Rapid Decision Support

A product of the Contextualized Health Research Synthesis Program
Newfoundland & Labrador Centre for Applied Health Research

Rapid Decision Support for Environmental Sustainability Frameworks: An Evidence Scan

Search focus: For this *Rapid Decision Support* report, CHRSP researchers searched for and identified research evidence that examined environmental frameworks and their components, with a focus on the health system level. We included articles that described overarching sustainability frameworks for healthcare with well-identified areas of priority.

What we found: This report summarizes articles published between 2014-2024 with a focus on articles published between 2019-2024. It includes 24 documents including 9 scoping/other reviews, 4 frameworks/maps, 3 systematic reviews, 5 other articles (toolkits, conference findings, reports, policy analysis), 2 perspectives, and 1 primary study. References are separated by category and listed alphabetically within each category. Quotes that reflect pillars of sustainability frameworks and key takeaways are **highlighted in bold.**

Content summary: This report comprises two sections; 1) studies of frameworks and 2) framework implementation.

Many of the articles have identified common priority areas for improving sustainability within a healthcare context such as human resources, medical resources, energy, data, and policies. In addition to proposing new frameworks, articles also cite well-known sustainability initiatives/frameworks such as de-carbonization, net-zero, triple bottom line, and circular economy.

High level reviews describe more specific issues such as facilities management, supply chain management, resource consumption, data and benchmarking, staff training and development, staff engagement, culture, policy, organizational leadership, digital transformation, transportation, and procurement.

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Studies of Frameworks

The following studies lay out frameworks and/or maps for improving sustainability within healthcare organizations.
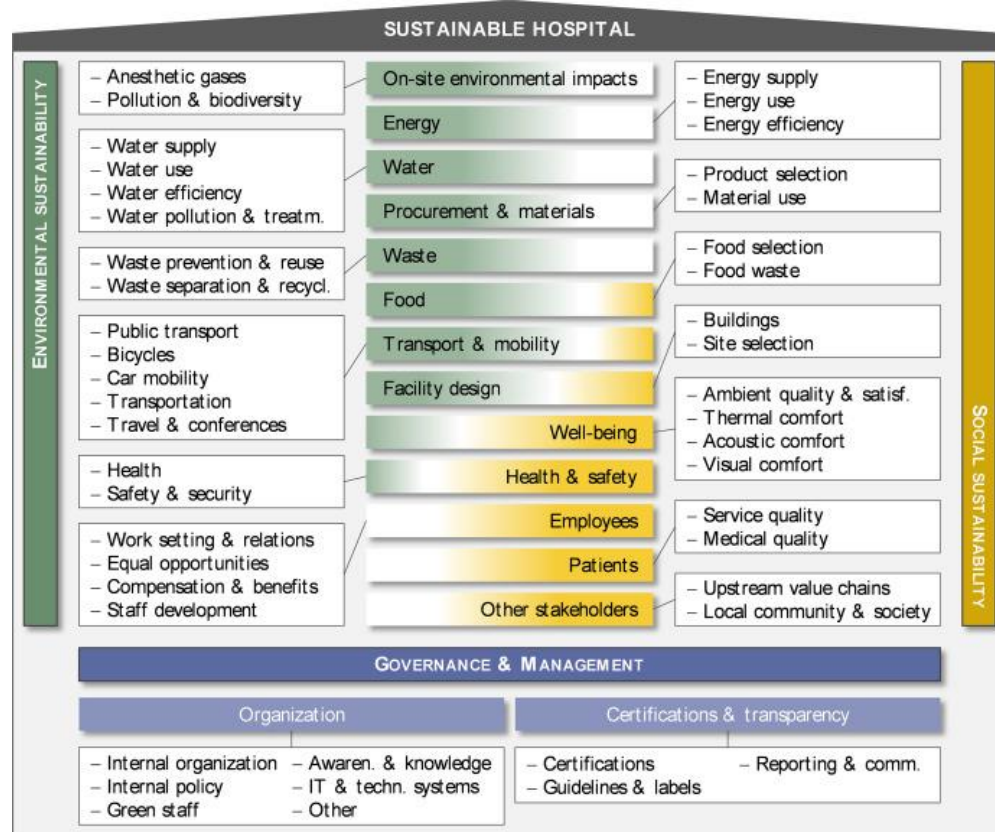
Reviews

Kailay M, Paposa KK. **Sustainable Human Resource Management in the Hospital Sector: A Review of Literature. Journal of Health Management**. 2024. ([LINK](#))

- Review (109 articles) and proposed model for sustainable human resource management (SHRM) in the hospital sector
- Combines human resource management ideas with environmental considerations
- **Aim**: "In 1994, John Elkington founded the triple-bottom-line concept, which describes the three bottom lines in the business—needs to be concerned about its impact on people and the planet—and not only finance and profits. There is tremendous research available in this area. Sustainable management practices are much needed for ensuring the sustainable performance of hospitals. We found a research gap concerning the implementation of all the dimensions of SHRM."
  - "SHRM is built upon four dimensions: triple bottom line approach—economic, social and environment, and psychological human resource management."
- **Literature review:**
  - "**First**, to the best of our knowledge, no prior research has been conducted in SHRM practices considering the hospital sector. **Second**, the earlier studies were diverted more towards the environmental aspect as the word 'sustainable' is generally linked. Nevertheless, the present study will cover all the dimensions—economic, social, ecological and psychological human resource management. **Third**, even though there has been tremendous research is done on this topic. However, there is a gap concerning that how well-being is secured through SHRM practices."
- **Proposed framework** (includes the following elements):
  - **Psychological Approach:** Quality of work-life, diversity management, employability of workers, promoting health and pleasure, transformational leadership
  - **Strategic Perspective:** Transparency in human resource management practices, Profitability and long-term thinking
  - **Environmental Aspect:** "it is appreciable if organizations support human resource management practices, such as staffing, training, performance evaluation, and rewards to implement greening practices and behaviour. Recruitment and selection of employees committed to the environment were essential for the organizations which implement green practices; environment training is also a relevant dimension under Green HRM. Green HRM includes recruiting and maintaining employees who endorse eco-friendly behaviour, providing them environmental awareness training, reflecting their eco-friendly contributions in performance appraisal (Shen et al., 2018; Amrutha & Geetha, 2020). Employees are also more likely to attach themselves to companies that are adopting environmental management practices. Initiatives going paperless, recycle glass, paper, plastic, assembling waste materials, reducing business travel."
  - **Social sustainability:** "which primarily involves the well-being and wellness of employees, not only in terms of their health but also in terms of their job security"

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- **Conclusions:** "There is a need to recognize these working conditions through sustainable practices. Eventually, by considering all the research done on the hospital sector, it is necessary to embrace sustainability, not only for its workforce but surely for the entire world and entire ecosystem"

Messman L, Köhler S, Antimisaris K, Fieber R, Thorenz A, Tuma A. **Indicator-based environmental and social sustainability assessment of hospitals: A literature review**. Journal of Cleaner Production. 2024. (LINK)

- Review (88 articles)
- **Aim:** "to (1) critically review existing assessments of hospitals; **(2) identify relevant sustainability topics in a hospital context and derive a best-practice categorization**; (3) highlight thematical gaps. Based on the PRISMA method, we identify 88 relevant articles. First, 47 articles (comprehensive hospital sustainability assessments with extensive indicator sets) are reviewed, forming the basis for deriving a best-practice categorization."
- **Results:** "3.1.2. **Best-practice categorization**"
  - Framework of indicators derived from review

- **Conclusion:** "We find strong variations in the taxonomies and terminologies of the reviewed articles… **Major thematical gaps relate to (1)** sustainability along upstream and downstream value chains (especially food and pharmaceuticals) and **(2)** quantitative indicators for social sustainability (especially for stakeholders other than patients) and governance. These thematical

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gaps provide pathways for future research, laying the foundation for future developments of consistent indicator-based assessments of hospitals."

Frameworks and Maps

Bosco F, De Gerio C, Fioriani G, Stola G. **How to manage sustainability in healthcare organizations? A processing map to include the ESG strategy**. Journal of Public Budgeting, Accounting & Financial Management. 2024. ([LINK](#))

- Environmental, social, and governance (ESG) Processing Map
- **Aim**: "to identify the key issues that healthcare knowledge-intensive organizations (KIPOs) should focus on to define themselves as socio-environmentally and governance responsible for integrating environmental, social, and governance (ESG) logic into their business strategy. At the same time, this provides an understanding of how healthcare KIPOs contribute to achieving the Sustainable Development Goals of the 2030 Agenda."
- **Results:**
  - ESG Processing Map
    - "Taking a cue from the model developed by the World Economic Forum, an "ESG Processing Map" was constructed to identify qualitative disclosures that a healthcare company should consider when implementing sustainability logic. The aspects investigated were processed, considering national and international standards, frameworks and disclosures. The social network analysis technique was used to systemize and combine the outcomes of these processes and analyze their consistency with sustainable development."
  - **Pillars**
    - **Environmental** (Environmental management system, Climate change, natural resource protection, Waste and pollution),
    - **Social** (Human Rights, diversity and inclusion, protection of human resources, health and safety, quality of care, management and protection of privacy, global citizenship)
    - **Governance** (quality of the governing body, ethical behavior)
- **Conclusions**: "the proposed map has management implications as it enables the organizations under examination to have a more conscious and responsible orientation concerning the decisions and strategies to be undertaken with a view to sustainability. From a theoretical point of view, however, the proposed guidance tool will return, through the manuscript, replicable results. For this reason, it is considered adaptable to organizations of various sizes and operating in different sectors than public healthcare."
- **Conclusions:** "This study appraises a compendious theoretical model for sustainability in healthcare based on the triple bottom line. The model reflects the extent of sustainability practices in healthcare. These practices instigate the healthcare system to trace and manage value-added through them. The model accommodates an assortment of environmental, social, and economic measures and sub-measures"

Mortimer F, Isherwood J, Wilkinson A, Vaux E. **Sustainability in quality improvement: redefining value.** Future Healthcare Journal. 2018. ([LINK](#))

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- Framework
  - Proposes a framework **(SusQi)** for embedding sustainability into quality improvement processes
- **Aim:** "We identify four stages in the quality improvement process (setting goals, studying the system, designing the improvement effort and measuring impact) at which sustainability is usefully considered and make specific suggestions for its inclusion. The intention is to transform sustainability from a lofty aim into a practical component of everyday improvement efforts."
- **Results:**
  - **The SusQI Framework:** This section describes different frameworks for identifying areas of resource use such as the 'Seven Capitals Matrix' (financial, staff, patients, community, staff networks, infrastructure, natural), and The Centre for Sustainable Healthcare (CSH)'s four principles of sustainable practice: "The principles are numbered in descending order of importance: 1) prevention, 2) patient empowerment and self-care, 3) lean systems and pathways, and 4) preferential use of technologies and interventions with lower environmental impact (Fig (Fig5).5). A fifth, non-clinical principle calls for improved operational resource use, for example, reduced packaging or water consumption for a given procedure."
- **Table 2 describes SusQi elements**:
  - **Setting goals**: "With finite resources available to deliver a high standard of patient care, quality improvement must look to maximize sustainable value, i.e. to deliver maximum health gain with minimum financial cost and harmful environmental impacts, while adding social value at every opportunity"
  - **Studying the system**: "A simple approach is to scan for environmental, social and economic resource use when mapping the current system."
  - **Design of the improvement effort**: "The Centre for Sustainable Healthcare (CSH) has defined four principles of sustainable clinical practice, aiming to first minimize the need for healthcare activity and then reduce the environmental impact of activity that is retained, while maintaining or improving health outcomes.
  - **Measuring impact**: "Having redefined value (Fig (Fig3)3) and modified the original goal of quality improvement to include environmental and social dimensions, the evaluation of quality improvement initiatives should ensure that impacts in these areas are captured, alongside health outcomes and financial costs (see Mortimer et al in this issue. Traditionally, these impacts (e.g. benefits to staff wellbeing, time savings or reduced fuel and parking charges from avoided patient journeys) may have been excluded from cost-benefit analyses."
- **Conclusion:** "We propose a practical framework for embedding sustainability across quality improvement education, practice and research.
  - What this paper offers:
  - A longer-term perspective on the responsibilities of health services and professionals.
  - A holistic approach to defining value, which considers environmental and social impacts alongside patient-based outcomes and financial costs.
  - A practical and ethical solution to address the sustainability of healthcare."

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Sood N, Teherani A. **How Should Health Systems Science Promote Health Systems' Sustainability?** Medical Education. 2022. ([LINK](#))

- Perspective
- **Aim: "**An expanded sustainability framework for health systems science (HSS) could promote health systems' capacity to deliver efficient, effective care for patients and to care for the planet by decreasing emissions and solid waste while cutting costs…Training clinicians to think critically about health system function, resilience, and sustainability will help prepare trainees to lead, innovate, and transform current health systems to prioritize planetary health, resource stewardship, and patient outcomes in a circular supply chain with low emissions."
- **Results:**
  - Discusses the following sections: **Sustainable Health Professions Education, Lean Six Sigma, Redefining Value in Service Delivery and Redefining Value in Education**
  - Lists examples of organizations employing leading practices:
    - "For example, Kaiser Permanente's progressive environmental standards for medical products and equipment has resulted in tens of millions of dollars in annual savings. Individual hospitals' sustainability efforts have also proved lucrative. The Carolinas Medical Center, for example, saved an estimated $158 000 annually by "reusing foam padding, reprocessing single-use devices, and powering down equipment overnight." Practice Greenhealth and Health Care Without Harm offer health systems best practices for employment of LSS methodologies to reduce solid waste and emissions from anesthetic gas use, increase operating room system efficiency, and reduce energy use.:
- **Conclusions:** "Training the rising generation of clinicians to think critically about health system functioning, resilience, and sustainability will pay dividends in the future. It will prepare trainees to lead, innovate, and transform the current health system into one that wholly prioritizes planetary health, resource stewardship, and patient outcomes through a circular supply chain and low-emissions system."

Framework Implementation

This section contains articles that focus on the implementation and evaluation processes for sustainability frameworks.

Systematic Reviews

Berniak-Woźny J, Rataj M. **Towards Green and Sustainable Healthcare: A Literature Review and Research Agenda for Green Leadership in the Healthcare Sector**. 2023. ([LINK](#))
- Systematic review (144 articles)
- **Aim:** "to present the current state of the art and future research scenarios in the field of green and sustainable healthcare through a literature review by using the Preferred Reporting Items for Systematic Reviews Meta-Analyses (PRISMA) method to perform a bibliometric analysis of papers published in 2012–2022."

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- **Results:**
  - Includes extensive list of associations with "green leadership" starting on page 3/18 e.g., The Alliance of Nurses for Healthy Environments (ANHE), The Health and Environment Alliance (HEAL), The Global Climate and Health Alliance, Irish Doctors for Environment, OraTaiao, The Canadian Association of Physicians for the Environment, Doctors for the Environment Australia
  - **Most cited articles:**
    - " "Measuring the health-related Sustainable Development Goals in 188 countries: a baseline analysis from the Global Burden of Disease Study 2015". The research focuses on analysis of 33 health-related SDG indicators based on the Global Burden of Diseases, Injuries, and Risk Factors Study 2015."
    - ""The Roles of System and Organizational Leadership in System-Wide Evidence-Based Intervention Sustainment: A Mixed-Method Study" , published in the Administration and Policy in Mental Health and Mental Health Services Research in 2016 by an international team from Asia, the USA, and Europe. The article highlights the role of positive sustainable leadership in positively contributing to the implementation of the sustainable development goals in the context of public health.
    - Third is the article "Implementation of Obstetric Telehealth During COVID-19 and Beyond""
  - **Conclusions:**
    - "As a result of our systemic review, we can state that the interests of researchers are encapsulated in three thematic clusters: the **first (general)** focuses on sustainable development in the health sector; the **second (climate)** focuses on the impact of health sector organizations on the climate or wider environment; and the **third (digital transformation)** focuses on new technologies applied in healthcare that can support the sustainable development of the sector"
    - "There is a lack of work devoted to green leadership in the health sector, which translates into continuing insufficient awareness in the health sector community regarding the negative impact that the sector has on the natural environment and possible steps to be taken to reduce or completely eliminate this impact."

Mostepaniuk A, Akalin T, Parish MR. **Practices Pursuing the Sustainability of A Healthcare Organization: A Systematic Review.** Sustainability. 2023. (LINK)

- Systematic review (67 articles)
- **Aim**: "to investigate efficient practices pursuing the sustainability of healthcare organizations, as the healthcare sector and its activities affect different spheres of social life, the economy, and the state's performance, highlighting the importance of this subject."
- **Results:** "the following successful practices are oriented towards achieving the sustainability of an organization: improvements in management approaches, promoting leadership, specifically "engaged with other" leadership; management selection processes that account for managers' personal characteristics; the promotion and encouragement of clinicians engaging in the management, promotion, and modification of organization culture and management style;

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spreading the usage of virtual means of communication in healthcare, as it leads to more equal access to healthcare organizations and doctors, simultaneously, allowing the reduction of costs, consumption and ecological footprint; promoting the environmental supply chain, which positively affects the overall level of environmental degradation; encouraging rational resource consumption, which leads to increasing the efficiency of the usage of available natural resources by encouraging recycling, reuse and shifting towards durable goods rather than disposable ones, thereby promoting techniques for minimizing waste generation by healthcare organizations."

- **Conclusions: "**the following efficient practices were suggested to improve the sustainability of healthcare organizations: improvements in management practices, leadership practices, manager selection, the engagement of clinicians in the management, the promotion of organizational culture and management style, the promotion of virtual health communication, environmental supply chain management, rational resource consumption, and waste management."

Other Reviews

Lakatos K, Teherani A, Thottathil SE, Gandhi S, Weiser SD, Brindis CD. **A race to net zero—early lessons from healthcare's de-carbonization marathon**. Health Affairs Scholar. 2023. ([LINK](#))

- Review and jurisdictional scan (U.S. and UK)
- **Aim:** "Through a process of reviewing the peer-reviewed literature, publicly available published documents, annual sustainability reports, conference presentations, and participation in a national de-carbonization collaborative, we (1) provide a diverse set of examples showcasing the variety of ways healthcare systems are responding; (2) identify a set of emergent key themes to implementing de-carbonization practices, such as the role of an organizational culture of iterative improvement and building systems of cross-organizational collaboration; and (3) synthesize the identifiable set of driving factors for long-term sustainability of these de-carbonization efforts."
- **Provides list of institutions and de-carbonization efforts in Table 1**
- **Key themes to implement de-carbonization practices**:
  - "Importantly, a common thread seen across all examples is committed organizational leadership at both the executive and direct-provider level."
  - "LSS principles of waste reduction have helped many organizations advance their mission, meet their de-carbonization goals, and simultaneously achieve a financial pay-off. Another tool developed by the Institute for Healthcare Improvement, the Framework for Strategic Improvement, adopts concepts of "will and idea gathering," as well as providing additional support and strategies for process implementation. While not explicitly developed for the purpose of de-carbonization, it has wide utility in mobilizing organizations across the country to pursue strategic and meaningful change, including initiatives on mitigating impact on climate change."
  - "An encouraging outcome in this increasing pool of examples is the growing body of evidence demonstrating that, alongside their environmental and social cost savings, **de-carbonization practices can have concomitant economic benefits, all while maintaining a high standard of patient care and safety**."
  - "A focus on the cross-calculation of the economic, environmental, and social costs, referred to as the triple bottom line, has been noted as the next phase to achieve healthcare value."

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- **Conclusions:** "The synergistic work of global and national policy stakeholders, along with healthcare systems' early adopters of de-carbonization, have helped create scaffolding for implementing a variety of strategies across the healthcare sector. Future steps are needed to ensure that additional healthcare systems adopt a series of sustainable strategies that address all emissions in an ongoing manner."

Sherman JD, Thiel C, MacNeill A, Eckelman MJ, Dubrow R, Hopf H, et al. **The Green Print: Advancement of Environmental Sustainability in Healthcare. Resources, conservation and recycling**. Resources, Conservation and Recycling. 2020. (LINK)

- Narrative review
- **Aim**: "This narrative review describes the scope of healthcare sustainability research, identifies knowledge gaps, introduces a framework for applications of existing research methods and tools to the healthcare context, and establishes research priorities to improve the environmental performance of healthcare services"
- **Structure of the paper**: "This narrative is organized first by the current state in the areas of healthcare emissions research, implementation, benchmarking and accounting, and education. Next, research gaps and priorities were identified. Finally, outcome recommendations, summarized in Table 1, and overarching conclusions are presented."
- **Results:**
  - Safety, quality and value in healthcare
  - **See table 1: Key Research Gaps and Priorities for Environmental Sustainability in Clinical Care**
    - "Pollution itself is a patient safety issue, and pollution prevention should be included in efforts to improve healthcare quality."
    - "Clinical activities are the major driver of resource utilization and waste in health care and provide a fundamental opportunity for engaging health professionals in pollution prevention efforts."
  - Healthcare emissions research
    - "Strategic areas of investigation include: basic materials management, pharmaceuticals and medical device design, environmentally preferable clinical care pathways, hospital/health systems and provider-level performance metrics with international benchmarks."
  - Implementation, benchmarking and accountability
    - "The evidence-based, best practices identified by initiatives like Choosing Wisely, Getting it Right the First Time, and the Wise List must include environmentally preferable, in addition to waste-sparing, practices. Partnerships with these organizations are recommended to mainstream environmental stewardship into the healthcare quality discourse."
    - "Integrating environmental sustainability into value-based healthcare reform, and communicating with clinicians and policy makers in the language of these paradigms, can help to achieve rapid uptake and success of healthcare sustainability initiatives."
  - Research funding for sustainable clinical care

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- **Conclusions:** "To date, framing environmental sustainability in terms of its co-benefits for the healthcare system and population health has been an effective strategy for introducing this agenda as non-threatening to core healthcare mandates and by emphasizing compatibility with current resource constraints. However, achieving the ambitious targets that are necessary to mitigate dangerous environmental instability requires that healthcare sustainability be recognized as imperative to the health of current and future populations, and to the viability of health systems. Aligning and integrating this agenda with the widely accepted core values of quality, safety and high-value care is the necessary next step toward a sustainable future."

Soares AL, Buttigieg SC, Bartosz B, McFadden S, Hughes C, McClure P, et al. **A Review of the Applicability of Current Green Practices in Healthcare Facilities**. International Journal of Health Policy and Management. 2023. ([LINK](#))

- Scoping review (106 articles total, 19 reports, two webpages, 1 book)
- **Aim:** "The following research questions were formulated to guide this scoping review:
  - What is the current status of [circular economy] CE implementation within **the European Union (EU)?**
  - What is the applicability of CE in hospitals?
  - How can the application of CE to healthcare be expanded or improved?"
- **Applicability of Circular Economy in Healthcare:**
  - "However, the healthcare industry is itself a significant contributor to the GHG emissions and damage to the environment. Most of the global healthcare GHG originates in the supply chain, making it the area of highest impact for healthcare de-carbonization. As this industry has been steadily increasing single-use disposable medical devices, emblematic of a take-make-waste economy, this has resulted in increased waste and pollution as well as associated public health damage"
- **Application of Circular Economy Within Hospitals**:
  - Topics discussed: **hospital design, green team, waste management, energy, water, travel/transportation/telemedicine, procurement, food, behaviour**
- **Results:** "Almost every article identified the need for engagement of individuals and sustainable/environmental behaviour for a full application of environmental sustainability practices ([Table 2](#)). This includes to involve staff and patients, given their role in the hospital's environmental impact. Staff awareness has been identified as one of the most important factors required for hospital improvement since they are the drivers of change within the hospital. Additionally, some literature refers the importance of proper waste management training for hospital staff in a successful implementation."
- **Conclusions:** "This overview regarding CE implementation and applicability in hospitals practice was presented to provide a comprehensive picture of the actual situation and help to identify how CE can be implemented in current hospitals. As addressed before, the concept of CE was applied to this study in its wider scope, since it addressed not only the reduction in natural resources extraction, the reuse of resources extracted and the re-introduction of resources back into the economy, instead of becoming waste; but also interprets the use of energy and water as resources, and addressed GHG emissions as part of the CE since they are emitted as a result of the use of fossil fuels, which are a resource."

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van Schie. **Governance related factors influencing the implementation of sustainability in hospitals: A systematic literature review.** Health Policy. 2024. ([LINK](#))

- Review (30 articles)/comparative article
- **Aims:**
  - "In these papers, **four governance related factors were identified to be important for** Papers explore governance related factors important to "**the implementation of sustainable development in the hospital**: knowledge, involvement from management, commitment from healthcare professionals, and technology use..""
  - Follows-up on gaps in research on hospital sustainability identified by McGain and Naylor (2014)
- **Results**:
  - "Stakeholder theory was identified as the most common theoretical framework used and future research related to this was suggested by multiple authors"
  - "An interesting finding in these themes is that both a top down (commitment from management) as well as a bottom-up (involvement from healthcare professionals) approach seem to be needed to govern sustainable development."
  - "Practical implications that follow from the governance related factors identified in this review in the hospital are that management should commit to sustainability and healthcare professionals should also be given enough attention in sustainable development.
- **Conclusions:**
  - "In these papers, four governance related factors were identified to be important for the implementation of sustainable development in the hospital: knowledge, involvement from management, commitment from healthcare professionals, and technology use."
- **Related resources:**
  - McGain F, Naylor C. **Environmental sustainability in hospitals – a systematic review and research agenda**. Journal of Health Services Research & Policy. 2014. ([LINK](#))
    - Systematic review (76 studies)

    - **Conclusions:** "This systematic review aimed to give an overview of the role of governance in sustainable development in hospitals in Europe. Knowledge, involvement from management, commitment from healthcare professionals, and technology use are found to influence the implementation process of sustainability. In addition, stakeholder theory is the most used theoretical framework which stresses the importance of stakeholders in the process."

Primary Studies

Ali A, Sivakanthan Y, Kukoyi A, Koleoso P, Jeyarajan S, Uche V. **14 Brick by brick: the foundations of management practices needed to reach net zero in NHS hospitals' estates & facilities**. Leadership for sustainable healthcare. 2024. ([LINK](#))

- Qualitative study
  - 21 interviews conducted on sustainability leaders in the healthcare system, 8 of which were experts

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- **Aim: "**Whilst the NHS has committed to becoming the first healthcare service in the world to reach net-zero by 2040, it contributes to 4–5% of the UK's total emissions. Of all NHS emissions, 15% can be attributed to its Estates & Facilities (E&F), only second to medicine. However, this problem is largely underrepresented in the literature, particularly concerning the role of management in realizing net zero. This oversight led us to our research, which aimed to identify the barriers and facilitators for management to achieve net zero in NHS Hospitals' E&F. We would like to showcase the intricate challenges and opportunities we have found in the intersection of Healthcare Management and sustainability."
- **Results:**
  - "Following our NLR and interviews, barriers included Engagement, Data, Estate Operations, Hierarchical Management and Funding. Funding was the most salient barrier we found"
  - "Facilitators included Engagement, Hierarchical management, Estate Operations, Data, Policy, Training and Development."
- **Conclusions:**
  - "We created **the Foundation Model of Estates and Facilities Management** from these barriers and facilitators. Our novel model illustrates the seven key meta-themes identified in the discussion and their interactions downward and bottom-up. Ultimately, these findings fill a gap in the literature, highlighting the current barriers and facilitators experienced by Sustainability Leads in their efforts to de-carbonize their Hospital [estates and facilities] E&F. Specifically, the lowermost 'foundational' themes, Engagement, [training and development] T&D, and Data, are the most influential in driving de-carbonization efforts in Estate Operations"

Langstaff K, Brzozowski V. **Managing environmental sustainability in a healthcare setting**. Healthcare Management Forum. 2017. (LINK)
- Review of St. Joseph's Healthcare Hamilton (SJHH) environmental sustainability plan
- **Aim**: "examine the strategies and outcomes of an environmental sustainability plan for one hospital from 2008 to present, including best strategies, lessons learned, and what lies ahead of us in the new world of capping greenhouse gas emissions."
- **Includes sections on**: "Strategies that worked (corporate culture and stakeholder engagement); Waste management; New facility, new standard: Redevelopment of SJHH's West 5th campus; Getting ready for cap and trade"
- **Conclusions**: "St. Joseph's Healthcare Hamilton continues to utilize students to complete waste audits, continues to engage staff, visitors, and patients in a joint effort and continues to manage and measure the programs put in place over the past 2 years. Once in place, a well-thought and well-executed plan, with full leadership support and ongoing auditing and measurements, should be able to sustain itself."

Kalogirou MR, Dalhke S, Davidson S, Yamamoto S. **Integrating planetary health into healthcare: A document analysis.** Health Policy. 2021. (LINK)

- Document (policy) analysis of planetary health framework integration into a Canadian healthcare organization

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- - "A **planetary health** perspective suggests it is important to understand how healthcare organizations around the world can deliver high quality healthcare services while also operating in environmentally sustainable ways."
- **Aim**: "to answer the following: How does a large Western Canadian healthcare organization incorporate environmentally responsible practice and planetary health into its policies, and what do policies related to the procurement, utilization, conservation, and disposal of workplace resources reveal about the organization's perspectives on climate change?"
- **Results**: "Four themes were identified: procurement of resources, resource utilization, resource conservation, and waste management."
- **Conclusions**: "The findings suggest that the organization's top priority was the delivery of efficient and safe healthcare. Furthermore, the concept of safety was so pervasive that it permeated every step of the resource life cycle. The organization's conceptualization of safety was limited to employees, patients, and the public, and little mention was made towards planetary health."

Reports

Seppanen AV, Zeynep O. **The Environmental Sustainability of Health Care Systems: A literature review on the environmental footprint of health care systems and interventions aiming to reduce it – for a framework for action for France**. Institute for Research and Information in Health Economics. 2023. ([LINK](#))

- Report carried out by [IRDES](#) for the French government, includes "A literature review on the environmental footprint of health care systems and interventions aiming to reduce it – for a framework for action for France"
- **Aim**: "provided evidence on interventions aiming to reduce the environmental impact of health care. All articles included in the review can be found page 77, and their principal results page 81."
- **Results**:
  - **Main areas of inquiry**:
  - Interventions targeting hospital, surgery and operating rooms
  - Increasing reusing and sterilizing
  - Waste management and reduction
  - Reducing travel and greening transport
  - Reducing pharmaceutical pollution and green prescription practices
  - Health system-level approaches

World Health Organization. **Environmentally sustainable health systems: a strategic document**. 2017. ([LINK](#))

- Strategic Document
- **Abstract:** "Ten avenues for action are proposed that can form the core of a strategy for fostering environmental sustainability in health systems, namely adopting a national environmental sustainability policy for health systems; minimizing and adequately managing waste and hazardous chemicals; promoting an efficient management of resources; promoting sustainable procurement; reducing health systems' emissions of greenhouse gases and air pollution; prioritizing disease prevention, health promotion and public health services; engaging the health

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workforce as an agent of sustainability; increasing community resilience and promoting local assets; creating incentives for change; and promoting innovative models of care."]

- **Results:**
  - Based on experiences in Member States and the scientific literature, the plan may include the following actions: overarching action: adopting a national environmental sustainability policy for health systems; minimizing and adequately managing waste and hazardous chemicals; promoting an efficient management of resources; promoting sustainable procurement; reducing health systems' emissions of greenhouse gases and air pollutants; prioritizing disease prevention, health promotion and public health services; engaging the health workforce as an agent of sustainability; increasing community resilience and promoting local assets; creating incentives for change; and promoting innovative models of care.

Guidance

Cascades document. **Organizational readiness for sustainability**. 2022. ([LINK](#))

- Playbook for sustainability from CASCADES
- **Aim:** "The Playbook provides ideas, examples and resources. It served as a template for a Level Setting report highlighting areas of expertise across TAHSN to inform efforts across the network. These materials were developed from a rapid environmental scan and discussions with sustainability professionals and leaders from the CoP and TAHSN hospitals from January through June 2022."
- **Results:** Discusses 4 priority areas of activity for sustainability: Service design & delivery, procurement & supply chain, facilities & estates, food & nutrition, and 4 "Hows": Engage senior leaders & governors, build cross-organizational capacity, pursue partnerships for impact, advance measurement & reporting

Ritcey G, Burra T, Byers E, Gardner K, Gurney L, Fallis J, et al. **Training for Better Health Outcomes: Integrating Sustainability into Healthcare Quality Improvement Education version 1.0**. CASCADES. 2023. ([LINK](#))

- Playbook from the [CASCADES](#) group, very high level
- **Aim**: "This playbook provides ideas examples and resources for facilitators, education leads, instructional designers and quality leads of healthcare-based quality improvement (QI) programs to identify opportunities too incorporate principles of sustainability into new or existing QI courses, resources and plans."
- "Contents include a framework for embedding sustainability within the six domains of quality, a project charter specifically developed for sustainable quality improvement projects and an environmentally sustainability quality improvement workshop package"
- **Includes a section on**: "Embedding Environmental Sustainability into Quality: a Framework for Canadian Health Systems"
- See YouTube video "A new quality framework for Canadian health systems" from CASCADES Canada that introduces **Embedding Environmental Sustainability in Quality: A Framework for Canadian Health Systems** here: https://www.youtube.com/watch?v=kxjm_Ehy2FQ

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Other

Alami H, Lehoux P, Miller FA, Shaw SE, Fortin JP. **An urgent call for the environmental sustainability of health systems: A 'sextuple aim' to care for patients, costs, providers, population equity and the planet**. The International Journal of Health Planning and Management. 2023. ([LINK](#))
- Perspective
- **Aim: "**In this paper, we interrogate the suitability and feasibility of integrating the aim of 'environmental sustainability' to form the 'Sextuple Aim.' Environmental sustainability may be in tension with, but also a potential lever to meet the other cardinal aims: (1) quality and experience of patient care; (2) population health; (3) quality of work and satisfaction of healthcare providers; (4) equity and inclusion; and (5) cost reduction. We propose policy and practical avenues to help move towards the Sextuple Aim."
- **Results:**
  - Includes sections on "Why Make Environmental Sustainability a Sextuple Aim?" and "Progress to Date and Critical Next Steps to Achieving the Sextuple Aim"
- **Conclusions: "**Progress has been made, but much more needs to be done. A formal and concrete environmental commitment in healthcare decisions and practices is now urgently needed. Healthcare providers, managers, policymakers, industries, civil society, and the public must now see environmental sustainability as the logical extension of the five cardinal aims of improving quality and experience of patient care, population health, quality of work and satisfaction of providers, equity and inclusion, and cost control."

Rajagopalan S, Pronovost P, Al-Kindi S. **Implementing a Sustainability Framework in Healthcare: A Three-Lens Framework**. Healthcare (Basel). 2023. ([LINK](#))
- Framework
- **Aim:** "we review approaches to embed sustainability as a core strategy in HCOs and discuss implementation from the standpoint of a three-lens political, strategic, and cultural framework. We discuss solutions to **embed sustainability and to facilitate buy-in, and provide a pathway to operationalize sustainability initiatives**."
- **Results:**
  - "A strong operational plan for engaging, standardizing, and maintaining sustainability initiatives is essential. We outline key steps HCOs can take on their sustainability journey.
  - **Choosing a Pilot Indicative Unit for Sustainability**: Most HCOs standardize processes by testing them on a small scale in one pilot unit, which serves as the "model unit" or a place for experimentation and implementation. **When looking for a model unit, some attributes are particularly important. (a) Stability and Opportunistic Units**: the best units to test sustainability initiatives may include those with low workforce turnover and ample sustainable practice opportunities, such as operating rooms. Alignment around sustainability goals: managers in the unit should understand what is expected of them, how their work is going to change, and why standardizing practices is important for sustaining quality. **(b) Practice "hygiene":** it is preferable to find testbeds that already have a few sustainable practices in place and stable routines. A chaotic environment will have difficulty implementing sustainable practices. **(c) Engagement**: the unit should have a respected local change champion who can build excitement for change, encourage participation, coach the team, and celebrate success.

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- o **Deploy Overlapping Timelines**: Overlapping timeframes for accomplishing goals are a way to address complex and ambiguous challenges such as sustainability. Thus, having short-term, medium-term, and long-term goals can make progress seem more tangible. Short-term goals (months to a year) could include the reduction of plastics and waste, aggressive recycling, the shift to clean energy sources, energy conservation approaches, and cafeteria reform to include locally sourced foods and plant-based diets. In the medium term (years), priorities may include a total switch to electric cars, engagement with suppliers to design a more circular system, and reducing Scope 3 emissions. Ultimately, the long-term target could be achieving net carbon neutrality across the HCO.

- o **Process Evaluation of Sustainability Initiatives**: A life cycle analytical (LCA) approach can help account for inputs, emissions, and subsequent health impacts from "cradle-to-grave". This includes direct emissions from product use, along with indirect emissions from both upstream (i.e., the supply chain production and transportation) and downstream (i.e., waste disposal management) activities. LCA and other industrial ecology methods and tools, such as circular economy principles, can be used to assess clinical pathways, procedures, individual drugs, and medical devices. Assessing the adoption, implementation, and maintenance of initiatives using an implementation science framework is crucial to ensure the durability of change. Additionally, evaluating the cost-effectiveness of sustainability initiatives is important to provide reassurance that these measures improve the financial bottom line of cash-strapped HCOs."

- **Conclusions:** "Currently, healthcare pollution causes significant direct and indirect public health damage, resulting in substantial costs and resource consumption. Sustainability initiatives will require a transformational shift to new models of care that are crucial to achieving net zero status, as outlined by the Intergovernmental Panel on Climate Change (IPCC), within a short timeframe. Healthcare has a moral and economic imperative to accelerate sustainability efforts. The time to start is now."

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