Health Education England

Evidence Brief: Sustainability

Contents

Produced by the HEE Knowledge Management team Evidence Briefs offer a quick overview of the published reports, research, and evidence on a workforce-related topic.

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- Complete Evidence Brief list – link for HEE staff
- Complete Evidence Brief list – link for External staff

Key publications – the big picture

Sustainable healthcare technology
Source: NHS Digital
Publication date: Last updated July 2022
NHS Digital is committed to making sure environmental and social sustainability is core to the design of new healthcare technology.
Without it, there's a real risk of negative impacts affecting the energy and material footprint of the healthcare system.

Applying net zero and social value in the procurement of NHS goods and services
Source: NHS England
Publication date: March 2022
NHS England's stated policy objective is to meet its net zero carbon targets while achieving its wider social value priorities. This document sets out how the procurement of NHS Goods and Services can play its part in achieving these policy objectives.

A blueprint: for green workforce transformation
Source: Deloitte
Publication date: 2022
The UK of 2050 will look radically different from today.
We anticipate a world where carbon emissions are captured and reused, and homes have moved to low-carbon heating. AI-driven farming will produce more from less land; food 'waste' will be transformed into valuable medicine, while in our cities low-energy travel will be the norm. But reaching this point requires changes from every industry. As jobs become greener we'll all need to acquire green skills, many of them outside the specialised sustainability areas you might expect. Marketing, HR, IT and Finance are all set to become greener.

Sustainable improvement: growing a greener NHS
Source: The Health Foundation
Publication date: 28th October 2021
The Health Foundation supports the NHS's ambition to reduce its contribution to climate change and become the world's first net zero health care system. The 2021 United Nations Climate Change Conference (COP26) is being held in Glasgow from 31 October to 12 November, where world leaders will be sharing how they are meeting their promises made at COP21 in Paris and galvanising action around climate change. Here we look at some of the improvement work we are funding that can contribute to achieving NHS net zero, and how local NHS institutions can contribute to sustainability in the places they serve.

Going green: what do the public think about the NHS and climate change?
Item Type: Journal Article
Authors: Cameron, Genevieve;Göpfert, Anya;Gardner, Tim and Health Foundation
Publication Date: 2021
With the NHS aiming to become the world's first 'net zero' emissions health care system, understanding the views of the public will support the development and implementation of policies to successfully transition to net zero. This long read explores public perceptions of climate change, health and the NHS. It highlights key findings from a nationally representative survey of 1,858 UK adults, conducted by Ipsos MORI in July 2021.

How to produce a Green Plan: A three-year strategy towards net zero
Source: NHS England

Publication date: Updated June 2021
To support the co-ordination of carbon reduction efforts across the NHS and the translation of this national strategy to the local level, the 2021/22 NHS Standard Contract set out the requirement for trusts to develop a Green Plan to detail their approaches to reducing their emissions in line with the national trajectories. Given the pivotal role that integrated care systems (ICSs) play, this has been expanded to include the expectation that each system develops its own Green Plan, based on the strategies of its member organisations. This guidance explains how NHS organisations should construct their Green Plans, and the areas and initiatives that the plans should cover.

Climate changes is a public health emergency: the NHS is rising to the challenge
Source: NHS Providers
Publication date: December 2021
The NHS has recognised climate change as a public health priority. Over the next three decades, climate change will increasingly threaten the health and wellbeing of people and communities globally and provoke change in how we deliver health services on multiple fronts.
● The NHS has a central role to play in efforts to reduce carbon emissions and respond to the sustainability agenda more broadly, harnessing its considerable economic and social value, and the support and enthusiasm of its workforce.
● The NHS' ambition to become a net zero health service by 2040 and 2045 provides trusts with the opportunity to plan how they will reduce emissions. However, it is important that the service, including integrated care systems (ICSs), contribute to change before 2030.

Getting to net zero in UK public services: the road to decarbonisation (a UNISON report on the measures and costs for public services to meet climate targets)
Source: Unison
Publication date: November 2021
Public services as a whole (excluding transport) represent about 8% of the UK's direct greenhouse gas emissions. The NHS alone represents about 4% of the UK's emissions. When procurement, construction, and social housing are taken into account, public services' impacts are much greater. See section 9 "Health"

Delivering a 'Net Zero' National Health Service
Source: NHS England
Publication date: October 2020 (update July 2022)
This report provides a detailed account of the NHS' modelling and analytics underpinning the latest NHS carbon footprint, trajectories to net zero and the interventions required to achieve that ambition. It lays out the direction, scale and pace of change. It describes an iterative and adaptive approach, which will periodically review progress and aims to increase the level of ambition over time.

Sustainable and environmentally friendly general practice report
Source: British Medical Association (BMA)
Publication date: September 2020
Ways in which GP practices can develop, and can be helped to develop, environmentally responsible practices, as part of the campaign for carbon neutrality by 2030.

Climate change and sustainability: the health service and net zero.
Item Type: Journal Article
Authors: British Medical Association
Publication Date: 2020
This report states that with the NHS contributing up to 5 per cent of the UK's total carbon emissions, increased sustainability and changes to working practices are vital if the health of future

generations is to be protected. The health service has a responsibility to its patients to reduce its own carbon footprint and to strive for net zero emissions, if it is to take a leading role in combating the harmful effects of climate change.

Going green: preparing the UK workforce for the transition to a net-zero economy
Source: Nesta
Publication date: June 2020
To tackle the climate crisis, the UK Government has set a target of net-zero greenhouse gases by 2050. To achieve this target, a major transformation is required to prepare sectors and workers for the green economy. This report analyses the scale of the challenge and considers how sectors can adapt to avoid unemployment through the transition and ensure people are reskilled to do a 'green job'. By analysing 10 datasets (including Office of National Statistics, Organisation for Economic Co-operation and Development and Eurostat), this report includes an 'Eco-Transformation of Industries Matrix'. This brand new taxonomy classifies industries as 'leaders', 'neutrals', 'followers' or 'laggards' based on: how high (or low) their carbon emissions are, and how high (or low) they are engaged in environmental activities.

Sustainable development management plan summary report 2017-2022
Source: NHS Digital
Publication date: October 2019
We're committed to reducing our impact on the environment. This is our first sustainable development management plan, covering the period 2017-2022 and setting out a clear route map to develop a more sustainable organisation.

Long Term Plan
Source: NHS
Publication date: January 2019
"The NHS is leading by example in sustainable development and reducing use of natural resource in line with government commitments. In 2016/17 NHS providers generated nearly 590,000 tonnes of waste. Of this only 15% goes directly to landfill, with 23% of waste recycled190 . Between 2010 and 2017 the health and care sector reduced water consumption by 21%, equivalent to around 243,000 Olympic swimming pools. The carbon footprint of health and social care has reduced by 19% since 2007, despite a 27% increase in activity. This leaves a significant challenge to deliver the Climate Change Act target of 34% by 2020 and 51% by 2025. A shift to lower carbon inhalers will deliver a reduction of 4%, with a further 2% delivered through transforming anaesthetic practices. Additional progress in reducing waste, water and carbon will be delivered by ensuring all trusts adhere to best practice efficiency standards and adoption of new innovations. Key to this will be delivering improvements, including reductions in single use plastics, throughout the NHS supply chain."

Reducing the use of natural resources in health and social care
Source: NHS England; Public Health England and Sustainable Development Unit
Publication date: 2018
The report summarises the footprint of the health, public health and social care system across four key impacts: water, waste, air pollution and carbon equivalent emissions. Set against a backdrop of increased clinical activity and during a period of transformation, the NHS, public health and social care system has demonstrated significant progress by reducing carbon emissions by 18.5 per cent between 2007 and 2017; reducing the water footprint by 21 per cent between 2010 and 2017; and ensuring 85 per cent of NHS provider waste is avoiding going directly to landfill. The final sections of the document identify

some targeted actions that can deliver integrated natural resource savings against all four areas of impact.

Less waste, more health: a health professional's guide to reducing waste
Source: Royal College of Physicians
Publication date: April 20178
The Less waste, more health report explains how health professionals can positively influence societal health and wellbeing by making simple changes to the procurement and disposal of medical supplies.
In England, there are 165 hospital trusts with a combined expenditure of over £4.6 billion per annum on medical supplies and other consumables. What we use and how we dispose of it has an impact not only on the finances of the NHS but the environment and population health.

Our Strategy – Delivering Health Sustainably
Source: NHS Supply Chain
To drive better health outcomes and create economic, social and environmental value for our stakeholders, NHS Supply Chain is committed to leveraging the strength of its people and operations to deliver health sustainably.

Sustainable Development Management Plan for NHS England 2018-20
Source: NHS England
Publication date: April 2017
This plan shows how we will encourage smarter ways of working creating a workplace culture that has a positive impact on our business, health and wellbeing of our workforce.
At its core is an approach to development that looks to balance different needs against an awareness of the environmental, social and economic limitations we face as a society.

Breaking the fever: sustainability and climate change in the NHS
Source: Royal College of Physicians
Publication date: March 2017
Breaking the fever: Sustainability and climate change in the NHS gives an overview of the impact of climate change on healthcare in the UK, and how physicians and the NHS can contribute to reducing greenhouse gas emissions.

Case Studies

The Delivering a Net Zero NHS report demonstrated that the NHS has both met and exceeded the 2020 targets outlined in the Climate Change Act.
One year on from this landmark commitment we are on track to meet our net zero ambition, but meeting our final target will only be possible if every part of the NHS – more than 1.3 million of us – is working together. The section provides case studies highlighting the important work happening at all levels across the NHS.

- Reducing unnecessary cannulation at Charing Cross Hospital
- Green transport delivers life-saving drugs and improves patient experience
- Solar power sparks an electrical future for Milton Keynes University Hospital
- Pedal power for cleaner healthcare delivery – Sussex Community NHS Trust
- Putting anaesthetic-generated emissions to bed: An initiative by University Hospitals Bristol NHS Foundation Trust
- Boosting healthy and sustainable travel in Manchester

- Zooming into a greener future: The case for a zero-emissions courier services: An initiative by Newcastle upon Tyne Hospitals NHS Foundation Trust
- For a greener NHS: GOSH reducing single use plastics

The Leeds Teaching Hospitals NHS Trust
You can read a selection of our sustainability case studies below, and watch the short video on how we are reducing the use of paper across the Trust, by moving to a digitised patient record system.

HEE Star

More resources and tools are available in the HEE Star

Statistics

You can find relevant statistics on the Health and Care Statistics Landscape

HEE National Data Programme

HEE staff can look at the National Data Warehouse (NDL) SharePoint site to find out more about datasets and Tableau products.

Published Peer Reviewed Research

Training, education, and skills

Chapter: Entrepreneurship and Sustainability: Plugging the Green Skills Gap with Empathy, Compassion and Connectedness to Nature Abstract only*
Author(s): Moon
Source: In “Entrepreneurship, institutional framework and support mechanisms in the EU”
Publication date: August 2021
This chapter investigates the ‘green skills gap’ as economies move towards net zero emissions. Building on the work of Moon, Walmsley, Apostolopoulos, and Zollo (2020), the author identifies critical skills needed in the green economy to ensure that current skills gaps identified by the International Labour Organization (2018) are bridged. However, the ILO (2018) report predominantly refers to macro level changes in society as economies transition to carbon neutrality (job destruction, job creation and job reallocation). There is little evidence of detailed action plans nor their implementation and the ILO report concludes that skills development programmes are yet to be mainstreamed in policy discussions. This chapter thus highlights the green skills needed, identifies some of the barriers preventing economies from mainstreaming such skills development programmes into policy and provides recommendations for governments, enterprises and universities in the short to medium term. The chapter includes a review of global progress in developing skills for a greener future (ILO, 2019) but focusses on implications for European policy in particular.

The Greta Thunberg effect: student nurses’ attitudes to the climate crisis

Author(s): Richardson et al.
Source: Clinical Practice Research Sustainability 117(5)
Publication date: May 2021
The risks of the climate crisis and environmental damage have recently been highlighted in the media – for example, through the actions of climate activist Greta Thunberg. The negative impacts of the climate crisis on health and healthcare are well documented, with reports of unacceptable levels of risk for the health of populations worldwide. We compared the attitudes towards sustainability and the climate crisis of student nurses starting a nursing degree in 2019 with those from 2014. Study results showed that the 2019 students were more likely to agree that the climate crisis and sustainability are important topics in nursing and should be included in the curriculum. We suggest how this can be achieved and highlight future research needs.

Integrating sustainability into postgraduate medical education
Author(s): Gandhi et al.
Source: Future Healthcare Journal
Publication date: June 2020
The delivery of healthcare is a major contributor to the climate crisis, with the NHS being the largest public sector contributor of carbon emissions in the UK. Physicians have an important role to play in the fight against climate change through the practice of sustainable healthcare. This involves maintaining the current and future quality of healthcare through balancing environmental, social and financial constraints. To this end, integrating these skills into medical education is crucial. A large number of medical schools have already embedded planetary health and sustainability theory into their curriculum, however, there is no formal sustainability curriculum in postgraduate education and training. This is vital for enabling clinicians to translate sustainability theory taught at undergraduate level into clinical practice. This article proposes which topics should be included in a postgraduate sustainability curriculum and explores various methods that could be used to incorporate these into the current educational framework.
See also response to this article

Green competencies: insights and recommendations from a systematic literature review
Source: Benchmarking: An international journal
Publication date: August 2020
Purpose: This study conceptualises the construct – green competencies. The concept is in the niche stage and needs further elaboration. Hence, to address the research gap, this study follows the steps proposed by Tranfield et al. (2003). The major part of the study comprises descriptive analysis and thematic analysis. Descriptive analysis of the selected 66 articles was examined with the classification framework, which contains year-wise distribution, journal-wise distribution, the focus of the concept, the economic sector, and dimensions of sustainable development. The paper conducts a thematic analysis of the following research questions. What are the green competencies and their conceptual definition? What are their dimensions? Design/methodology/approach: This paper applies a systematic literature review of green competencies literature, extends the state-of-the-art using the natural resource-based view, and discusses future research directions for academicians and practitioners. Findings: In recent years, there was considerable interest in green competencies (GC), as reflected in the surge of articles published in this genre. This paper asserts that green competencies are a multidimensional construct comprised of green knowledge, green skills, green abilities, green attitudes, green behaviours, and green awareness. Originality/value: Despite the significance of green competencies, there has been a dearth of study to define the constructs and identify the dimensions. Hence, this study addresses the literature gap by conceptualisation and discusses dimensions of the construct.

Chapter: Integrating sustainable development into healthcare curriculum Abstract only*
Author(s): Gurbutt and Gurbutt
Source: Integrating Sustainable Development in the Curriculum
Publication date: March 2020
This chapter will set the scene for the need of sustainable development in the healthcare curriculum by discussing the contemporary context of healthcare provision and its associated challenges. This is specifically in the context of wicked or complex problems. An exploration of what gives rise to such problems is used to lead into integrated care as a proposed solution and its associated drivers. This is considered in relation to sustainability and curriculum development with a focus on two examples: the creation of a post-graduate curriculum to teach sustainable integrated care to clinical staff and a new pedagogical approach called socially immersive learning. Through this the challenges of barriers and enablers to integrated care will be considered and the extent to which a global mind-set transition might occur among participants to align sustainable development goals.

Environmental competencies for healthcare educators and trainees: a scoping review Abstract only*
Author(s): Parker et al.
Source: Health Education Journal
Publication date: November 2019
Background: The health-care community has a responsibility to address the environmental impact of delivering health-care services. Educational programmes present ideal fora to confer 'environmental competencies' to future health system leaders, managers, practitioners and researchers. The aim of this review is to synthesise the literature on health-care competencies, education and training of relevance to issues of environmental sustainability and climate change in the health sector. Methods: We conducted a systematic review of English language articles on environmental competencies in healthcare in the MEDLINE, Cumulative Index to Nursing and Allied Health Literature (CINAHL) and ProQuest databases published from inception to April 2019. Thematic analysis and descriptive statistics were used to synthesise the findings and develop a typology of environmental competencies. Results: Of the 902 unique citations, we identified 23 articles that met our inclusion criteria. Environmental competencies that align with general management skills were most frequent (40%), followed by research skills (37%). Three competencies specific to the environment (22%) were identified: resource stewardship (n = 16), systems thinking (n = 14) and social and environmental justice (n = 7). The majority of work was identified in nursing, medicine and public health. Competencies were most commonly embedded in existing curricula or offered as new courses or workshops. Conclusion: Incorporating environmental competencies into education programmes will serve to raise awareness of, and advance the significance of, the health sector's impact on climate change and environmental sustainability. Our findings that environmental competencies align with previously validated health-care competencies support the perspective that these competencies represent essential knowledge and skills for the health-care workforce.

Competencies on environmental health and pedagogical approaches in the nursing curriculum: a systematic review of the literature Abstract only*
Author(s): Lopez-Medina et al.
Source: Nurse Education in Practice 37 pp. 1-8
Publication date: May 2019
It has been suggested that climate change is the biggest threat to public health for the 21st Century; increased demand on health services will impact on already overstretched resources and systems will need to be able to respond. However limited

attention is given to climate change and sustainability in nursing education; there is no clear guidance on curricula content for nurses or recommendations regarding the skills and competencies that will be required. Literature published in Dutch, English, German, and Spanish was searched and 32 papers met the inclusion criteria for the review. Results suggests that holistic/systems thinking is relevant to healthcare so bringing a 'sustainability lens' to nursing curricula could be seen as being consistent with wider determinants of health. The literature review has identified the educational approaches necessary to provide a broad based curriculum and a cross-disciplinary approach. The findings suggest that topics such as the use of resources, food, health promotion, globalism, disease management, and the environmental impact of delivering healthcare, if embedded in nursing education could support the nursing profession's response for this new and important aspect of healthcare.

Fulfilling a new obligation: teaching and learning of sustainable healthcare in the medical education curriculum
Author(s): Tun
Source: Medical Teachers 41(1) pp. 1168-1177
Publication date: 2019
Aims: Leading the growing international recognition of the need for sustainability in healthcare delivery, the UK medical regulator has mandated that newly qualified doctors must be able to apply the principles of sustainable healthcare to medical practice. This original research investigates how best to incorporate this new learning into the medical curriculum. Methods: Data from multiple sources were triangulated to generate themes through grounded theory. Meetings were held with representatives of key stakeholder organizations, relevant documents were reviewed and semi-structured interviews were conducted with diverse medical educators who teach sustainable healthcare. Results: There is continual pressure on space in the curriculum, and faculty lack the knowledge to teach this emerging subject, which is also difficult to examine. Students increasingly demand that sustainability be addressed in their education and future careers. Many sources of support and learning resources are available. Conclusions: Practical recommendations for implementation in any medical school include: teaching sustainability as a cross-cutting theme rather than a topic, clinicians and students learning from each other in this developing field, and embedding into assessment the wider determinants of disease. Sustainable healthcare emphasizes prevention rather than late intervention, with benefits to the environment on which health depends, healthcare systems and patients.

Can a sustainability and health scenario provide a realistic challenge to student nurses and provoke changes in practice? An evaluation of a training intervention Abstract only*
Author(s): Grose and Richardson
Source: Nursing & Health Sciences 18(2) pp. 256-261
Publication date: September 2015
Climate change and limited natural resources will impact on the sustainable supply and disposal of materials used in health care. Healthcare students need opportunities to reflect on the ecological footprint of health services to mitigate against negative effects on service delivery. In order to raise awareness of these issues, there is a need for evidence-based teaching tools which are relevant and meaningful to nursing practice. An evidence-based sustainability skills teaching session was delivered to 293 nursing students from child and adult health disciplines. Following the sessions, evaluation sheets were distributed to the participants, of which 290 responded. The majority of nurses valued both the delivery and the content of the training and some were motivated to complete further study. The evaluation provided valuable information on how to deliver sustainability education and important insights into where more

information and support was needed in order to change practice. Embedding sustainability teaching in skill sessions appears to be a realistic way of informing and motivating learners to consider current and best practice. Following training, further evaluation of practice-based behaviour is needed.

The use of evidence-informed sustainability scenarios in the nursing curriculum: development the evaluation of teaching methods Abstract only*
Author(s): Richardson et al.
Source: Nurse Education Today 34(4) pp. 490-493
Publication date: April 2014
Background: Climate change and resource scarcity pose challenges for healthcare in the future, yet there is little to raise awareness about these issues in the nursing curriculum and nurses are poorly equipped to practice in a changing climate. The aims of this paper are to describe how an evidence-informed 'sustainability and health' scenario based on two sustainability issues (resource depletion and waste management) was introduced into a nursing clinical skills session, and to report the evaluation of the session. Methods: Based on evidence from our own research on waste management, sustainable procurement and resource scarcity, a practical hands-on skill session was delivered to 30 second year student nurses as part of a scheduled clinical skills day. The session was observed by one of the facilitators and interactions recorded and this was followed by a brief questionnaire completed by participants. Findings: Observations of the group sessions and discussion found that students demonstrated limited knowledge about natural resources (such as oil) used in the production of items used in healthcare; they engaged in discussions following the use of Internet resources, and were able to segregate waste appropriately. Thirty (100%) students completed the evaluation questionnaire, found the resources used in the skill session helpful, and thought that the scenarios were realistic. Nineteen reported being more aware of peak oil; 30 were more aware of risks to patient experience and service delivery if resources become unavailable; 30 reported greater awareness of the management of waste in healthcare. Comments on the questionnaire indicated a high level of engagement and interest in the subject. Conclusion: The problem of climate change and resource scarcity can too easily be seen as a distant or intractable problem. However one way to make this topic real for students is through the use of clinically relevant scenarios in skill sessions.

NHS and Net Zero

The scope for radiology to contribute to the NHS net zero target: findings from a survey of radiology staff in the UK.
Abstract only*
Item Type: Journal Article
Authors: Gendy, D.;Walters, H.;O'Mahony, E. and Zaman, S.
Publication Date: Aug ,2022
Journal: Clinical Radiology 77(8), pp. e667-e672
Abstract: AIM: To assess attitudes towards the climate emergency among radiology staff and to identify current practices that may contribute towards the National Health Service (NHS) net zero target. MATERIALS AND METHODS: An online survey of radiology staff was conducted assessing current attitudes to the climate emergency. Further questions focused on staff travel, home working, virtual conferences, and recycling. RESULTS: Two hundred and forty-two responses were received from all staff groups within radiology. There were high levels of concern about the climate emergency among radiology staff. Active travel accounts for a relatively small proportion of commuting related to provision of radiology services. Some energy-saving measures are implemented

commonly in radiology departments but these are likely to account for only a small proportion of energy use within a department. CONCLUSION: There is significant scope for reducing the carbon footprint of radiology services by reducing travel, both for work and for radiology education. We discuss the potential for large savings related to energy-saving measures. Copyright © 2022 The Royal College of Radiologists. Published by Elsevier Ltd. All rights reserved.

How can we address the ever-pressing need to 'green up' surgical practice in the National Health Service? Abstract only*
Item Type: Journal Article
Authors: Anastasopoulos, Nikolaos-Andreas and Papalois, Vassilios
Publication Date: 2022
Journal: Journal of the Royal Society of Medicine 115(6), pp. 213-219
Abstract: Clinical practice has inadvertently changed after the COVID-19 pandemic and currently the need to provide sustainable surgical services is more pressing than ever. The National Health Service has committed to a long-term efficient plan to reduce carbon footprint but there is no detailed plan for surgical practice, the domain that contributes the most to hospital-derived pollution. A series of consecutive steps and measures ought to be taken, starting from a hybrid approach quantifying surgically attributed carbon footprint. Then, a variety of suggested measures can be widely discussed and accordingly applied on a wider or more local level. Appropriate training should always precede implementing new practices to ensure that staff is familiar with these. These measures cover a broad range and should be arranged on a patient-centred basis from preoperative preconditioning to an effective follow-up. The need for more intense research and implementation of enhanced recovery protocols is widely discussed. Also, the necessity of green research and reinvestment of materials and resources is highlighted. A change of philosophy from a cradle-to-grave approach to a repurposing approach is suggested. We are confident that a new era is dawning in surgical practice and teamwork is the key for providing greener surgical services.

Modelling the factors in implementation of environmental sustainability in healthcare organisation Abstract only*
Author(s): Vaishnavi and Suresh
Source: Management of environmental Quality
Publication date: July 2022
Purpose: Environmental sustainability (ES) is an increasing tendency in the healthcare industry as it seeks to enhance the environmental friendliness and reduces waste in operations to save money. The objective of research article is to identify the factors that contribute to improving the performance of ES in hospitals. Understanding the factors that contribute to the improvement of healthcare services may be helpful for practitioners, who need to address and implement an effective framework to enable an environment-friendly practice in hospitals. Design/methodology/approach: The current study utilised the technique called total interpretive structural modelling (TISM) to identify the factors and understand the interconnection between the identified factors. A literature review revealed 12 factors, which were then refined with the input of hospital experts. Based on a questionnaire survey, a planned interview is conducted in chosen Indian hospitals. The matrix impact cross multiplication applied to classification (MICMAC) study employs dependency and driving power to identify the hierarchical relationship between the detected factors. Findings: Green building initiatives, water consumption, resource usage, and renewable energy were identified as key factors in the study. Other factors such as staff behaviour, procurement of goods and management of hazardous substance would be influenced by these fundamental components. With the implementation of green initiatives in the

hospital, ES is primarily used to reduce the excessive use of scarce resources. Practical implications: The ES programme begins at the hospital grounds, with awareness and specific training provided to all personnel, including doctors, nurses, and managers at all levels. The training programme is intended to raise awareness; sessions are divided into targeted groups; a new organisational structure is created; and a consultant agent is hired to commence ES. Originality/value: Existing literature has focussed mostly on ES factors such as carbon emissions, water conservation, and effective waste disposal, while ignoring organisational viewpoints and their interrelationships. As a result, the current study used TISM to show the relationship between various organisational and environmental perspective components in order to comprehend the reasoning behind improving performance.

Assessing the efficacy of coproduction to better understand the barriers to achieving sustainability in NHS chronic kidney services and create alternate pathways.
Item Type: Journal Article
Authors: Mc Laughlin, Leah;Williams, Gail;Roberts, Gareth;Dallimore, David;Fellowes, David;Popham, Joanne;Charles, Joanna;Chess, James;Williams, Sarah Hirst;Mathews, Jonathan;Howells, Teri;Stone, Judith;Isaac, Linzi and Noyes, Jane
Publication Date: Apr ,2022
Journal: Health Expectations 25(2), pp. 579-606
Abstract: CONTEXT: Too many people living with chronic kidney disease are opting for and starting on hospital-based dialysis compared to a home-based kidney replacement therapy. Dialysis services are becoming financially unsustainable. OBJECTIVE: This study aimed to assess the efficacy of coproductive research in chronic kidney disease service improvement to achieve greater sustainability. DESIGN: A 2-year coproductive service improvement study was conducted with multiple stakeholders with the specific intention of maximizing engagement with the national health kidney services, patients and public. SETTING AND PARTICIPANTS: A national health kidney service (3 health boards, 18 dialysis units), patients and families (n = 50), multidisciplinary teams including doctors, nurses, psychologists, social workers, and so forth (n = 68), kidney charities, independent dialysis service providers and wider social services were part of this study. FINDINGS: Coproductive research identified underutilized resources (e.g., patients on home dialysis and social services) and their potential, highlighted unmet social care needs for patients and families and informed service redesign. Education packages were reimagined to support the home dialysis agenda including opportunities for wider service input. The impacts of one size fits all approaches to dialysis on specialist workforce skills were made clearer and also professional, patient and public perceptions of key sustainability policies. DISCUSSION AND CONCLUSIONS: Patient and key stakeholders mapped out new ways to link services to create more sustainable models of kidney health and social care. Maintaining principles of knowledge coproduction could help achieve financial sustainability and move towards more prudent adult chronic kidney disease services. PATIENT OR PUBLIC CONTRIBUTION: Involved in developing research questions, study design, management and conduct, interpretation of evidence and dissemination. Copyright © 2021 The Authors. Health Expectations published by John Wiley & Sons Ltd.

Health care’s response to climate change: a carbon footprint assessment of the NHS in England
Author(s): Tennison et al.
Source: The Lancet Planetary Health 5(2) pp. e84-e92
Publication date: February 2021
Background: Climate change threatens to undermine the past 50 years of gains in public health. In response, the National

Health Service (NHS) in England has been working since 2008 to quantify and reduce its carbon footprint. This Article presents the latest update to its greenhouse gas accounting, identifying interventions for mitigation efforts and describing an approach applicable to other health systems across the world. Methods: A hybrid model was used to quantify emissions within Scopes 1, 2, and 3 of the Greenhouse Gas Protocol, as well as patient and visitor travel emissions, from 1990 to 2019. This approach complements the broad coverage of top-down economic modelling with the high accuracy of bottom-up data wherever available. Available data were backcasted or forecasted to cover all years. To enable the identification of measures to reduce carbon emissions, results were disaggregated by organisation type. Findings: In 2019, the health service's emissions totalled 25 megatonnes of carbon dioxide equivalent, a reduction of 26% since 1990, and a decrease of 64% in the emissions per inpatient finished admission episode. Of the 2019 footprint, 62% came from the supply chain, 24% from the direct delivery of care, 10% from staff commute and patient and visitor travel, and 4% from private health and care services commissioned by the NHS. Interpretation: his work represents the longest and most comprehensive accounting of national health-care emissions globally, and underscores the importance of incorporating bottom-up data to improve the accuracy of top-down modelling and enabling detailed monitoring of progress as health systems act to reduce emissions. Funding: Wellcome Trust.

Opinion: Less than half of the public believe the NHS has a responsibility to reduce its impact on climate change. Does it matter?
Item Type: Journal Article
Authors: Cameron, G.
Publication Date: 2021
Journal: The BMJ 375(pagination), pp. no pagination

Improving public understanding of the NHS's role in the climate crisis will help us achieve net zero plans. In a few days, world leaders will gather for the long awaited COP26 global climate summit. Regardless of the outcome, this will be a defining moment in the effort to solve the climate crisis. As an industry that makes up 4-5% of global greenhouse gas emissions,1 healthcare will feature on the packed agenda. Here, the NHS can demonstrate global leadership as the first national healthcare system with net zero commitments—to achieve net zero by 2040 for the emissions it directly controls and 2045 for the emissions it influences.

Realist evaluation of the implementation and impact of the NHS carbon reduction strategy in the UK.
Item Type: Journal Article
Authors: Husain, S. A. and Sidhu, M.
Publication Date: 2021
Journal: BMJ Open 11(9), pp. no pagination
Abstract: Objectives To evaluate the extent to which organisational factors facilitate or inhibit the implementation of the National Health Service (NHS) carbon reduction strategy within acute hospital settings. Setting A single acute NHS Trust with four satellite sites which serve more than 2 million patients annually in Central England. Participants Interviews with a purposive sample of 10 stakeholders, including those who conceptualised the intervention and those who were responsible for its implementation. Intervention The NHS is a major carbon emitter and therefore developed the NHS carbon reduction strategy (NHSCRS)' in 2009. NHS organisations are contractually obliged to develop a local carbon reduction strategy known as a Sustainable Development Management Plan (SDMP) which details carbon reduction measures (CRM), as described in the NHSCRS. However, the organisational context within which the SDMP is implemented is likely to determine the extent of its success. We undertook an adapted

realist evaluation cycle to develop refined initial programme theories. Documents were analysed using thematic content analysis. Interview data were analysed using thematic analysis. Results CRM were most likely to be implemented if the Trust Board were sufficiently pressured by staff and reputational fears, and the potential impacts of CRM were perceived to align with wider organisational aims. Differences in implementation of CRM across hospital sites were related to logistical factors, accessibility to regional partners and contractual relationships. There were expected carbon, energy and long-term financial savings, with variability in the effectiveness of some CRM post implementation. Conclusions Organisational factors, particularly Board leadership and internal implementation pathways, have a significant bearing on whether CRM are implemented or not. However, greater national support and guidance is needed for NHS organisations to effectively reduce their carbon emissions. Further cycles of this evaluation are necessary in multiple case study sites to illuminate the path to a net-zero NHS carbon footprint by 2045. Copyright ©

Opinion: A strategy for NHS Scotland focused on reducing emissions and enhancing wellbeing
Item Type: Journal Article
Authors: Mulcahy, Elaine
Publication Date: 11 24 ,2021
Journal: Bmj 375, pp. n2905
In 2019, the Scottish Government announced its ambition for NHS Scotland to become net-zero by 2045. After much anticipation in the lead up to COP26 in Glasgow, the NHS Scotland Climate Emergency and Sustainability Strategy was published on 10 November 2021 and opened for consultation until February 2022.1
The strategy raises the bar on the initial target by bringing forward the date for achieving net-zero emissions to 2040. Fundamental to the goal of reducing emissions is an ambition to do this is in a way that enhances wellbeing and reduces health inequalities: “A health service that improves the opportunities, life chances, health and wellbeing of every citizen in our country and fully contributes to a more cohesive, resilient and net-zero society in a just way that contributes of population wellbeing and a reduction in health inequalities.”

Health care's response to climate change: a carbon footprint assessment of the NHS in England.
Item Type: Journal Article
Authors: Tennison, Imogen;Roschnik, Sonia;Ashby, Ben;Boyd, Richard;Hamilton, Ian;Oreszczyn, Tadj;Owen, Anne;Romanello, Marina;Ruyssevelt, Paul;Sherman, Jodi D.;Smith, Andrew Z. P.;Steele, Kristian;Watts, Nicholas and Eckelman, Matthew J.
Publication Date: 2021
Journal: The Lancet.Planetary Health 5(2), pp. e84-e92
Abstract: BACKGROUND: Climate change threatens to undermine the past 50 years of gains in public health. In response, the National Health Service (NHS) in England has been working since 2008 to quantify and reduce its carbon footprint. This Article presents the latest update to its greenhouse gas accounting, identifying interventions for mitigation efforts and describing an approach applicable to other health systems across the world. METHODS: A hybrid model was used to quantify emissions within Scopes 1, 2, and 3 of the Greenhouse Gas Protocol, as well as patient and visitor travel emissions, from 1990 to 2019. This approach complements the broad coverage of top-down economic modelling with the high accuracy of bottom-up data wherever available. Available data were backcasted or forecasted to cover all years. To enable the identification of measures to reduce carbon emissions, results were disaggregated by organisation type. FINDINGS: In 2019, the health service's emissions totalled 25 megatonnes of carbon dioxide equivalent, a reduction of 26% since 1990, and a decrease of 64% in the

emissions per inpatient finished admission episode. Of the 2019 footprint, 62% came from the supply chain, 24% from the direct delivery of care, 10% from staff commute and patient and visitor travel, and 4% from private health and care services commissioned by the NHS. INTERPRETATION: This work represents the longest and most comprehensive accounting of national health-care emissions globally, and underscores the importance of incorporating bottom-up data to improve the accuracy of top-down modelling and enabling detailed monitoring of progress as health systems act to reduce emissions. FUNDING: Wellcome Trust.

How to achieve a net zero carbon NHS during a pandemic.
Item Type: Journal Article
Authors: Wilkinson, E.
Publication Date: 2021
Journal: The BMJ 375(pagination), pp. no pagination
Despite covid-19, the NHS remains committed to carbon net zero by 2040. Emma Wilkinson asks how this could be possible. In January 2020, an expert panel was tasked with setting out a practical and evidence based plan for a greener NHS. A week later, the World Health Organization named covid-19 a “public health emergency of international concern,” before declaring a pandemic in March. Yet in October that year, despite the impact of the virus, NHS officials pledged that the service would be carbon net zero by 2040. There was no choice, an NHS report concluded: ill health, health inequalities, and the climate crisis are all inextricably linked.

Comment: 10 years to green the NHS and the health sector.
Item Type: Journal Article
Authors: Stancliffe, Rachel
Publication Date: 2020
Journal: The Lancet.Planetary Health 4(4), pp. e126-e127
How do you feel about the words “climate emergency”? Clearly, we are in a terrible mess and in danger of reaching points of no return for several planetary boundaries.1 Although some organisations are feeling great about signing up to targets for Carbon Zero by 2040, the Intergovernmental Panel on Climate Change is clear that the aim should be for 2030.2 That is only 10 years away, which is very scary. Eco-anxiety is a rational response to this crisis, but with shared recognition of the problem comes hope for meaningful action. It is amazing to be going to meetings now in which the climate emergency is widely accepted, to discuss plans on how to get to net zero.

News: NHS aims to become world’s first “net zero” health service by 2040 Full text available with Athens account*
Author(s): Torjesen
Source: BMJ 371
Publication date: October 2020
The NHS in England has committed itself to becoming “net zero” for greenhouse gas emissions for the care it provides and has set a target of 2040 to achieve this. The NHS has control over certain emissions, such as those produced by its services, buildings, and vehicles, and it will take until 2028 to 2032 to reduce these by 80% and until 2040 to eliminate them, says a report it commissioned.1

The UK National Health Service Is World Leader in Sustainable Healthcare: Recommendations for Canada Abstract only*
Item Type: Journal Article
Authors: Duane, Brett
Publication Date: 2020
Journal: Healthcarepapers 19(3), pp. 27-34
Abstract: The National Health Service (NHS) in the UK is regarded by many as the world leader in sustainability. In this

article, I present six main reasons for this. The first three reasons are that the UK passed appropriate legislation; a long-term strategy was developed; and a sustainability direction and delivery framework emerged for not only the NHS and the social system but also for its partner organizations in education. The UK has also committed resources, has a system of governance and accountability and continually reviews its current systems in a constant need for regeneration. Copyright © 2020 Longwoods Publishing.

Mapping the co-benefits of climate change action to issues of public concern in the UK: a narrative review
Item Type: Journal Article
Authors: Jennings, Neil;Fecht, Daniela and De Matteis, Sara
Publication Date: 2020
Journal: The Lancet.Planetary Health 4(9), pp. e424-e433
Abstract: To avoid a 1.5degreeC rise in global temperatures above preindustrial levels, the next phase of reductions in greenhouse gas emissions will need to be comparatively rapid. Linking the co-benefits of climate action to wider issues that the public are concerned about can help decision makers to prioritise decarbonisation options that increase the chance of public support for such changes, while ensuring that a just transition is delivered. We identified key issues of concern to the UK public by use of Ipsos MORI public opinion data from 2007 to 2020 and used these data to guide a narrative review of academic and grey literature on the co-benefits of climate change action for the UK. Correspondence with civil servants, third sector organisations, and relevant academics allowed us to identify omissions and to ensure policy relevance of the recommendations. This evidence-based Review of the various co-benefits of climate change action for the UK identifies four main areas: health and the National Health Service; security; economy and unemployment; and poverty, housing, and inequality. Associated trade-offs are also discussed. City-level and regional-level governments are particularly well placed to incorporate co-benefits into their decision making because it is at this scale that co-benefits most clearly manifest, and where interventions can have the most immediate effects. Copyright © 2020 The Author(s). Published by Elsevier Ltd. This is an Open Access article under the CC BY-NC-ND 4.0 license. Published by Elsevier Ltd.. All rights reserved.

Editorial: A more sustainable NHS Full text available with Athens account*
Author(s): van Hove and Leng
Source: BMJ
Publication date: August 2019
Inhalers and anaesthetics with a lower carbon footprint are quick wins that should be implemented now
The Climate Change Act 2008 was introduced to ensure that the UK cuts carbon emissions by 34% by 2020 and 50% by 2025, and Theresa May’s recent announcement committed the UK to reduce emissions to net zero by 2050.12 While the NHS is leading by example in reducing use of natural resources, it also contributes substantially to the UK’s carbon footprint, accounting for 40% of public sector emissions.3

Greener treatments: The NHS carbon footprint Abstract only*
Item Type: Journal Article
Authors: Mendes, A.
Publication Date: 2019
Journal: British Journal of Community Nursing 24(5), pp. 248-249
With Earth Day having taken place on 22 April, the hefty targets and the pressure on the NHS to reduce its carbon footprint are a major priority for many. The NHS is the heaviest public-sector contributor to climate change, and the most recent figures show that the NHS in England alone is responsible for emitting 22.8 million tonnes of carbon dioxide equivalents (MtCO2e)

(Sustainable Development Unit (SDU), 2019a; 2019b) and spending £50 million on carbon permits every year (King's Fund, 2019). Carbon emissions from the NHS, public health and social care systems have reduced by 19% since 2007 despite activity increasing by 27% (NHS, 2019). However, there is some way to go in terms of meeting the targets to cut emissions by 34% by 2020, 51% by 2025 by and 80% (using 1990 as the baseline) by 2050 (NHS Digital, 2018; NHS, 2019).

Climate change is a health issue: what can doctors do?
Abstract only*
Item Type: Journal Article
Authors: Sainsbury, Peter;Charlesworth, Kate;Madden, Lynne;Capon, Anthony;Stewart, Greg and Pencheon, David
Publication Date: 2019
Journal: Internal Medicine Journal 49(8), pp. 1044-1048
Abstract: The visit to Australia by Dr David Pencheon, Founding Director of the National Health Service (NHS) Sustainable Development Unit, in April–May 2018 generated considerable interest and engagement. Dr Pencheon's overarching messages were that climate change is a health issue and that doctors and health systems have an opportunity, and responsibility, to lead climate action. This article distils Dr Pencheon's presentations into three themes: (i) carbon accounting; (ii) transformational change in our systems of healthcare; and (iii) a health system fit for the future. For each theme, we highlight promising initiatives that are already underway in Australia that are starting to transform our health system into one fit for a future environmentally sustainable world. We suggest practical ways in which doctors can lead the transformation through personal action and influence broader systems.

A new role for anaesthetists in environmentally-sustainable healthcare
Item Type: Journal Article
Authors: Shelton, C. L.;McBain, S. C.;Mortimer, F. and White, S. M.
Publication Date: 2019
Journal: Anaesthesia 74(9), pp. 1091-1094
Abstract: Most anaesthetists, for example, are aware of the global warming potential of inhalational anaesthetic agents, which contribute the equivalent of ~5% of the carbon footprint of acute NHS Trusts 12]. Of these, nitrous oxide accounts for two-thirds of the contribution; although this is predominantly from sources outside theatre (e.g. obstetric analgesia), it has been estimated that where nitrous oxide is used as part of a general anaesthetic, it often makes up the largest component of the carbon footprint of anaesthesia 13]. Where an inhaled anaesthetic is required, the carbon footprint can be minimised by avoiding the use of both desflurane and nitrous oxide, monitoring depth of anaesthesia and minimising flow rates. This issue was investigated in a life cycle study by Sherman et al. 13] which indicated that propofol TIVA has a life cycle carbon impact orders of magnitude less than volatile anaesthesia, with the greatest single contributor being the electricity required to run the infusion pump.

Estimating the costs of air pollution to the National Health Service and social care: An assessment and forecast up to 2035
Item Type: Journal Article
Authors: Pimpin, Laura;Retat, Lise;Fecht, Daniela;de Preux, Laure;Sassi, Franco;Gulliver, John;Belloni, Annalisa;Ferguson, Brian;Corbould, Emily;Jaccard, Abbygail and Webber, Laura
Publication Date: 2018
Journal: PLoS Medicine / Public Library of Science 15(7), pp. e1002602

BACKGROUND: Air pollution damages health by promoting the onset of some non-communicable diseases (NCDs), putting additional strain on the National Health Service (NHS) and social care. This study quantifies the total health and related NHS and social care cost burden due to fine particulate matter (PM2.5) and nitrogen dioxide (NO2) in England. METHOD AND FINDINGS: Air pollutant concentration surfaces from land use regression models and cost data from hospital admissions data and a literature review were fed into a microsimulation model, that was run from 2015 to 2035. Different scenarios were modelled: (1) baseline 'no change' scenario; (2) individuals' pollutant exposure is reduced to natural (non-anthropogenic) levels to compute the disease cases attributable to PM2.5 and NO2; (3) PM2.5 and NO2 concentrations reduced by 1 mug/m3; and (4) NO2 annual European Union limit values reached (40 mug/m3). For the 18 years after baseline, the total cumulative cost to the NHS and social care is estimated at 5.37 billion for PM2.5 and NO2 combined, rising to 18.57 billion when costs for diseases for which there is less robust evidence are included. These costs are due to the cumulative incidence of air-pollution-related NCDs, such as 348,878 coronary heart disease cases estimated to be attributable to PM2.5 and 573,363 diabetes cases estimated to be attributable to NO2 by 2035. Findings from modelling studies are limited by the conceptual model, assumptions, and the availability and quality of input data. CONCLUSIONS: Approximately 2.5 million cases of NCDs attributable to air pollution are predicted by 2035 if PM2.5 and NO2 stay at current levels, making air pollution an important public health priority. In future work, the modelling framework should be updated to include multi-pollutant exposure-response functions, as well as to disaggregate results by socioeconomic status.

Opinion: Cut fossil fuel links and curb burden on the NHS
Abstract only*
Item Type: Journal Article
Authors: Munro, Alice
Publication Date: Jun 21 ,2017
Journal: Nursing Standard 31(43), pp. 29
Abstract: At a time when the NHS is struggling to meet demand, it is easy to regard the health impact of climate change as less urgent than the immediate needs of patients. However, action now to limit the effects of climate change would also reduce demands on the health service and help us to meet the healthcare needs of future generations.

Supply Chain

Environmental Sustainability of Hospital Foodservices across the Food Supply Chain: A Systematic Review. Abstract only*
Item Type: Journal Article
Authors: Carino, Stefanie;Porter, Judi;Malekpour, Shirin and Collins, Jorja
Publication Date: 2020
Journal: Journal of the Academy of Nutrition & Dietetics 120(5), pp. 825-873
Abstract: BACKGROUND: Hospitals have a responsibility to support human health, and given the link between human and environmental health, hospitals should consider their environmental impacts. Hospital foodservices can negatively affect the environment at every stage of the food supply chain (production/procurement, distribution, preparation, consumption, and waste management/disposal). OBJECTIVE: To systematically identify and synthesize the following across the hospital patient food/nutrition supply chain: environmental and associated economic impacts of foodservice; outcomes of strategies that aim to improve the environmental sustainability of foodservice; and perspectives of patients, staff, and

stakeholders on environmental impacts of foodservice and strategies that aim to improve the environmental sustainability of foodservice. METHODS: Eight electronic databases (ie, Cumulative Index to Nursing and Allied Health Literature Plus, Embase via Ovid, Global Health, National Health Service Economic Evaluation Database, Ovid Medline, ProQuest Environmental Science Collection, Scopus, and Web of Science) were searched from database inception to November 2018 for original research conducted across any stage of the hospital food supply chain (from production/procurement to waste management/disposal) that provides food/nutrition to patients, with no restrictions on language or study design. Titles/abstracts then full texts were screened independently by two authors. The Mixed Methods Appraisal Tool was used for quality appraisal for included studies. Data were synthesized narratively. RESULTS: From 29,655 records identified, 80 studies met eligibility criteria. Results were categorized into production/procurement (n=12), distribution (n=0), preparation (n=6), consumption (n=49), waste management/disposal (n=8), and multiple food supply chain aspects (n=5). The environmental impact most widely explored was food waste, with many studies reporting on food waste quantities, and associated economic losses. Strategies focused on reducing food waste by increasing patients' intake through various foodservice models. Perspectives identified a shared vision for sustainable foodservices, although there are many practical barriers to achieving this. CONCLUSION: The literature provides examples across the hospital food supply chain that demonstrate how environmental sustainability can be prioritized and evaluated and the opportunities for credentialed nutrition and dietetics practitioners to contribute. Future studies are warranted, particularly those measuring environmental impacts and testing the effects of sustainable strategies in the distribution, preparation, and waste management stages.

Single-use plastics

Single-use plastic and COVID-19 in the NHS: Barriers and opportunities.
Item Type: Journal Article
Authors: Hu, X.;Davies, R.;Morrissey, K.;Smith, R.;Fleming, L. E.;Sharmina, M.;St. Clair, R. and Hopkinson, P.
Publication Date: 2022
Journal: Journal of Public Health Research 11(1), pp. no pagination
Abstract: Background: Single-use personal protective equipment (PPE) has been essential to protect healthcare workers during the COVID-19 pandemic. However, intensified use of PPE could counteract the previous efforts made by the UK NHS Trusts to reduce their plastic footprint. Design and methods: In this study, we conducted an in-depth case study in the Royal Cornwall Hospitals NHS Trust to investigate plastic-related issues in a typical NHS Trust before, during and after the pandemic. We first collected hospital routine data on both procurement and usage of single-use PPE (including face masks, aprons, and gowns) for the time period between April 2019 and August 2020. We then interviewed 12 hospital staff across a wide remit, from senior managers to consultants, nurses and catering staff, to gather qualitative evidence on the overall impact of COVID-19 on the Trust regarding plastic use. Result(s): We found that although COVID-19 had increased the procurement and the use of single-use plastic substantially during the pandemic, it did not appear to have changed the focus of the hospital on implementing measures to reduce single-use plastic in the long term. We then discussed the barriers and opportunities to tackle plastic issues within the NHS in the post-COVID world, for example, a circular

healthcare model. Conclusion(s): Investment is needed in technologies and processes that can recycle and reuse a wider range of single-use plastics, and innovate sustainable alternatives to replace single-use consumables used in the NHS to construct a fully operational closed material loop healthcare system. Copyright © the Author(s), 2021.

Reusable sharps

Before/after intervention study to determine impact on life-cycle carbon footprint of converting from single-use to reusable sharps containers in 40 UK NHS trusts Abstract only*
Item Type: Journal Article
Authors: Grimmond, T. R.;Bright, A.;Cadman, J.;Dixon, J.;Ludditt, S.;Robinson, C. and Topping, C.
Publication Date: 2021
Journal: BMJ Open 11(9), pp. no pagination

Abstract: Objectives To compare global warming potential (GWP) of hospitals converting from single-use sharps containers to reusable sharps containers (SSC, RSC). Does conversion to RSC result in GWP reduction? Design Using BS PAS 2050:2011 principles, a retrospective, before/after intervention quantitative model together with a purpose-designed, attributional a cradle-to-grave' life-cycle tool, were used to determine the annual greenhouse gas (GHG) emissions of the two sharps containment systems. Functional unit was total fill line litres (FLL) of sharps containers needed to dispose of sharps for 1-year period in 40 trusts. Scopes 1, 2 and 3 emissions were included. Results were workload-normalised using National Health Service (NHS) national hospital patient-workload indicators. A sensitivity analysis examined areas of data variability. Setting Acute care hospital trusts in UK. Participants 40 NHS hospital Trusts using RSC. Intervention Conversion from SSC to RSC. SSC and RSC usage details in 17 base line trusts immediately prior to 2018 were applied to the RSC usage details of the 40 trusts using RSC in 2019. Primary outcome measure The comparison of GWP calculated in carbon dioxide equivalents (CO2 e) generated in the manufacture, transport, service and disposal of 12 months, hospital-wide usage of both containment systems in the 40 trusts. Results The 40 trusts converting to RSC reduced their combined annual GWP by 3267.4 tonnes CO2e (-83.9%); eliminated incineration of 900.8 tonnes of plastic; eliminated disposal/recycling of 132.5 tonnes of cardboard and reduced container exchanges by 61.1%. GHG as kg CO2 e/1000 FLL were 313.0 and 50.7 for SSC and RSC systems, respectively. A sensitivity analysis showed substantial GHG reductions within unit processes could be achieved, however, their impact on relevant final GWP comparison varied Copyright © Author(s) (or their employer(s)) 2021. Re-use permitted under CC BY-NC. No commercial re-use. See rights and permissions. Published by BMJ.

Inhalers

Climate change in healthcare: Exploring the potential role of inhaler prescribing
Item Type: Journal Article
Authors: Starup-Hansen, Joachim;Dunne, Henry;Sadler, Jonathan;Jones, Anna and Okorie, Michael
Publication Date: 2020
Journal: Pharmacology Research & Perspectives 8(6), pp. e00675
Abstract: Climate change has been described as the biggest global health threat of the 21st century. As a result, governments around the world are committing to legislative change in order to reduce greenhouse gas emissions (GHGEs). The healthcare sector makes a significant contribution to GHGEs and in line with national legislation in the UK, the NHS

has recently committed to achieving net zero emissions by 2050. The management of asthma and COPD largely depends on the prescribing of medications that are delivered through inhalers. In the UK, the use of pressurized metered dose inhalers (pMDIs), which rely on hydrofluorocarbon (HFC) propellants accounts for 3.5% of the NHS's total carbon footprint. In contrast, dry powder inhalers (DPIs) have a much lower carbon footprint due to the absence of a HFC propellant. Here we review evidence of the impact of inhaler choices across four domains: environmental impact, clinical effectiveness, cost effectiveness and patient preferences. We find that as well as a lower global-warming potential, DPIs have additional benefits over pMDIs in other domains and should be considered first line where clinically appropriate. Copyright © 2020 The Authors. Pharmacology Research & Perspectives published by John Wiley & Sons Ltd, British Pharmacological Society and American Society for Pharmacology and Experimental Therapeutics.

Our prescription for climate change: reduce and recycle inhalers! Full text available with Athens account*
Item Type: Journal Article
Authors: Mikolasch, Theresia Auguste and Stadler, Collette Isabel
Publication Date: 2020
Journal: British Journal of General Practice 70(690), pp. 30
Abstract: Unbeknown to most doctors and patients, metered-dose inhalers (MDIs) - the most common is the trusted "blue puffer" salbutamol - pose a devastatingly significant and direct threat to the environment. Of the estimated 35 million inhalers issued by the NHS each year, only about 0.5% are recycled appropriately.2] Thus millions of MDIs end up in landfill each year, where they not only contribute to plastic waste, but also, over time, release residual HFCs into the atmosphere. Thus, the British Thoracic Society (BTS) now encourages all prescribers and patients to switch from MDIs to non-propellant devices whenever they are likely to be equally effective.4] Second, we must responsibly dispose of used MDIs.

Costs of switching to low global warming potential inhalers. An economic and carbon footprint analysis of NHS prescription data in England
Item Type: Journal Article
Authors: Wilkinson, Alexander J. K.;Braggins, Rory;Steinbach, Ingeborg and Smith, James
Publication Date: 10 29 ,2019
Journal: BMJ Open 9(10), pp. e028763
Abstract: OBJECTIVES: Metered-dose inhalers (MDIs) contain propellants which are potent greenhouse gases. Many agencies propose a switch to alternative, low global warming potential (GWP) inhalers, such as dry powder inhalers (DPIs). We aimed to analyse the impact on greenhouse gas emissions and drug costs of making this switch. SETTING: We studied National Health Service prescription data from England in 2017 and collated carbon footprint data on inhalers commonly used in England. DESIGN: Inhalers were separated into different categories according to their mechanisms of action (eg, short-acting beta-agonist). Within each category we identified low and high GWP inhalers and calculated the cost and carbon impact of changing to low GWP inhalers. We modelled scenarios for swapping proportionally according to the current market share of each equivalent DPI (model 1) and switching to the lowest cost pharmaceutically equivalent DPI (model 2). We also reviewed available data on the carbon footprint of inhalers from scientific publications, independently certified reports and patents to provide more accurate carbon footprint information on different types of inhalers. RESULTS: If MDIs using HFA propellant are replaced with the cheapest equivalent DPI, then for every 10% of MDIs changed to DPIs, drug costs decrease by 8.2M annually. However if the brands of DPIs stay the same

as 2017 prescribing patterns, for every 10% of MDIs changed to DPIs, drug costs increase by 12.7M annually. Most potential savings are due to less expensive long-acting beta-agonist (LABA)/inhaled corticosteroids (ICS) inhalers. Some reliever inhalers (eg, Ventolin) have a carbon footprint over 25 kg CO2e per inhaler, while others use far less 1,1,1,2-tetrafluoroethane (HFA134a) (eg, Salamol) with a carbon footprint of e per inhaler, while others use far less 1,1,1,2-tetrafluoroethane (HFA134a) (eg, Salamol) with a carbon footprint of 2e per inhaler. 1,1,1,2,3,3,3-Heptafluoropropane (HFA227ea) LABA/ICS inhalers (eg, Flutiform) have a carbon footprint over 36 kg CO2e, compared with an equivalent HFA134a combination inhaler (eg, Fostair) at e, compared with an equivalent HFA134a combination inhaler (eg, Fostair) at 2e. For every 10% of MDIs changed to DPIs, 58 kt CO2e could be saved annually in England. CONCLUSIONS: Switching to DPIs would result in large carbon savings and can be achieved alongside reduced drug costs by using less expensive brands. Substantial carbon savings can be made by using small volume HFA134a MDIs, in preference to large volume HFA134a MDIs, or those containing HFA227ea as a propellant.

Recycling

Opinion: Recycling in the NHS – where does the buck stop?
Author(s): Varshney
Source: BMJ 375
Publication date: November 2021
It was an ordinary working day at hospital and I was in the treatment room clearing up a tray I had used for cannulation. I mumbled pleasantries to our housekeeper who had come in to help with stocking up. Unfortunately, our small treatment room only had a single orange clinical waste bin, and we soon found ourselves awkwardly dancing around each other as we disposed of our respective packaging. Absentmindedly, we both threw non-contaminated packaging in the clinical waste bin, where the contents were destined for death by incineration.

Geriatrics

Calculating the carbon footprint of a Geriatric Medicine clinic before and after COVID-19.
Item Type: Journal Article
Authors: Bartlett, S. and Keir, S.
Publication Date: 2022
Journal: Age and Ageing 51(2), pp. no pagination
Abstract: Background: climate change is a health emergency. Central to addressing this is understanding the carbon footprint of our daily life and work, in order to reduce it effectively. The coronavirus disease of 2019 (COVID-19) pandemic has brought about rapid change to clinical practice, most notably in use of virtual clinics and personal protective equipment (PPE). Aim(s): to estimate the carbon footprint of a Geriatric Medicine clinic, including the effect of virtual consultation and PPE, in order to inform design of a service that addresses both the health of our patients and our environment. Method(s): data from the Greenhouse Gas Protocol, NHS Carbon Footprint Plus and UK Government were used to estimate the carbon emissions per consultation. Values were calculated for virtual and face-to-face contact and applied to actual clinics both before and during the COVID-19 pandemic. Result(s): the carbon footprint of a face-to-face clinic consultation is 4.82 kgCO2e, most of which is patient travel, followed by staff travel and use of PPE. The footprint of a virtual consultation is 0.99 kgCO2e, most of which is staff travel, followed by data use. Using our hybrid model for a single session clinic reduced our annual carbon footprint by an estimated 200 kgCO2e, roughly equivalent to a surgical

operation. Discussion(s): the COVID-19 pandemic has made us deliver services differently. The environmental benefits seen of moving to a partially virtual clinic highlight the importance of thinking beyond reverting to 'business as usual' - instead deliberately retaining changes, which benefit the current and future health of our community. Copyright © 2022 The Author(s) 2022.

Geriatric medicine in the era of climate change. Abstract only*
Item Type: Journal Article
Authors: Davies, Bethan and Bhutta, Mahmood F.
Publication Date: 2022
Journal: Age & Ageing 51(1), pp. 01 06
Abstract: Climate change has been termed the greatest threat to human health of the 21st century. Older people and those living with frailty are more vulnerable to the effects of climate change including heatwaves and extreme weather events, and therefore, we have a responsibility to advocate for action on the climate emergency and take steps to reduce the environmental impact of our care provision. The NHS contributes 5.7% to the carbon footprint of the UK, and by reviewing the financial costs associated with frailty, we estimate the carbon footprint of frailty to be 1.7 MtCO2e, or 7% of the total NHS carbon footprint. Resource use also increases with age with particular interventions and medical equipment such as hearing and mobility aids being predominantly associated with the care of older people. The NHS has committed to net zero carbon emissions by 2045 and in order to achieve this we all need to act-balancing the triple bottom line of environmental, social and financial impacts alongside outcomes for patients and populations when making decisions about care. The principles of sustainable healthcare are already embedded in the geriatrician's holisitic approach to the care of older people and those living with frailty, and the imperative to reduce the carbon footprint of healthcare should add weight to the argument for extending the role of the geriatrician into other specialties. It is time to begin our journey to net-zero geriatric medicine.

Hand hygiene

Hand hygiene with hand sanitizer versus handwashing: what are the planetary health consequences?
Item Type: Journal Article
Authors: Duane, Brett;Pilling, Jessica;Saget, Sophie;Ashley, Paul;Pinhas, Allan R. and Lyne, Alexandra
Publication Date: Jul ,2022
Journal: Environmental Science & Pollution Research 29(32), pp. 48736-48747
Abstract: In order to reduce the transmission of pathogens, and COVID-19, WHO and NHS England recommend hand washing (HW) and/or the use of hand sanitizer (HS). The planetary health consequences of these different methods of hand hygiene have not been quantified. A comparative life cycle assessment (LCA) was carried out to compare the environmental impact of the UK population practising increased levels of hand hygiene during the COVID-19 pandemic for 1 year. Washing hands with soap and water was compared to using hand sanitizer (both ethanol and isopropanol based sanitizers were studied). The isopropanol-based HS had the lowest environmental impact in 14 out of the 16 impact categories used in this study. For climate change, hand hygiene using isopropanol HS produced the equivalent of 1060 million kg CO2, compared to 1460 million for ethanol HS, 2300 million for bar soap HW, and 4240 million for liquid soap HW. For both the ethanol and isopropanol HS, the active ingredient was the greatest overall contributing factor to the environmental impact

(83.24% and 68.68% respectively). For HW with liquid soap and bar soap, there were additional contributing factors other than the soap itself: for example tap water use (28.12% and 48.68% respectively) and the laundering of a hand towel to dry the hands (10.17% and 17.92% respectively). All forms of hand hygiene have an environmental cost, and this needs to be weighed up against the health benefits of preventing disease transmission. When comparing hand sanitizers to handwashing with soap and water, this study found that using isopropanol based hand sanitizer is better for planetary health. However, no method of hand hygiene was ideal; isopropanol had a greater fossil fuel resource use than ethanol based hand sanitizer. More research is needed to find hand hygiene sources which do not diminish planetary health, and environmental impact is a consideration for public health campaigns around hand hygiene. Copyright © 2022. The Author(s).

Dental

Discussing the environmental impact of dental-associated travel - how do we build from the current COVID-19 crisis towards a more sustainable future within dentistry?
Item Type: Journal Article
Authors: Wainer, Christina
Publication Date: 2022
Journal: British Dental Journal 232(7), pp. 437-440
Abstract: Dentistry is a highly energy- and resource-intensive field and consequently has a significant environmental impact. In 2013-2014, total greenhouse gas emissions of NHS dental services in England measured 675 kilotonnes of carbon dioxide equivalents, with 64.5% related to travel, 19% from procurement and 15.3% from energy use. There is currently an absence of comprehensive standards or guidelines for sustainable dentistry. Instead, sustainable initiatives have been at a small scale and are adopted voluntarily by groups or professionals as an ethical duty or practical requirement. However, a recent study showed that there seems to be increasing interest from dental teams in how to become more sustainable. This opinion article focuses on how the dental profession can ensure a sustainable recovery as England emerges from the COVID-19 crisis, with an emphasis on improving environmental sustainability related to travel within the dental healthcare system. Reducing dental-associated travel can include changing mode of transport, combining family appointments, appropriate scheduling of dental examinations, preventive dentistry and the use of information technology. Copyright © 2022. The Author(s), under exclusive licence to the British Dental Association.

An estimated carbon footprint of NHS primary dental care within England. How can dentistry be more environmentally sustainable?
Item Type: Journal Article
Authors: Duane, B.;Lee, M. B.;White, S.;Stancliffe, R. and Steinbach, I.
Publication Date: 2017
Journal: British Dental Journal 223(8), pp. 589-593
Introduction National Health Service (NHS) England dental teams need to consider from a professional perspective how they can, along with their NHS colleagues, play their part in reducing their carbon emissions and improve the sustainability of the care they deliver. In order to help understand carbon emissions from dental services, Public Health England (PHE) commissioned a calculation and analysis of the carbon footprint of key dental procedures.Methods Secondary data analysis from Business Services Authority (BSA), Health and Social Care Information Centre (HSCIC) (now called NHS Digital, Information Services Division [ISD]), National Association of Specialist Dental Accountants (NASDA) and recent Scottish papers was undertaken using a process-based and

environmental input-output analysis using industry established conversion factors.Results The carbon footprint of the NHS dental service is 675 kilotonnes carbon dioxide equivalents (CO2e). Examinations contributed the highest proportion to this footprint (27.1%) followed by scale and polish (13.4%) and amalgam/composite restorations (19.3%). From an emissions perspective, nearly 2/3 (64.5%) of emissions related to travel (staff and patient travel), 19% procurement (the products and services dental clinics buy) and 15.3% related to energy use.Discussion The results are estimates of carbon emissions based on a number of broad assumptions. More research, education and awareness is needed to help dentistry develop low carbon patient pathways.

Digital

Strategies during digital transformation to make progress in achievement of sustainable development by 2030
Author(s): Ziadlou
Publication date: June 2021
Source: Leadership in Health Services
Purpose: The purpose of this study is to explore strategies during transformation to obtain sustainable development and to identify the human-based factors contributing to the transformation. Design/methodology/approach: This qualitative study explored the strategies that health-care leaders need to adopt during transformation to achieve the Sustainable Development of the United Nations' agenda by 2030. The study was conducted in early 2020 among ten health-care leaders in the USA. The research design was an exploratory qualitative approach that used a semi-structured, open-ended questionnaire asked of ten US health-care leaders who had experience in leading health-care transformation in their organizations. The study findings identified that health-care leaders can facilitate the achievement of Sustainable Development by establishing strategies in knowledge improvement, innovation development, motivation increment, global strategy and local strategy alignment, leadership support and partnership development. Findings: Six major themes emerged from the data linked to the central research question: “What are the strategies during digital transformation to make progress in the achievement of Sustainable Development by 2030?” The compressed collection of themes for the study included the following six major themes: knowledge development; innovation development; motivation; global strategy establishment; leadership; collaboration enhancement; and two minor themes, namely, mindset change and vision creation. Research limitations/implications: Due to the few numbers of participants selected for this study (N = 10) may not be generalizable to other settings. The implication of this study is to identify the significant factors contributing to making progress in sustainable development in health-care organizations. The health-care leaders can learn what significant strategies can be helpful to establish future-based organizations toward achieving sustainability. Practical implications: The results of this study provided actionable strategies to empower the employees and increase managerial innovation in health-care organizations. Social implications: Promoting partnership of health-care organizations with social and global activities such as sustainable development goals that are contributing in 5Ps: People, Prosperity, Peace, Partnership and Planet. Originality/value: The main reason for the study was that health-care leaders worldwide could have a novel study that delineates the digital transformation strategies needed for creating impactful outcomes toward achieving sustainable development. Moreover, this unique study provided a useful outlook for health-care leaders to establish future-based health-care organizations while learning the dynamic of digital transformation is the key for health-care organizations to adapt their strategies for a sustainable future.

Digital sustainability: how information and communication technologies (ICTs) support sustainable development goals (SDGs) assessment in municipalities
Author(s): Ribeiro et al.
Source: Digital Policy, Regulation and Governance
Publication date: September 2021
Purpose: This paper aims to discuss the role of information and communication technologies (ICTs) in the effective assessment of the sustainable development goals (SDGs) related to smart and sustainable city initiatives. Design/methodology/approach: The study is based on a systematic review of the literature within the Web of Science and Scopus databases, comprising the studies about ICTs related to smart and sustainable city initiatives and sustainable assessment. Findings: The main results point out that there are several different ways of assessing SDGs performance related to ICTs use in smart and sustainable city initiatives. However, the effectiveness of these assessments can be questioned. The intensive use of technology understood as the core of smart and sustainable cities does not imply an improvement in sustainability unless these technologies are strategically addressed to underpin those objectives. Moreover, not all SDGs have considered the use of ICTs in their targets. Research limitations/implications: The scope of the study is limited to “how” the information is used and managed, rather than analysing the sustainable performance itself. As a limitation, the findings and conclusions do not consider other sources of studies, such as grey literature. Practical implications: This study suggests some requirements for providing better and more reliable sustainable assessment, making smart and sustainable city initiatives more correlated with the SDGs. Social implications: By acknowledging the difficulties associated with SDGs assessment, concerning the municipal level, the study offers valuable insights into the effectiveness of public policies and public management. Besides, the findings shed some light on if and how the use of ICTs can effectively enhance sustainable development issues. Originality/value: This study offers valuable contributions to the literature by providing a collection of insights regarding how the ICTs may genuinely lead to a sound assessment of sustainable development, especially regarding the SDGs.

Carbon emission savings and short-term health care impacts from telemedicine: An evaluation in epilepsy.
Item Type: Journal Article
Authors: Blenkinsop, Stephen;Foley, Aideen;Schneider, Natascha;Willis, Joseph;Fowler, Hayley J. and Sisodiya, Sanjay M.
Publication Date: 2021
Journal: Epilepsia 62(11), pp. 2732-2740
Abstract: OBJECTIVE: Health systems make a sizeable contribution to national emissions of greenhouse gases that contribute to global climate change. The UK National Health Service is committed to being a net zero emitter by 2040, and a potential contribution to this target could come from reductions in patient travel. Achieving this will require actions at many levels. We sought to determine potential savings and risks over the short term from telemedicine through virtual clinics. METHODS: During the severe acute respiratory syndrome coronavirus 2 (SARS-2-CoV) pandemic, scheduled face-to-face epilepsy clinics at a specialist site were replaced by remote teleclinics. We used a standard methodology applying conversion factors to calculate emissions based on the total saved travel distance. A further conversion factor was used to derive emissions associated with electricity consumption to deliver remote clinics from which net savings could be calculated. Patients' records and clinicians were interrogated to identify any adverse clinical outcomes. RESULTS: We found that enforced telemedicine delivery for over 1200 patients

resulted in the saving of ~224 000 km of travel with likely avoided emissions in the range of 35 000-40 000 kg carbon dioxide equivalent (CO2 e) over a six and half month period. Emissions arising directly from remote delivery were calculated to be e) over a six and half month period. Emissions arising directly from remote delivery were calculated to be 2 e (~0.5% of those for travel), representing a significant net reduction of greenhouse gas emissions. Only one direct adverse outcome was identified, with some additional benefits identified anecdotally. SIGNIFICANCE: The use of telemedicine can make a contribution toward reduced emissions in the health care sector and, in the delivery of specialized epilepsy services, had minimal adverse clinical outcomes over the short term. However, these outcomes will likely vary with clinic locations, medical specialties and conditions. Copyright © 2021 The Authors. Epilepsia published by Wiley Periodicals LLC on behalf of International League Against Epilepsy.

Ambulance emissions

Scoping ambulance emissions: Recommendations for reducing engine idling time Abstract only*
Item Type: Journal Article
Authors: Sheldon, A. and Hill, L.
Publication Date: 2019
Journal: Journal of Paramedic Practice 11(7), pp. 305-312
Abstract: The NHS is a significant contributor to the UK's greenhouse gases and environmental pollution. The current review seeks to examine the degree to which ambulance services contribute to environmental pollution and provides quality improvement suggestions that may reduce emissions, save money and improve public health. A literature search was conducted to identify the English language literature for the past 7 years related to ambulance service carbon emissions and pertinent strategies for reducing harm. An average of 31.3 kg of carbon dioxide (CO2) is produced per ambulance response in the current box-shaped ambulance design. A number of quality improvement suggestions related to cost, emissions and public health emerge. Ambulance services should consider a range of system-level and individual-focused interventions in order to reduce emissions, save money and promote public health. Copyright © 2019 MA Healthcare Ltd

Workplaces

A practice based learning approach towards sustainable consumption in the workplace
Author(s): Dantas de Figueiredo et al.
Source: Journal of Workplace Learning
Publication date: May 2021
Purpose: The purpose of this paper is to analyze how changes toward sustainable consumption of electric energy [1] are learned in the workplace, the paper uses a practice-based approach to organizational learning. This paper focuses on the workplace as a rich environment where social learning is not limited to individuals but is also rooted in the community of practitioners at an organizational level.
Design/methodology/approach: This paper used participative action research through interviews, two focus groups and observations. Departing from the interventions, this paper identified the elements of the practice of energy consumption. This paper further altered elements to intentionally promote the reconfiguration of such practice toward sustainable patterns among the working group. Findings: The results show that the goal of promoting sustainability through changes in the individual and collective actions and understandings may be achieved through sharing knowledge and keeping knowledge alive within the practices of a community; embedding knowledge in material practices and innovating as an ongoing process. During the research, this paper observed that

employees became more aware of sustainable consumption and such self-consciousness prompted behavioral changes in the workplace. Likewise, the new material arrangements adopted in the work environment nudged sustainable energy consumption, which required lower levels of awareness. Originality/value: This paper contributes to sustainability studies by providing more information on how the learning of sustainable energy consumption happens in the level of social practices. It also contributes to workplace studies by showing that changes in materials, meanings and competences interwove with new dynamics to reshape the practice, foreshadowing more lasting changes toward sustainability.

Self-efficacy and workplace well-being: moderating role of sustainability practices
Author(s): Singh et al.
Source: Benchmarking: An International Journal
Publication date: January 2019
Purpose: How psychological variables especially self-efficacy plays significant role to attain workplace well-being is yet to be explained. The extant literature calls for further research works in the field of sustainability practices to bridge the gap between self-efficacy and workplace well-being. The purpose of this paper is to extend the literature of workplace well-being while scientifically examining the moderating role of sustainability practices. Design/methodology/approach: The study collected data from 527 full-time executives of Indian public and private manufacturing industries. The authors performed moderated regression analysis through a series of hierarchical models to test the hypotheses of the study. Findings: The result indicates positive relationship between self-efficacy and workplace well-being. Furthermore, the result suggests that the relationship between self-efficacy and workplace well-being was stronger among executives with high level of sustainability practices and vice versa. Research limitations/implications: The cross-sectional sample of executives employed in Indian manufacturing organizations limits the generalizability of the findings. Practical implications: HR functionaries and senior management may benefit by closely examining their sustainability practices along with their employees perceived ability to address workplace well-being. Originality/value: The study contributes to extend the literature on self-efficacy and workplace well-being. This research work is one of the first few studies to examine the moderating effect of sustainability practices.

Sustainable cultures: engaging employees in creating more sustainable workplaces and workstyles
Author(s): Greene et al.
Source: Facilities
Publication date: April 2014
Purpose: This paper aims to describe a design research project which looked at how to support facility managers engage employees in behaviour change to create more environmentally sustainable workplaces and work styles.
Design/methodology/approach: The multi-disciplinary research team used ethnographic and user-centred design methodologies to get employees' perspectives on environmental sustainability in the workplace. This involved in-depth interviews and workplace observations to understand employees' views on sustainability in their organisation; workshops to explore attitudes towards sustainability; and design provocations to explore how employees might be motivated to act more sustainably. Findings: The research demonstrated the different understandings people have of what sustainability in the workplace should mean and whose responsibility they think it should be. The results were developed into a model of four different sustainability cultures, pragmatist, libertarian, housekeeper and campaigner, based upon people's perception of the cost of sustainability to both

company and employees. This model can be used to provide insight into the predominant sustainability culture of an organisation as well as the attitudes of individual employees. Originality/value: The research has been compiled into a toolkit, “The Sustainable Cultures Engagement Toolkit”, aimed at FM and workplace managers, which uses this model as the basis to provide information about how best to communicate with employees about environmental sustainability in the workplace and how to motivate behavioral change. This research demonstrates a user-centred design approach to address these challenges.

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