

Care Pathways: Guidance on Appraising Sustainability

Summary



Second Edition
December 2023



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Prepared by Michael Collins, Simon Aumônier, Saori Galley and Aoife Calnan

For and on behalf of
Environmental Resources Management

Approved by: Michael Collins

Signed:



Position: Partner

Date: 06 December 2023

This report has been prepared by Environmental Resources Management the trading name of Environmental Resources Management Limited, with all reasonable skill, care and diligence within the terms of the Contract with the client, incorporating our General Terms and Conditions of Business and taking account of the resources devoted to it by agreement with the client.

The first edition (2015) was prepared by Tom Penny, Michael Collins, Andy Whiting and Simon Aumônier



We are at a critical point in time for the future health of people, communities and our environment. We know we must develop more sustainable healthcare products and services as part of our transformation towards a low carbon economy and take a close look at the way we use resources in healthcare.

The Coalition for Sustainable Pharmaceuticals and Medical Devices (CSPM) has been leading on the work to address the significant contribution of pharmaceuticals and medical devices to healthcare greenhouse gas (GHG) emissions. In 2012 it published internationally recognised Greenhouse Gas Healthcare Product Guidance to consistently appraise health products which was a great development in understanding the GHG emission of healthcare products through manufacture, use and disposal.

In addition, within the health system we must look beyond healthcare products to address the way we deliver care, to redesign services and to promote prevention. This new Sustainable Care Pathways Guidance supports that approach and extends on the previous GHG Healthcare Product Guidance by providing vital information about the GHG emissions, water and waste impacts of health services, interventions and pathways.

This guidance is well placed to ensure sustainability is a consideration when designing new models of care or optimising existing services. Furthermore it allows us to better understand the environmental benefits of investing in prevention early in a care pathway. We recommend it be used not just by policy makers but by patients, healthcare providers, suppliers and anyone working in health that has the interest or opportunity to improve the sustainability of the health system.

We must all continue to show our commitment to reducing emissions and meeting both national and global levels of ambition and this document is evidence of the CSPM members' commitment to sustainability.

We welcome this guidance as a crucial step towards developing health systems and services to incorporate sustainable development into decision making, and encourage the CSPM to continue its work to ensure it is an integral part of health systems now and in the future.

A handwritten signature in black ink, appearing to read "H. Duff".

Howard Duff
Director for England of the Royal Pharmaceutical Society

NICE National Institute for
Health and Care Excellence

"NICE is committed to exploring methods for building sustainability into its guidance and to promoting sustainable growth in the health and care system. This guidance represents an important step towards utilising environmental information when designing more sustainable models of care. We strongly support this guidance and thank the CSPM for its development."

Sir Andrew Dillon CBE
CEO of the UK National Institute for Health and Care Excellence

FOREWORD TO THE SECOND EDITION

It is commonly said that one can only manage what one can measure. While not a universal truth, to be able to shed light on aspects of complex systems, such as health care pathways, is certainly a helpful starting point to focus efforts to bring meaningful change.

The climate crisis and the necessary role of healthcare, to both take action to mitigate its own contribution to climate change and to help build human resilience to its impacts, have only become more urgent since this guidance was first published in 2015. We are at a critical point for the future health of people, communities and our environment. There is an urgent need to develop more sustainable healthcare products and services as part of our transformation towards a low carbon economy and take a close look at the way we use resources in healthcare.

This updated edition brings the guidance up to date with links to more recent information and expands the modelling of surgical pathways. Specifically, it incorporates updated references, example calculations, signposts useful calculators and provides additional supporting information.

This second edition of Care Pathways: Guidance on Appraising Sustainability is published as interest in quantifying and reducing the impact of care pathways is growing. There is increased prioritisation, and action, on climate change from within the healthcare sector, as the NHS and other health services develop and implement their net zero commitments. We must all continue to show our commitment to reducing emissions, while improving clinical and societal outcomes, and meeting both national and global levels of ambition to transition to net zero and environmental sustainability.

A handwritten signature in black ink, appearing to read 'Fiona Adshead', followed by a long horizontal line.

Dr Fiona Adshead
Chair, Sustainable Healthcare Coalition

PREFACE TO THE SECOND EDITION

This second edition is published as interest in appraising and reducing the impact of care pathways is growing. There is increased prioritisation, and action, on climate change from within the healthcare sector as the NHS, and other health services, develop and implement their net zero commitments. This edition: incorporates updated references; updated surgical procedure calculations and signposts useful calculators, and provides additional supporting information. The updates to this summary document are the addition of a 'Foreword to the Second Edition' (page 3) and updated results for the surgical procedure (pages 12 & 13).

Acknowledgement is given to the invaluable input of the following individuals and organisations associated with the first edition:

Sustainable Healthcare Coalition (SHC), formerly Coalition for Sustainable Pharmaceuticals and Medical Devices (CSPM), Leadership Members

- AstraZeneca: Keith Moore and Wesley White.
- Baxter Healthcare: Julie Aspin and Margaret Enos.
- Becton Dickinson: Ivan Weldaert.
- Boehringer Ingelheim: Richard Pitt.
- GlaxoSmithKline: Mark Rhodes and Matt Wilson.
- Johnson & Johnson: Phil Dahlin, Dominika Domanska and Erol Odabasi.
- Medtronic: Sarah Hill and Silvia Montisci.
- Novo Nordisk: Anne Gadegaard and Nanja Hedal Kløverpris.
- Sustainable Development Unit: Sonia Roschnik.

SHC Advisory Members

- Association of British Healthcare Industries: Andy Vaughan.
- Association of British Pharmaceutical Industries: Mike Murray.
- Barts Health NHS Trust: Fiona Daly.
- British Generic Manufacturers Association: Paul Fleming.
- Guys & St Thomas Trust: Alex Hammond.
- Hull and East Yorkshire NHS Trust: Marc Beaumont.
- International Sustainability Unit: Laura Partridge.
- Medicines and Healthcare products Regulatory Agency: Ian Harwood.
- National Institute for Health and Clinical Excellence: Jennifer Watts.
- Pharmaceutical Market Support Group: Kevan Wind.
- Royal Pharmaceutical Society: Helen Gordon, Howard Duff and Jamie Woodward.
- UK Department of Health: David Wathey and Danny Palnoch.
- United Nations Development Programme (UNDP) Europe and Central Asia: Christoph Hamelmann.

Convening Body and Technical Author

- Environmental Resources Management Limited (ERM): Tom Penny, Michael Collins, Andy Whiting and Simon Aumônier.

SUMMARY

This guidance allows users consistently and practically to appraise the environmental impacts of care pathways.

Why is this guidance needed?

The global effects of climate change are a threat to both health and to effective healthcare delivery. Sustainability is a crucial, but often overlooked, aspect of health. Many examples point to the relationship between sustainability, environment and climate change and the impact on the health of global populations ⁽¹⁾. Although healthcare largely improves lives, it can also contribute to environmental and social issues such as the consumption of scarce resources, the generation of unnecessary waste, poor social standards in supply chains, and the release of hazardous substances. With both an increasing need for health services and higher demands on resources, a transformative change is needed to redesign health systems to be more sustainable.

The NHS has committed to two main targets; for the emissions it directly controls, it will be net zero by 2040, and for the emissions it can influence, it will be net zero by 2045. The NHS has multiple focus areas outlined in its “Delivering a ‘Net Zero’ National Health Service” report and the Greener NHS has medicines and supply chain as a focal point ⁽²⁾. It intends to work with suppliers to ensure that they meet, or exceed, their commitment on net zero emissions before the end of the decade.

In order to achieve net zero, a holistic patient-centred and care pathway approach, which includes all sectors of healthcare delivery (primary, secondary, tertiary and community care) is required. The scale of this work is large, due to the multiple clinical specialities within the NHS, each of which requires numerous care pathways.

However, good progress has been made. Examples include: the phase out of desflurane gas, which was a key driver of impact in the surgical care pathway; ⁽³⁾ and addressing inhaler propellants by moving away from high greenhouse gas emission propellants, such as HFC-134a, to low impact alternatives such as dry powder inhalers.

The Alliance for Transformative Action on Climate and Health (ATACH) works to build climate resilient and sustainable health systems using the collective power of WHO member states within working groups to address issues such as low carbon sustainable health systems and supply chains ⁽⁴⁾. Given the scale and agenda of this,

(1) Lancet, Tackling climate change: the greatest opportunity for global health, [http://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(15\)60931-X/abstract](http://www.thelancet.com/journals/lancet/article/PIIS0140-6736(15)60931-X/abstract)

(2) NHS, Delivering a ‘Net Zero’ National Health Service, <https://www.england.nhs.uk/greenernhs/wp-content/uploads/sites/51/2022/07/B1728-delivering-a-net-zero-nhs-july-2022.pdf>

(3) NHS, <https://www.england.nhs.uk/greenernhs/2023/01/putting-anaesthetic-emissions-to-bed/>

(4) WHO, Alliance for Transformative Action on Climate and Health (ATACH), <https://www.who.int/initiatives/alliance-for-transformative-action-on-climate-and-health>

and other, work within health systems and healthcare delivery in the 21st century, there is a need for a tested and standardized approach.

This guidance aims to enable consistent and holistic appraisals of the sustainability of care pathways, and provides a much-needed aid towards the development of global sustainable health systems. Environmental sustainability is considered on a holistic life cycle basis and includes waste, wastewater and carbon emissions. The use of a care pathway approach considers all aspects of healthcare delivery, thus capturing the emissions across the identified carbon hotspots, such as energy, supply chain and travel.

An action-focused approach is required to address healthcare's role in the climate emergency. This guidance on appraising care pathways makes possible such an approach.

How was it developed?

The Sustainable Care Pathways Guidance was developed through the Sustainable Healthcare Coalition (SHC), formerly the Coalition for Sustainable Pharmaceuticals and Medical Devices (CSPM), an international consortium of pharmaceutical and medical device companies, government organisations, non-government organisations (NGOs) and trade associations working collaboratively to address health sustainability issues.

The original guidance was funded by the following SHC Leadership Members:

- AstraZeneca;
- Baxter Healthcare;
- Becton Dickinson;
- Boehringer Ingelheim;
- GlaxoSmithKline;
- Johnson & Johnson;
- Medtronic;
- Novo Nordisk; and the
- Sustainable Development Unit.

Other organisations and independent experts contributed to the development of this guidance and are listed in the Acknowledgements section in the main document.

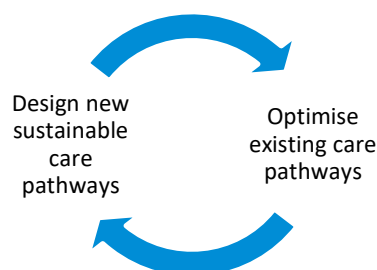
Environmental Resources Management (ERM) authored the guidance, with support from Trucost in collecting the necessary data for the environmental impact calculations for each module.

The guidance was completed according to the following timeline:

Project initiation	Kickoff at CSPM meeting on 25th November 2014
Workshops	Workshops with invited experts to determine scope of guidance on 21st and 22nd January 2015
1st draft	First draft of guidance written by ERM in February and March 2015
1st consultation	CSPM members and invited experts provided comments on draft in April 2015
2nd draft	Second draft of guidance written and data collection by Trucost in May to August 2015
2nd consultation	CSPM members provided further comments on second draft in August 2015
Final draft	Final guidance document completed in September 2015
Launch	Launch and publication of the guidance in London on 20th October 2015
Second edition	Updated example calculations, signposts to useful calculators and additional supporting information July 2023. The Main Document, Summary and Surgical Procedure Module documents have been updated to a Second Edition.

How should it be used?

This guidance should be used to incorporate sustainability into decision-making when designing new care pathways or to understand sustainability considerations when optimising existing care pathways.



This guidance has been developed to enable users to understand the sustainability of new or existing models of care and ultimately to improve the sustainability of health systems. By applying the guidance, a user will gain a greater understanding of the environmental impacts of health services, with both the direct impacts and those expressed across the whole care pathway being investigated.

The guidance can be used to educate, to inform decision-making and ultimately to deliver more effective health systems.

Who was it developed for?

This document should be used by anyone interested in understanding the sustainability of health and care systems globally. This may include:

- *Patients*, in understanding and influencing sustainability issues regarding their health and care;

- *Policy makers and regulators*, allowing sustainability to be considered when developing new models of care;
- *Healthcare providers*, in understanding where changes in service design can lead to an improved sustainability performance of a service (examples may include frontline workers or clinical commissioning groups);
- *Suppliers*, in understanding how their products or services benefit or impact the sustainability of health and care systems; and
- *Sustainability practitioners, academics, and researchers*, in defining the boundaries, data sources and requirements consistently to appraise healthcare services.

What is included in the guidance?

This guidance describes the steps necessary consistently to appraise the environmental impacts of a care pathway. An example pathway may be the management of Type 2 diabetes from an initial GP consultation, through to self-management, complications, hospital visits, surgeries and check-ups.

This guidance document uses the definition of a care pathway employed by the European Pathway Association ⁽⁵⁾.

“A care pathway is a complex intervention for the mutual decision-making and organisation of care processes for a well-defined group of patients during a well-defined period.”

This guidance considers that pathways can be separated into common modules that can be investigated individually or added together like building blocks to create an overall pathway. A care pathway module is described as follows:

A care pathway module describes one or more distinct healthcare-related activities performed for, on behalf of, or by a patient.

Care pathway modules are the building blocks which make up the total care pathway.

At present, this guidance includes information for six modules documented in separate chapters. Ultimately, the intention is that this list will be expanded. These modules included in the guidance are:

(5) European Pathway Association, <https://e-p-a.org/care-pathways/>

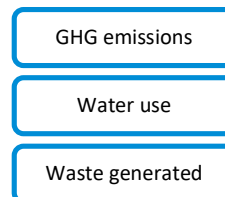
1. GP Consultation
2. Patient Travel
3. Emergency Department Visit
4. Inpatient / Bed Day
5. Surgical Procedure
6. Condition Self Management

Each module chapter includes information on how to appraise the sustainability of the module, examples of what should be included (eg equipment, building energy, etc), likely environmental hotspots, examples of useful /relevant studies and an estimate of the environmental impact of the module to use as a guide.

This main document underpins these modules with common guidance and is divided into three sections:

- *Section 1: [Introduction to care pathways guidance](#)*
- *Section 2: [Common principles applicable to all modules](#)*
- *Section 3: [Reporting recommendations](#)*

This guidance considers sustainability to mean a balance of environmental, social and financial considerations, as defined in the Sustainable Development Strategy for the UK NHS, Public Health and Social Care System ⁽⁶⁾. However, initially we only consider three key environmental metrics. It is expected that further environmental and social metrics will be added over time. The three initial environmental metrics are:



(6) Sustainable Development Strategy for UK NHS, Public Health and Social Care, 2014, <http://www.sduhealth.org.uk/policy-strategy/engagement-resources.aspx>

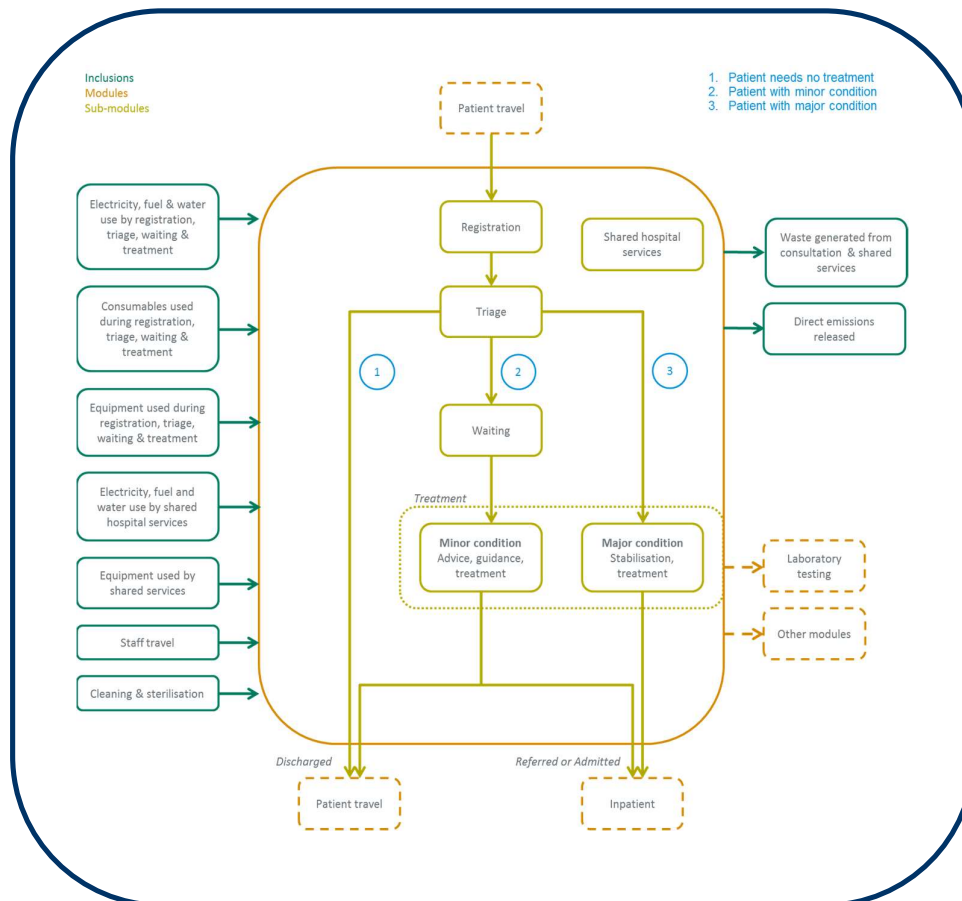
Steps to appraising a pathway

A set of steps to appraise the environmental impact of a care pathway are described in the main document, in order to ensure consistency between appraisals. A summary of these are below:

1. [define the objectives](#) of the care pathway appraisal;
2. [define the care pathway](#) to be appraised, including a draft of the activities required to provide the pathway;
3. [define the unit of analysis](#) for the care pathway, which, as a minimum shall include patient type and representativeness, condition and severity, geographical coverage and age of the patient group;
4. [create a detailed map](#) of the activities required in a care pathway by consulting literature and technical experts relevant to the pathway;
5. [group activities into modules](#) to simplify the care pathway where possible, using guidance provided for modules in each of the separate [module](#) chapters;
6. [complete a materiality assessment](#) to reduce the primary data collection requirements for the care pathway ⁽⁷⁾;
7. [calculate each module](#) based on the guidance below and the information provided in each separate module chapter;
8. [add the correct multiples of modules together](#) to develop an appraisal of the care pathway as a whole; and
9. [interpret and report the findings](#), including any information that may be useful to improve the sustainability of similar care pathways.

A detailed map of a module will include all relevant resources and emissions required to provide that module service. An example map of an emergency department visit is presented below.

(7) A materiality assessment is a high-level study that explores the estimated and relative impact of the study's components to prioritise data collection efforts.



Boxes with a dotted line denote other care pathway modules to show how different modules can interact with each other. Sub-modules are sections of a module that, when combined, result in a module. For example, the sub-modules above are combined to result in an emergency department visit module.

Once the impacts of each module have been calculated, they can be added together to form a care pathway, as shown schematically below.



Module environmental impacts

Each module appraisal shall include data for the following categories (if significant as shown by a materiality assessment):

- consumables;
- equipment;
- pharmaceuticals;
- building energy, waste and water use;
- staff travel;
- patient and visitor travel; and
- medical gases.

As an example, data have been collected for each category above and used to calculate impact results for each module. These can be found in the module documents, please refer to the Sustainable Healthcare Coalition's care pathways online resources ⁽⁸⁾ for the most up to date results and care pathway activity assessments. The results provided for each module are based on primary data from health providers, secondary data and estimated data. These results are provided so that they may be used in care pathway screening appraisals and materiality checks, but also where the module is not known to be significant to the overall pathway, thereby saving time and resources.

Care Pathway Module Environmental Impacts

Please refer to <https://shcpathways.org/> for up to date results and care pathway activity assessments

Module	Units	GHG emissions (kg CO ₂ e)	Fresh water use (m ³)	Waste generated (kg)
1. GP consultation	Per visit	1.1	2.3	0.19
2. Patient travel				
Self – to GP	Per single trip	0.56	0.10	x
Self – to elective care	Per single trip	2.9	0.53	x
Provided non-emergency	Per single trip	7.9	26	0.13
Provided emergency	Per single trip	36	91	0.53
3. Emergency department	Per visit	14	21	0.29
4. Inpatient admission				
Low intensity UK	Per day	38	61	3.3
High intensity UK	Per day	90	137	13
5a Surgical procedure (includes desflurane use)	Per hour	54	65	0.41
5b Surgical procedure (desflurane replaced with sevoflurane)*	Per hour	38	64	0.41
6. Self-management Patient education session	Per session	1.6	x	0.02

*original data included desflurane, this is replaced with sevoflurane to reflect NHS drive to eliminate the use of desflurane

Note: "x" indicates that no data were available to calculate the environmental impact

Values for direct and indirect fresh water use and for hazardous and non-hazardous waste have also been calculated for each module and can be found in the relevant module chapter.

From the analysis, it is also possible to estimate the significant 'hotspots' for the greenhouse gas (GHG) emissions of each module. For those users seeking to understand and to reduce the environmental impact of a module, these hotspots are a signpost to opportunities for GHG reduction.

(8) <https://shcpathways.org/>

Module GHG Emission Hotspots

Module	Consumables	Equipment	Medical gases	Travel	Energy	Water	Waste
1. GP consultation	26%	<1%		12%	59%	<1%	3%
2. Self-travel				100%			
2. Provided non-emergency travel	10%	7%	13%	50%	15%	<1%	<1%
2. Provided emergency travel	6%	8%	10%	59%	17%	<1%	<1%
3. Emergency department	6%	2%	15%	6%	70%	<1%	<1%
4. Low intensity inpatient UK	39%	4%	5%	10%	40%	<1%	1%
4. High intensity inpatient UK	16%	4%	4%	5%	68%	<1%	2%
5a. Surgical procedure	13%	2%	61%	1%	22%	<1%	<1%
5b. Surgical procedure*	19%	3%	44%	2%	31%	<1%	<1%
6. Self-management	24%	3%		35%	38%	<1%	<1%

Key	
	Greater than 50% contribution to module
	Between 20% and 50% contribution to module
	Between 10% and 20% contribution to module
	Between 5% and 10% contribution to module
	Between 0% and 5% contribution to module
	0% contribution to module or not applicable

* Original data included desflurane, this is replaced with sevoflurane to reflect NHS drive to eliminate the use of desflurane

For further information or to provide feedback please visit: <https://shcoalition.org/>

This document is the second edition prepared by Michael Collins, Simon Aumônier, Saori Galley and Aoife Calnan.

The first edition was prepared by Tom Penny, Michael Collins, Andy Whiting and Simon Aumônier and was published in October 2015 with the support of:

