraging students to research the intersection of sustainability and patient care.

By aligning clinical care, education, and research with environmental goals, Amsterdam UMC is not only reducing its carbon footprint but also inspiring wider systemic change in the healthcare sector.

Sustainable food practices in healthcare

The Newcastle upon Tyne Hospitals NHS Foundation Trust

- Country: United Kingdom
- Region: Newcastle upon Tyne
- Type of institution: NHS Hospital trust
- Number of staff: 16,000
- Number of beds: 2.300

NEWCASTLE UPON TYNE HOSPITALS NHS TRUST HAS MADE SIGNIFICANT STEPS TO ENSURE SUSTAINABILITY ACROSS ITS CATERING SERVICES, ALIGNING WITH ITS BROADER GOAL TO ACHIEVE NET ZERO DIRECT EMISSIONS BY 2030 AND INDIRECT EMISSIONS BY 2040.

The hospital's Food and Drink Strategy (2022-2027) prioritises nutritious food and sustainability, with specific targets to reduce carbon emissions, food waste, and the use of single-use plastics while supporting local suppliers.

Food production and procurement account for a notable share of the healthcare sector's carbon footprint, with agriculture and food purchasing contributing nearly 10% of its emissions.

To address this challenge, the Trust implemented innovative solutions in procurement, food preparation, and waste management, aligning food services with the commitment to environmental sustainability.

Efforts include transitioning to electric catering vehicles, introducing digital meal ordering systems to reduce overproduction, and implementing "Meat-Free Mondays" alongside daily vegan options, with a target of 50% plant-based meals offered.

These initiatives align with the Trust's commitment to reducing food-related emissions by 25% by 2030 as part of the Coolfood Pledge. Additionally, the hospital has significantly reduced single-use plastics by adopting reusable and recyclable alternatives, offering discounts for reusable cup use, and introducing recyclable packaging.

Progress has been remarkable, with over 200 tonnes of food waste diverted to anaerobic digestion - a process to convert waste into renewable energy - in a single year.

Additionally, sustainability, climate, and social value criteria have been embedded in all future food tenders, promoting more sustainable and local supply chains.

Finally, the Trust's catering vehicle is now electric, and gas-powered kitchen appliances are being phased out. By implementing these initiatives, the hospital has reduced food emissions and waste, positioning itself as a model and aiming to collaborate with other healthcare organisations to maximise their local communities' health and well-being.

Recycling inhalational gases: Pioneering sustainability in anaesthesia

KABEG LKH Villach, Austria

- Country: Austria
- Region: Carinthia
- Type of institution: Hospital
- Number of staff: 1,800
- Number of beds: 700

KABEG LKH VILLACH HAS BECOME A PIONEER IN SUSTAINABLE ANAESTHETIC PRACTICES BY INSTALLING ACTIVE CARBON-BASED SYSTEMS TO CAPTURE AND RECYCLE INHALATIONAL ANAESTHETICS – MAINLY SEVOFLURANE – IN ITS OPERATING THEATRES.

This initiative tackles the long-lasting impact of anaesthetic gases, which remain in the atmosphere for years and contribute significantly to global warming.

Since implementing this system in March 2022, the hospital has substantially reduced emissions from anaesthetic gases, achieving a notable reduction in its carbon footprint. The project has been widely recognised, winning the Austrian Environmental Management Award in 2022 and inspiring other hospitals to adopt similar measures.

This low-cost and effective solution – with minimal installation costs and affordable filter cartridges – demonstrates the potential for widespread impact. If implemented in all hospitals in Europe, the impact on the carbon footprint would be massive, especially since up to 50% of the CO2e emitted in the perioperative setting is caused by inhalational anaesthetics.

By reducing emissions and air pollution, KABEG LKH Villach exemplifies how targeted interventions can advance healthcare sustainability and decarbonisation.

A healthcare journey towards net-zero direct emissions

Fundació Sanitària Mollet, Spain

Country: Spain

Region: Baix Vallès

Type of institution: Healthcare provider

Number of staff: 1,400

Number of beds: 270

MOLLET UNIVERSITY HOSPITAL, OPERATED BY FUNDACIÓ SANITÀRIA MOLLET (FSM) NEAR BARCELONA, HAS SET AN EXEMPLARY STANDARD FOR SUSTAINABILITY BY REDUCING ITS CO_2E DIRECT EMISSIONS BY 91% OVER THE PAST 12 YEARS.

FSM's comprehensive approach includes infrastructure upgrades, process optimisation, and a strong focus on fostering a green culture among staff. Their sustainability strategy not only benefits the environment but also improves patient care and staff well-being.

The hospital has implemented a sustainability strategy focused on three net zero core pillars.

The first pillar focuses on sustainable architecture and structure, including innovations such as geothermal energy systems, solar panels, and rainwater collection facilities.

The second one emphasises the implementation of sustainable processes, including reducing inpatient stays, optimising diagnoses, and recycling anaesthetic gases.

The third one prioritises sustainability education through staff training and stakeholder engagement.

Despite a 50% increase in hospital activity and a 30% growth in staffing since 2010, the Mollet Hospital has achieved substantial emissions reduction and has set ambitious goals, such as achieving:

- zero direct emissions without compensation by 2025,
- net zero indirect emissions from the supply chain by 2040,
- net zero residual emissions by 2050.

This comprehensive strategy has earned FSM recognition as a leader in sustainable healthcare, including the 2024 European Sustainable Healthcare "Healthy Futures Award".

Increasing circularity and reducing emissions in healthcare

Karolinska University Hospital, Sweden

- Country: Sweden
- Region: Stockholm
- Type of institution: Hospital
- Number of staff: 15,000
- Number of beds: 1,340

KAROLINSKA UNIVERSITY HOSPITAL, ONE OF EUROPE'S LARGEST UNIVERSITY HOSPITALS, IS COMMITTED TO REDUCING GHG EMISSIONS BY 40% AND INCREASING CIRCULAR RESOURCE MANAGEMENT BY 2027.

Recognising that a significant portion of its emissions comes from medical equipment, including single-use items, the hospital has adopted a comprehensive approach to minimise its environmental impact. This strategy includes providing guidance to departments on improving material use and circularity, setting reduction targets based on material usage and associated GHG emissions, and using dashboards to visualise emissions at the departmental level.

Departments are also encouraged to adopt targets for the circular use of material and introduce new resource-efficient, low-carbon alternatives.

Significant progress has already been achieved, with emissions from some single-use items, such as aprons and surgical drapes, decreasing since 2022 through an increased percentage of bio-based and lower carbon products. Circular initiatives, such as a programme to recycle aprons, have reduced waste by over 200,000kg annually and cut related emissions by 85%.

Other projects, including a reusable glove programme, which has the potential to save 100,000 kg of waste annually, and the introduction of biodegradable waste bins, which will cut GHG emissions from hazardous waste disposal by 55%, further reduced waste and emissions.

The hospital also fosters sustainability through mandatory staff training and collaborative green wards and networks - managed by health professionals and sustainability officers - to share best practices and increase its environmental performance.

Karolinska University Hospital's efforts demonstrate a transformative approach to low-carbon, circular healthcare, achieving measurable environmental and economic benefits while advancing sustainable practices across its operations.

CONCLUSION AND TAKEAWAYS

THESE INITIATIVES SHOW THAT HEALTHCARE SYSTEMS CAN SIGNIFICANTLY REDUCE EMISSIONS, ENHANCE RESILIENCE, LOWER COSTS, AND ALIGN WITH BROADER CLIMATE GOALS WHILE CONTINUING TO PROVIDE QUALITY CARE.

Despite challenges – such as regulatory barriers and balancing growth with climate goals, as well as engaging different stakeholders – these best practices offer valuable insights and takeaways to advance climate-smart healthcare:

- The integration of climate action into everyday healthcare operations has proven to be highly effective in reducing environmental impact without compromising the quality of care.
- Collaborating and engaging all stakeholders has been essential to achieve climate targets.
- Adaptability and innovation have also been cornerstones to ensure climate solutions can be scaled and adapted to different contexts.
- A long-term vision is crucial to reducing emissions, requiring gradual and incremental changes.
- Investments in renewable energy and low-emission technologies are essential to healthcare sustainability and decarbonisation.
- Cultural transformation is crucial to embed climate action as a core value within healthcare systems.

The healthcare sector has taken meaningful steps to reduce its climate impact by implementing concrete measures and developing innovative projects, such as those showcased in this collection.

Building climate-resilient and net-zero healthcare requires more than isolated efforts. It calls for a concerted focus on scaling up successful solutions like these, which can serve as valuable examples and inspirations for broader change across the sector and beyond.

A member of the Global Green and Healthy Hospitals network?
Check out the complete case studies on GGHH Connect.

GET INVOLVED

Subscribe

If you would like to be kept up to date with the latest developments from our Climate-smart Healthcare programme, you can subscribe to our newsletter.

Join our network

If you are interested in reducing the carbon footprint, strengthening the climate resilience of your hospital/health centre, or minimising the impact of your day-to-day work in healthcare, there are several ways you can join our network:

The organisational membership of Global Green & Healthy Hospitals (hospitals, health systems, and health centres only) gives your institution free access to a range of exclusive tools and resources, including these case studies and the full range of best practices coming from our members across the world.

Doctors for Greener Healthcare brings together doctors from across Europe to collaborate, share best practices, and advocate for a healthy future by reducing the environmental impact of healthcare.

Nurses Climate Challenge Europe empowers nurses across Europe to take action against the health impacts of climate change.

Pharmacists for Greener Healthcare brings together pharmacists from across Europe to share their best practices to tackle pharmaceutical pollution and its contribution to antimicrobial resistance (AMR).

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