

Teaching toolkit

An introduction to healthcare sustainability



**Royal College
of Physicians**

This teaching toolkit has been developed by the RCP's clinical sustainability fellow. Financial support for the RCP sustainability clinical fellowship was provided as an Independent Medical Education Grant from Pfizer Limited. Pfizer Limited had no involvement in candidate selection, and no influence on the work of the clinical fellowship.

Instructions and teaching notes for facilitators

This toolkit has been designed to support physicians to deliver introductory teaching for peers and colleagues on climate change, human health and healthcare sustainability. The teaching notes provide background information, discussion points and questions to help deliver an interactive and thought-provoking session even when the facilitator may have limited expertise and knowledge in this area.

Much of the content is relevant to anyone working in a clinical role, and so the session could be delivered to a multiprofessional audience. This may generate further rich discussion around actions to improve the sustainability of practice, and opportunities to share challenges and opportunities beyond the role of a physician.

It is anticipated that an average session would last 60 minutes without a break. This is based on teaching a small group (5–10) in a face-to-face setting. Recommended time spent on each section is given in the teaching notes. If there is more time available, a break may be incorporated. Timings can be adapted by the facilitator as required, eg promoting longer periods

of discussion, or reviewing the additional resources highlighted in the slides and teaching notes. It is recommended that additional time is allowed if the session is delivered online.

References are provided for further reading, and the facilitator may choose to review these in advance of the teaching session.

The teaching can be adapted for both small (5–10 people) and larger group (20–30 people) teaching. For smaller groups, the discussion activities may be more appropriately undertaken in pairs, or simply by sharing ideas within the group as a whole. For larger audiences, ‘breakout’ groups of 4–6 may be more appropriate for discussion activities.

The teaching can be delivered either online or in person, but if online, requires a platform that allows participant interaction and the ability to create ‘breakout rooms’ to facilitate small group discussions.

Hybrid delivery (online and in person) is possible but not recommended, to ensure that everyone has an equal opportunity to participate.

Learning objectives

- > Define climate change and recognise the link between climate change and human health
- > Recognise the contribution of the NHS to emissions and climate change
- > Describe some of the impacts of climate change on individual and population health
- > Define sustainable healthcare
- > Describe ways that healthcare professionals can contribute to a greener and more sustainable NHS
- > Plan at least one change you might make within your department to improve the sustainability of your/your team or department’s practice

Resources required

For in-person delivery

- > At least one facilitator
- > Private teaching space appropriate for size of intended teaching group
- > Slide deck
- > Teaching notes for reference
- > Access to AV system able to display PowerPoint slides
- > Consider access to a whiteboard or flipchart to write down key points/ideas from group feedback (not essential)

For online delivery

- > At least one facilitator
- > Facilitator may wish to access two screens to ensure teaching notes and presentation are visible simultaneously
- > Online platform permitting audience participation, sharing of PowerPoint slides, and creation of 'breakout rooms' for small group discussions
- > Consider use of an online 'whiteboard' or notes page to write down key ideas from group feedback (not essential)

Target audience

This teaching toolkit is intended for delivery to clinicians with limited experience or knowledge of healthcare sustainability.

Although it has been developed by the Royal College of Physicians, with reference to the RCP *Green physician toolkit*, much of the content is relevant to all healthcare professionals and could be delivered to a multidisciplinary audience.

The session encourages participants to consider changes they could make within their own practice to improve sustainability. While it is acknowledged that opportunities to influence, initiate and lead change may vary depending on the individual participant, the session encourages healthcare professionals at all levels of seniority to understand the importance of sustainability and climate change in relation to healthcare, and consider changes that may drive improvement in this area, regardless of scale.



Teaching notes

Background information supports delivery of the slide content and is best reviewed ahead of delivering the session. This information is not intended to be read out verbatim.

Guidance on delivery contains suggested discussion points, recommendations on how to deliver the session, and possible questions to pose to the participants.

Activities are highlighted in yellow.

Learning objectives

- > Define climate change and recognise the link between climate change and human health
- > Recognise the contribution of the NHS to emissions and climate change
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Introduction and learning objectives

Slides: 1–2 | Estimated time allocation: 1 minute

This teaching session is designed as an introduction to sustainability in healthcare for physicians. The content is based on range of material, including the RCP's *Green physician toolkit* as well as NHS England's policy document *Delivering a 'net zero' NHS*. References are given throughout to provide guidance on further reading, and there are also QR code links to alternative resources, including podcasts and case studies.

Background

Climate change, carbon emissions and healthcare



Background

Slide: 3 | Estimated time allocation: <1 minute

The links between climate change, carbon emissions and healthcare

What is climate change?

- > Can be a natural process
- > Recent rapid warming because of human activities
- > Primarily due to burning fossil fuels, generating greenhouse gas emissions
- > 'Greenhouse gases' include CO₂, N₂O, CH₄ and SF₆, which can all trap energy from the sun within the earth's atmosphere
- > 'CO₂e' is the global warming potency relative to reference compound of carbon dioxide
- > Air pollution and climate change are interlinked
- > 'Triple planetary crisis' – climate change, pollution and loss of biodiversity

Sources: Department for Energy Security and Net Zero. *Climate change explained*. UK Government, 2023. www.gov.uk/guidance/climate-change-explained
United Nations Climate Change. *What is the triple planetary crisis?* UN, 2022. <https://unfccc.int/news/what-is-the-triple-planetary-crisis>



What is climate change?

Slide: 4 | Estimated time allocation: 2 minutes

While natural fluctuations do occur, human influence has led to an average increase in the Earth's overall temperature. The change in temperature hasn't been consistent across the globe, for example, it has increased faster in the Arctic.

The Earth's surface, oceans and atmosphere are all warming. This in turn leads to melting polar ice, rising sea levels and more extreme weather events.

The 'greenhouse effect' results from rising levels of carbon dioxide (CO₂), and other gases such as methane (CH₄), nitrous oxide (N₂O) and sulphur hexafluoride (SF₆), which trap heat energy from the sun. Plants and oceans can absorb some of the carbon dioxide produced from human activities, but the rest goes into the atmosphere.

The unit of measurement ‘CO₂e’ may be familiar. It stands for ‘carbon dioxide equivalent’ and is a way of indicating the global warming potency of a greenhouse gas relative to carbon dioxide as a reference compound. It’s used to compare the climate change impact of different greenhouse gases.

The drivers of recent warming include burning of fossil fuels for energy, with the release of stored carbon, a reduction in the number of plants and trees available to absorb carbon dioxide (reduction of carbon sequestration), and industrial or agricultural processes that release greenhouse gases into the atmosphere.

As greenhouse gas emissions continue to increase, climate models project that the UK will experience warmer and wetter winters, hotter and drier summers, and more frequent extreme weather events.

Climate change and air pollution are closely interlinked. Many activities that contribute to air pollution will also contribute to climate change, and vice versa. For example, burning fossil fuels for energy will release greenhouse gases into the atmosphere, as well as other pollutants such as sulphur dioxide, oxides of nitrogen and particulates. Greenhouse gases directly trap heat within the Earth’s atmosphere, but other pollutants affect the climate through alternative means, including changing the reflectivity of the Earth to solar energy.

Air pollution can directly affect human health, and the types of air pollution that people are exposed to has changed over time, and may vary by country, by occupation or by level of socio-economic deprivation. In the UK, as an example, people growing up in the 1940s and 50s would have been exposed to soot and sulphur dioxide from burning coal. In the decades that followed, emissions from leaded petrol were prevalent. Now, people may breathe nitrogen dioxide or small particulate molecules from diesel engines, although exposure types can vary across the UK. In urban areas there is likely to be more traffic-related pollution, while in rural regions, air pollution may be linked to activities such as agriculture, burning of solid fuels, or forest and heathland fires.

The term ‘triple planetary crisis’ has been used to describe the relationship between three linked problems: climate change, pollution and loss of biodiversity. The emphasis of this teaching session is on climate change, and particularly how the healthcare system contributes to this. Biodiversity loss refers to the decline, or complete disappearance, of animals, plants and ecosystems. These losses and changes can result from a whole range of issues, such as clearance of forests to make

way for agriculture, to overfishing and hunting, and rerouting water courses for the purposes of building or development. Since all life on Earth is interlinked, loss of biodiversity will have grave effects on planetary health and ultimately, human health, with issues such as loss of food security, changing disease patterns, and impact on clean water supplies.

References for this section

- Department for Energy Security and Net Zero. *Climate change explained*. UK Government, 2023. www.gov.uk/guidance/climate-change-explained
- Royal College of Physicians. *Every breath we take: the lifelong impact of air pollution*. RCP, 2016.
- United Nations Climate Change. *What is the triple planetary crisis?* UN, 2022. <https://unfccc.int/news/what-is-the-triple-planetary-crisis>

Guidance on delivery

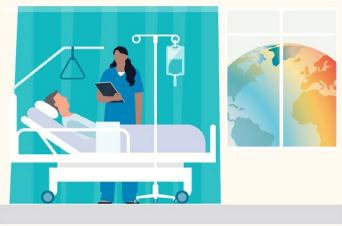
Most people will have some understanding of the issues underpinning climate change, and a complex exploration of the underlying theory is not intended during this teaching session.

There is a vast amount of additional information available online if people wish to find out more, including from organisations such as United Nations, which has agencies dedicated to each of the planetary crises.

Activity 1:
Why is climate change important in healthcare?

Consider the impact that environmental factors – such as heatwaves, air pollution and infectious diseases – may have on healthcare delivery.

List the potential impacts on patients, on staff and on infrastructure.



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Why is climate change important in healthcare?

Slide: 5 | Estimated time allocation: 5 minutes for discussion, 5 minutes for feedback

Activity 1. Consider the impact that environmental factors – such as heatwaves, air pollution and infectious diseases – may have on healthcare delivery

Guidance on delivery

Depending on the number of participants, consider splitting into smaller groups of 3–5 to discuss this issue. Encourage people to think beyond the UK to potential global effects.

Ask the groups to list the impacts under the following headings: impacts on patients, impacts on staff and impacts on infrastructure. Ask groups to nominate someone to feedback ideas and collect these before moving on to the next slide. If teaching in person, you may wish to write down each group's contributions on a flipchart/whiteboard.

Why is climate change important in healthcare?

Climate change is one of the biggest threats to human health and is projected to cause an excess of 250,000 deaths per year by 2050. The changing climate and air pollution are already impacting the UK population's health

Potential impacts of climate change/air pollution		
Impacts on patients	Impacts on staff	Impacts on infrastructure
> Heat- and cold-related deaths > Exacerbation of chronic diseases – increasing demand on stretched health service > Air pollution exposure linked to multiple conditions, eg cardiovascular disease, cancer > Mental health impacts – PTSD, 'eco-anxiety' > Worsening health inequalities – disproportionate effect on those who live in deprived areas > Changing patterns of infectious diseases	> Exacerbation of chronic diseases – sickness absence > Higher demand on health service (forced migration, exacerbation of diseases etc) > Increased workplace stress > Mental health impacts – PTSD, 'eco-anxiety'	> Failure of equipment in extreme temperature > Damage to equipment/buildings by flooding, wildfire, extremes of temperature > Interruption of supply chain

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Sources: Royal College of Physicians, Green physician toolkit; RCP, 2024; Royal College of Physicians, A breath of fresh air: responding to the health challenges of modern air pollution; RCP, 2025; IPCC, Climate change impacts and risks (Fact sheet – Health); IPCC, 2023. www.ipcc.ch/report/ar6/wg2/downloads/outreach/IPCC_AR6_WGII_FactSheet_Health.pdf

Why is climate change important in healthcare? (Feedback slide)

Slide: 6 | Estimated time allocation: 2–3 minutes

Climate change has a range of potential impacts on healthcare, from the direct effects of extreme heat and

cold on patients, to indirect effects through the impact on healthcare infrastructure. It is vitally important to recognise that the changing climate is already impacting the UK population's health. Between 2020 and 2024, heatwaves caused 10,781 excess deaths in England. Without additional adaptation and with limited global decarbonisation, heat-related deaths will continue to increase, and are predicted to reach 10,889 annually by the 2050s. In the UK, an estimated 30,000 deaths per year are attributed to air pollution. Adverse mental health impacts have been associated with flooding, including depression, anxiety and PTSD.

Impacts on patients

Climate change and air pollution can lead to exacerbation of chronic diseases. Climate change is leading to changing patterns of infectious diseases, with vector-borne diseases such as dengue fever, malaria and Lyme disease being extremely climate sensitive.

Air pollution can affect lung function and exposure in childhood may lead to reduced lung function in adulthood. Air pollution has also been classified by the International Agency for Research on Cancer as a cause of lung cancer. Importantly, air pollution does not just affect respiratory health, and potential links have been found between air pollution and almost every organ system. The negative health impacts of air pollution can be felt throughout the life course, beginning before conception. Being exposed to air pollution may affect mental and physical development in children, and cognition in older people, as well as being linked to the development of cardiovascular disease. In patients who already have heart disease, spikes in air pollution can make their symptoms worse. There is a growing body of evidence around the health effects of air pollution, which is discussed in more depth in the RCP's 2025 publication, *A breath of fresh air: responding to the health challenges of modern air pollution*.

Extreme heat can impact on control of chronic diseases. For example, patients taking diuretics may be more prone to the effects of a significant increase in heat and may need specific advice on how to manage their medications when extreme heat is predicted. Patients with mobility disorders, experiencing homelessness, with mental health disorders or social isolation may not have the support, facilities or ability to respond to extremes of temperature. Similarly, those who live in deprivation may be more likely to be exposed to air pollution, thus deepening health inequalities. The impacts of air pollution and climate change on health are still not fully understood and research may uncover new information and new links.

Impacts on staff

Healthcare staff themselves will not be exempt from experiencing illness because of air pollution and climate change. Extreme weather events, and climate or air pollution-related chronic disease exacerbations will place additional pressure on an already stretched health service, contributing to stress and burnout among healthcare staff.

Some patients or staff may experience mental health impacts related to climate change. For example, PTSD from experiencing the effects of extreme weather events, or 'eco-anxiety' related to their concern for the impact of environmental change on themselves and those important to them.

Impacts on infrastructure

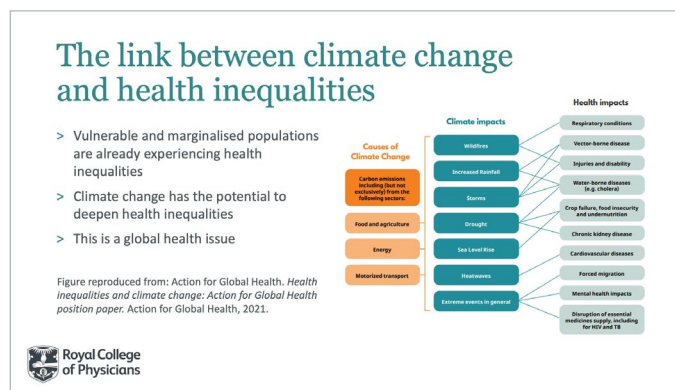
Extreme weather events can lead to IT or other equipment failures, damage to healthcare facilities and loss/damage to resources. Patients and staff may also be unable to attend healthcare facilities, and supply chains can be interrupted.

References for this section

- > Royal College of Physicians. *Green physician toolkit*. RCP, 2025.
- > Royal College of Physicians. *Every breath we take: the lifelong impact of air pollution*. RCP, 2016.
- > Royal College of Physicians. *A breath of fresh air: responding to the health challenges of modern air pollution*. RCP, 2025
- > Intergovernmental Panel on Climate Change. *Climate change impacts and risks* [Fact sheet - Health]. IPCC, 2023.

Guidance on delivery

The slide shows a selection of possible impacts, but the group may identify more. There may be topical events linked to these headings which could emerge in discussion.



The link between climate change and health inequalities

Slide: 7 | Estimated time allocation: 2 minutes

Vulnerable and marginalised populations are already experiencing health inequalities, and climate change has the potential to deepen these.

Some groups are more vulnerable to climate change than others. For example, older or very young people, people with pre-existing health conditions and disabilities, those living in coastal or low-lying areas, or people experiencing homelessness.

The interconnection between climate and health is complex, however, circumstances may render an individual more exposed to, or less resilient to, climate factors that can influence their health. For example, those living in more deprived areas are more likely to live near busy roads or industrial areas, and therefore be disproportionately affected by air pollution. They may be more likely to develop conditions related to exposure to air pollution, such as chronic respiratory disease, making them more vulnerable to the effects of extreme weather events from climate change.

The link between climate change and health inequalities is a global issue. Low- and middle-income countries experience higher exposure to some risks, such as extremes of weather (drought, flood) but have fewer resources to protect their populations or respond, while high- and upper middle-income countries are responsible for 86% of global CO2 emissions.

People on lower incomes typically live in poorer quality housing with fewer resources and are therefore more exposed to the impacts of events such as extreme heat, flooding, hurricanes and vector-borne diseases. Poorer access to healthcare services intensifies these impacts.

The figure on this slide highlights the causes of climate change, the climate impacts that may be experienced, and the health consequences which may result.

These are broad ranging and encompass direct effects on individuals' health, as well as indirect effects on healthcare infrastructure.

References for this section

- > Action for Global Health. *Health inequalities and climate change: Action for Global Health position paper*. Action for Global Health, 2021.

Guidance on delivery

Emphasise that the impact of climate change is a global issue, and the impacts of forced migration, changing patterns of communicable diseases, and lack of availability of essential medicines and vaccinations may be felt more keenly by some countries than others.

Find out more...





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Find out more

Slide: 8 | Estimated time allocation: <1 minute

The RCP Medicine podcast has episodes on healthcare sustainability and climate change. The QR codes on the screen link directly to related episodes, and new podcasts are published regularly.

In episode 64, the consultant nephrologist and RCP special adviser on sustainability Dr Mark Harber discusses why sustainability is an issue that all clinicians working in the NHS need to be concerned about, as well as outlining ways in which healthcare workers can make a positive impact on climate change in their day-to-day practice.

Episode 52 introduces Dr Ian Sinha, a consultant respiratory paediatrician who is heavily involved in the campaign against air pollution. This episode was originally released to mark 'Clean Air Day' 2022.

Guidance on delivery

The QR codes can be scanned and saved by attendees to access after the teaching session.

What about the impact of healthcare on climate change?

- > Healthcare also *contributes* to climate change
- > Reaching net zero will require making every part of healthcare more sustainable
- > As one of the UK's largest public sector emitters, the NHS must lead this transformation

The NHS in England accounts for:

40% of public sector emissions

4-5% of national emissions



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What about the impact of healthcare on climate change?

Slide: 9 | Estimated time allocation: <1 minute

While the health service must respond and adapt to the impact of climate change on the health of the population, its staff, and its infrastructure, it is also vital to recognise that healthcare itself makes a significant contribution to climate change, from vehicles in supply chains, to patient travel, heating of buildings and manufacture of medicines.

The NHS is responsible for around 40% of public sector carbon emissions, and approximately 4% of the UK's total emissions.

Activity 2:
Greenhouse gas emissions and the NHS

List activities which contribute to carbon emissions/greenhouse gas emissions and therefore to the overall carbon footprint of the NHS



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Greenhouse gas emissions and the NHS

Slide: 10 | Estimated time allocation: 2-3 minutes for discussion, 3 minutes for feedback

Activity 2. Ask participants to list activities which contribute to carbon emissions/greenhouse gas emissions, and therefore to the overall carbon footprint of the NHS

Guidance on delivery

Depending on the number of people in the group, consider splitting into smaller groups of 3–5 to discuss this issue, otherwise request answers to be called out/shared in chat (if online).

Encourage the group(s) to think about the wider activities of the NHS, ie beyond individual hospitals or departments.

Ask each group to share their ideas before revealing the next slide. You may wish to write the pooled ideas on a whiteboard/flipchart.

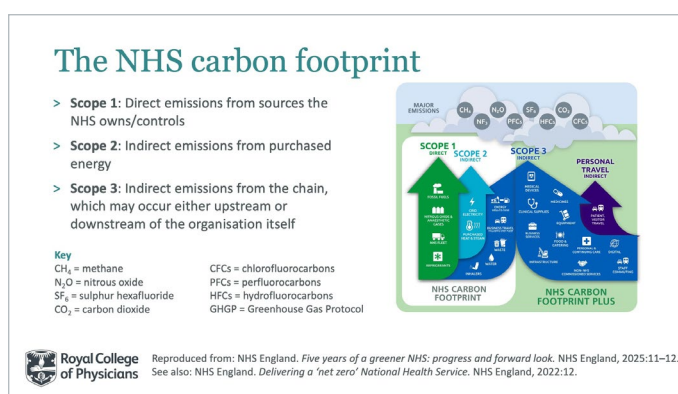


Diagram of NHS carbon footprint

Slide: 11 | Estimated time allocation: 2–3 minutes

Published in July 2022, NHS England's policy document *Delivering a net zero National Health Service* considers sources of emissions from within the NHS. An update to this document was produced in 2025, highlighting areas of progress and identifying targets for ongoing improvement. Some of these can be directly controlled by the health service, others may be secondary effects, for example, manufacturing costs of medications, or the carbon footprint of food and catering.

Firstly, the NHS carbon footprint (on the left of the figure) – emissions the NHS can control directly. For this group, NHS England has an ambition to reach an 80 % reduction by 2028 to 2032, and to be net zero by 2040. Within this group, emissions may be direct from facilities or vehicles owned or directly controlled by the NHS (scope 1), or indirect (scope 2), the emissions which result from the generation of purchased energy.

The NHS carbon footprint plus (on the right of the figure) is broader and includes activities that the health

service may be able to influence but does not control completely. For example, medicines, manufacturing of products and chemicals used by the health service, and commissioned services. By making thoughtful choices, the NHS can reduce its carbon footprint from these activities too. This might involve looking at the distance goods must be transported from their place of manufacture, or scrutinising the sustainable credentials of services they plan to commission.

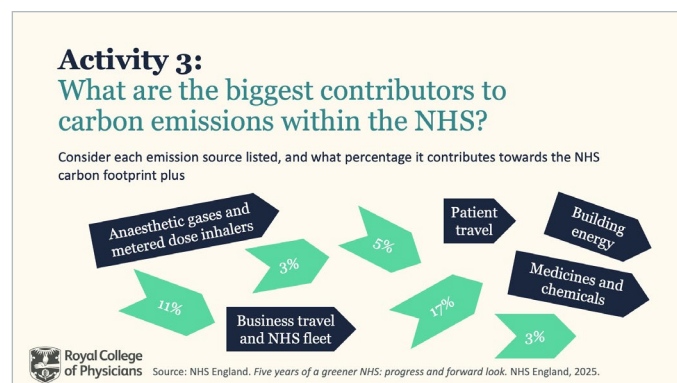
GHGP refers to 'Greenhouse Gas Protocol'. This is a standard used for measuring and managing emissions and uses a framework of scopes (1, 2 and 3) to help structure reporting of sources of carbon emissions. Scope 1 covers direct emissions from sources the company/organisation owns or controls. Scope 2 covers indirect emissions from purchased energy. Scope 3 focuses on indirect emissions from the chain, including purchase goods, travel, and waste disposal. These emissions may occur upstream or downstream of the organisation itself.

References for this section

- > NHS England. *Delivering a 'net zero' National Health Service*. NHS England, 2022:12.
- > NHS England. *Five years of a greener NHS: progress and forward look*. NHS England, 2025.
- > World Business Council for Sustainable Development, World Resources Institute. *The greenhouse gas protocol: a corporate accounting and reporting standard*. Rev edn. WBCSD and WRI, 2004.

Guidance on delivery

Reflect on the list drawn up by the group during activity 2 and compare with the diagram on the slide. Were there any contributors which were commonly overlooked?



What are the biggest contributors to carbon emissions within the NHS?

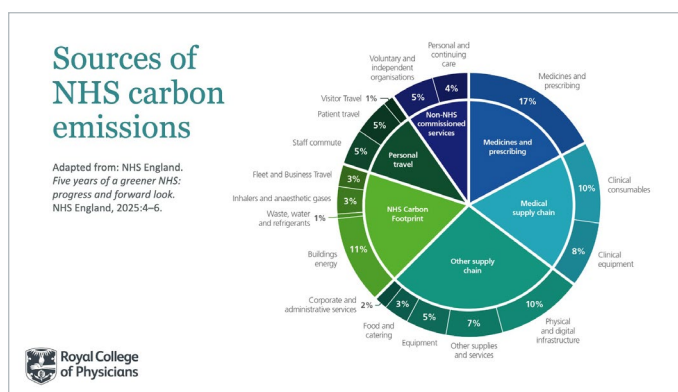
Slides: 12–13 | Estimated time allocation: 2–3 minutes

Activity 3. In groups or individually, ask participants to consider (in 1 minute) which of the listed activities contribute which percentage to the NHS carbon footprint plus. Anaesthetic gases and metered dose inhalers – emissions occurring at the point of use. Medicines and chemicals – carbon emissions inherent in the manufacture and supply chain.

Guidance on delivery

Slide 13 provides the answers – ensure adequate time is given to consider the activity before revealing the answers.

This activity may generate some debate, so ensure that the session moves on even if the group have not agreed on the answers. After revealing the answers, allow time for the group to review them and compare with their own answers.



Summary of sources of carbon emissions

Slide: 14 | Estimated time allocation: 2 minutes

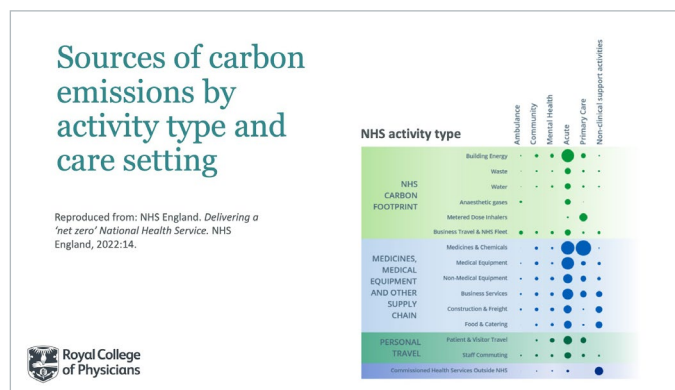
This sunburst graph links back to the diagram of NHS carbon footprint and carbon footprint plus on slide 11. Remember-the NHS carbon footprint is that where the NHS has direct control over the emissions, whereas the NHS carbon footprint plus includes activities over which the NHS may have only indirect control, or no control. (refer back to the diagram on slide 11 if a refresh is needed).

References for this section

- > NHS England. *Five years of a greener NHS: progress and forward look*. NHS England, 2025.

Guidance on delivery

Reflect on the contributors to the NHS carbon footprint. Are any figures surprising for the group? Did they believe some areas were higher, or lower, sources of emissions than the data shows?



Sources of carbon emissions by activity type and care setting

Slide: 15 | Estimated time allocation: 2 minutes

This graphic presents similar information, highlighting those areas of the health service which are the most significant contributors to the carbon footprint. It demonstrates that, while the acute sector is the largest contributor overall, and therefore the focus for greatest gains, there is a requirement for change across all care settings within the health service if net zero is to be achieved.

Guidance on delivery

Allow time for the group to review this diagram, appreciating that, although some areas of the health service are higher contributors than others, there are always areas for improvement and reduction in carbon footprint, requiring a 'whole system' approach. It also means there is likely to be opportunity everywhere!

Delivering a 'net zero' NHS

- > Published in July 2022, this policy document sets out the path to a 'net zero' NHS
- > It is underpinned by the understanding that climate change impacts health
- > It states two clear targets:
 - Net zero by 2040 for the emissions the NHS controls directly
 - Net zero by 2045 for the emissions the NHS can influence
- > An update was published in 2025

NHS England. *Delivering a 'net zero' National Health Service*. NHS England, 2022.

NHS England. *Five years of a greener NHS: progress and forward look*. NHS England, 2025.

Delivering a 'net zero' NHS

Slide: 16 | Estimated time allocation: 1 minute

In 2020, the NHS launched a campaign for a greener health service and commissioned a panel to set out a practical and evidence-based path to a 'net zero NHS'. This culminated in the publication in 2022 of the report, *Delivering a 'net zero' National Health Service*.

As discussed earlier, there is a clear link between climate change and health, with climate change and air pollution contributing to the development of conditions such as cardiovascular disease, asthma and cancers.

The Health and Social Care Act 2022 places duties on all trusts, foundation trusts and integrated care boards to contribute towards reduction of emissions and achievement of environmental targets.

Guidance on delivery

You may wish to review your organisation's own green plan in advance, and guide attendees to find it after the session, to see what is happening locally and how individual/team actions may contribute to sustainable objectives.



Sustainable healthcare

Slide: 17 | Estimated time allocation: <1 minute

What is sustainable healthcare?

'Sustainable healthcare meets the needs of our populations, without damaging the health or ability to meet the healthcare needs of vulnerable people now or in the future.'

Centre for Sustainable Healthcare

From: Centre for Sustainable Healthcare. *The principles of sustainable healthcare*.
<https://sustainablehealthcare.org.uk/about/our-story/the-principles-of-sustainable-healthcare/>



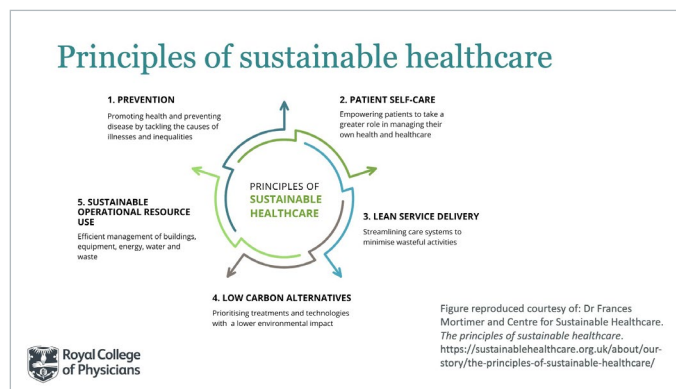
What is sustainable healthcare?

Slide: 18 | Estimated time allocation: <1 minute

The Centre for Sustainable Healthcare defines sustainable healthcare as 'healthcare that meets the needs of our populations, without damaging the health, or ability to meet the healthcare needs of vulnerable people now or in the future.'

References for this section

- > Centre for Sustainable Healthcare. *The principles of sustainable healthcare*. <https://sustainablehealthcare.org.uk/about/our-story/the-principles-of-sustainable-healthcare/>



Principles of sustainable healthcare

Slide: 19 | Estimated time allocation: 3–4 minutes

The Centre for Sustainable Healthcare outlines these guiding principles of sustainable healthcare that can help healthcare practitioners embed low carbon practices in their healthcare setting. Considering how these principles apply to current working patterns, as well as how they might be embedded more robustly can help lead to changes in practice that support more sustainable healthcare.

Prevention: Health promotion and illness prevention are part of healthcare delivery. There are a range of determinants of health, and tackling inequalities in social, environmental and economic determinants is a key part of the 'bigger picture' in preventing ill health and access to high-quality healthcare. Keeping the population healthy means lower demand on health services and all its associated resources and consumption.

Patient self-care: Patient should feel informed and empowered to manage their own health. This can help to reduce progression or worsening of a disease, and its potential complications, helping patients to remain as well as possible, for as long as possible. Again, this can help lower demand on health services and the associated use of resources.

Service delivery: Service delivery should be 'lean', ensuring that clinical decision making is optimised to reduce unnecessary interventions, reduce low value intervention and therefore remove any resource waste and associated environmental impacts. Lean service delivery can be supported by ensuring that there are

clear patient pathways with evidence-based guidance within each specialty. Getting it Right First Time (GIRFT) is a programme within NHS England designed to improve the treatment of care of patients through review of services, bench marking using evidence to guide change. 'Greener GIRFT' pathways are being developed, such as that for decarbonising the bladder cancer care pathway (referenced below). However, there are many other ways in which care systems can be streamlined to reduce wasteful activities. For example, by undertaking teleclinics/telephone follow up where this is appropriate, using electronic communications rather than paper, or by coordinating patient appointments where possible.

Low carbon alternatives: Where there are multiple approaches to investigation or management, and the likely clinical outcomes are identical, selecting the option with the lowest carbon footprint contributes to sustainable practice.

Sustainable operational resource use: Efficient management of NHS buildings, equipment, energy, water and waste.

References for this section

- > Centre for Sustainable Healthcare. *The principles of sustainable healthcare*. <https://sustainablehealthcare.org.uk/about/our-story/the-principles-of-sustainable-healthcare/>
- > NHS England. *GIRFT greener pathways: a practical guide to decarbonising the bladder cancer care pathway*. NHS England, 2024. <https://gettingitrightfirsttime.co.uk/girfts-first-greener-pathway-reducing-the-carbon-footprint-of-the-bladder-cancer-pathway-while-enhancing-patient-care/>

Guidance on delivery

You may wish to consider the specialty of the participants to offer some specific examples during the discussion, or ask the group to reflect on how these principles may be addressed more effectively within their own department/specialty/ward.



What can I do?

Slide: 20 | Estimated time allocation: <1 minute

What can I do? Actions to improve the sustainability of your practice

Guidance on delivery

Some participants may feel that healthcare sustainability is not the responsibility of individual physicians and views may be shared in this regard during the teaching session. You may wish to limit debate during the session if time is limited, but acknowledge differing viewpoints and consider directing towards published debate, for example a recent article in the *Future Healthcare Journal*:

Daniels T, Fernandes L. The FHJ debate: sustainable healthcare should be the responsibility of every physician. *Future Healthc J* 2025;12:100229.



Actions to improve the sustainability of your practice

Slide: 21 | Estimated time allocation: 3–4 minutes

Referring back to this sunburst diagram, it is possible to identify some simple changes that can be made to reduce waste and improve sustainability of practice. The first area listed here is medicines and chemicals, which contribute 20 % of the NHS carbon footprint plus.

Two broad areas to consider are the reduction in unnecessary prescribing and working towards minimising waste.

Activity 4. What specific actions might help participants to meet these goals?

Guidance on delivery

Ask participants to consider what specific actions they could undertake in their own practice which would be relevant to these overarching goals: how can they reduce unnecessary prescribing? How might waste generation be reduced?

Actions to improve the sustainability of your practice – medicines and chemicals

Reduce unnecessary prescribing

- > Collaborate with patients in deciding both initiation and ongoing use of medication
- > Consider patient's existing stock of medication
- > Consider using tools to support deprescribing where appropriate, eg Medstopper, STOPP/START and PrescQIPP
- > Continue to practice excellent antibiotic stewardship.
- > Switch from IV to oral options as soon as appropriate

Generate less waste

- > Check medication adherence in every contact with patients
- > Place products with the soonest expiry dates in the most accessible position
- > Return empty packaging and unused medicines to pharmacies for recycling/correct disposal
- > Consider 'greener' prescribing options, such as reusable insulin pens

From: Royal College of Physicians. *Green physician toolkit*. RCP, 2024; NHS Specialist Pharmacy Service. *Tools to support medication review*. NHS, 2025. <https://www.sps.nhs.uk/articles/tools-to-support-medication-review/>; Chowdhury TA, Stefanova S, Bennett-Richards P. Sustainable practice: Insulin therapy. *BMJ* 2024;387:e079425



Actions to improve the sustainability of your practice – Medicines and chemicals

Slide: 22 | Estimated time allocation: 2–3 minutes

Listed on this slide are some examples of actions that can help reduce unnecessary prescribing and generate less medicines waste.

References for this section

- > Royal College of Physicians. *Green physician toolkit*. RCP, 2025.
- > NHS Specialist Pharmacy Service. *Tools to support medication review*. NHS, 2025. <https://www.sps.nhs.uk/articles/tools-to-support-medication-review/>
- > Chowdhury TA, Stefanova S, Bennett-Richards P. Sustainable practice: Insulin therapy. *BMJ* 2024;387:e079425

Guidance on delivery

Talk through these examples and discuss whether participants came up with any other suggestions. Perhaps they have examples from their own practice, or suggestions for how there could be improvements made to these practices locally.

Managing multiple medications

- > Careful medication review + appropriate deprescribing → vital for patient care
- > Deprescribing can also impact on environmental sustainability
- > *Shared decision making is essential*
- > See the RCP acute care toolkit on managing multiple medications (2024) for more information

Image from: Royal College of Physicians. *Acute care toolkit 17: managing multiple medications*. RCP, 2024, originally adapted from Scottish Government Polypharmacy Model of Care Group. *Polypharmacy guidance, realistic prescribing*, 3rd edition. Scottish Government, 2018.



RCP acute care toolkit

Slide: 23 | Estimated time allocation: 1 minute

The RCP acute care toolkit on managing multiple medications describes the impact and consequences of multiple medications, as well as highlighting useful resources to help guide appropriate prescribing and deprescribing, and open conversations with patients about their medicines, and engage in shared decision making.

Of course, considering sustainability is not the driving factor in deprescribing, but reducing waste from unused or unnecessary medications can be a happy consequence of improving patient outcomes through reviewing and addressing problematic polypharmacy, ie appropriate decisions to deprescribe can be better for patients and better for the planet.

This diagram, taken from the acute care toolkit, and adapted from NHS Scotland's polypharmacy guidance, identifies seven steps to appropriate polypharmacy. This is centred around what matters to the patient, and is a cyclical process, not a one-off event.

References for this section

- > Royal College of Physicians. *Acute care toolkit 17: managing multiple medications*. RCP, 2024.

Guidance on delivery

Participants may like to access and review the toolkit in their own time.



Actions to improve the sustainability of your practice – medicines and chemicals

Slide: 24 | Estimated time allocation: <1 minute

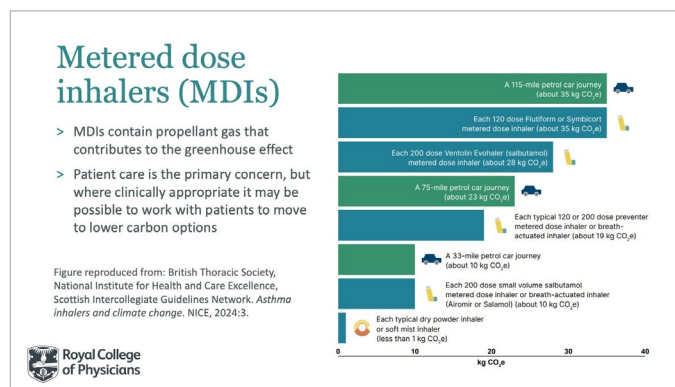
Medicines overall account for around a quarter of NHS carbon emissions, with a few medicines contributing to a large proportion of these emissions.

For example, anaesthetic cases and metered dose inhalers account for 3 % of NHS carbon emissions.

Anaesthetic gases such as desflurane have a high carbon footprint, and there have been efforts to move to lower carbon alternatives such as sevoflurane, develop effective capture and destruction of anaesthetic gases, as well as considering alternatives to general anaesthesia where this is clinically appropriate.

References for this section

- > NHS England. *Delivering a 'net zero' National Health Service*. NHS England, 2022:14.



Actions to improve the sustainability of your practice – medicines and chemicals

Slide: 25 | Estimated time allocation: 2 minutes

Metered dose inhalers contain propellant gas that contributes to the greenhouse effect. Dry powder inhalers do not contain any propellant.

This diagram, taken from a NICE patient decision aid, shows the carbon footprint of different inhalers.

Of course, patient care and outcomes remain the primary concern, and switching to a 'greener' inhaler may not be appropriate for everyone. However, NICE has published a patient decision aid in conjunction with SIGN and BTS to help patients understand the options and work together with their healthcare providers to assess whether a lower carbon inhaler may be right for them.

References for this section

- > British Thoracic Society, National Institute for Health and Care Excellence, Scottish Intercollegiate Guidelines Network. *Asthma inhalers and climate change*. NICE, 2024:3.

Guidance on delivery

This may already be well known to the participants, depending on their background/specialty. It is important to focus on the need for shared decision making with patients rather than blanket switches in medications.



Actions to improve the sustainability of your practice – medical equipment

Slide: 26 | Estimated time allocation: 1– 2 minutes

Medical equipment is another key contributor to the NHS carbon footprint plus. Manufacture, transport and disposal of medical equipment can all contribute to carbon emissions, so ensuring careful use of resources can help to reduce this. When undertaking any task, it is important to understand which resources are required or used; are these resources really needed, and what could be done to reduce waste?

Understanding what resources are used in a 'typical' procedure or situation can be the starting point from which to identify possible areas for improvement, and the baseline from which to calculate reduced costs, both financial and environmental.

References for this section

- NHS England. *Delivering a 'net zero' National Health Service*. NHS England, 2022:14.

Actions to improve the sustainability of your practice – medical equipment

- Use gloves only where clinically appropriate
- Organisations like the National Institute for Health and Care Excellence (NICE) and the Royal College of Nursing provide guidance on the use of gloves
- 'Contemplate before you cannulate'

Image © Royal College of Nursing. Reproduced from: *Glove awareness resources*. www.rcn.org.uk/Get-Involved/Campaign-with-us/Glove-awareness/resources#GAWresources

Royal College of Physicians

NHS England. *Standard infection control precautions: national hand hygiene and personal protective equipment policy*. NHS England, 2019. NHS England. *Reducing unnecessary cannulation at Charing Cross Hospital*. www.england.nhs.uk/greenernhs/whats-already-happening/reducing-unnecessary-cannulation-at-charing-cross-hospital/

Actions to improve the sustainability of your practice – medical equipment

Slide: 27 | Estimated time allocation: 1–3 minutes

The appropriate use of gloves is one example of ensuring that waste is reduced. There is also a financial cost to

the NHS of using gloves unnecessarily. All single use PPE contributes to the NHS carbon footprint, through extraction of raw materials required to manufacture them, the manufacturing process itself, packaging, transportation and disposal of resultant waste. However, reducing glove use is a good place to start.

Organisations like NICE and the Royal College of Nursing provide guidance on the appropriate use of gloves in clinical settings.

Since 2018, the Royal College of Nursing has held a 'Glove Awareness Week' to help highlight the issue of sustainable and healthy glove use. Gloves are an important part of PPE but should only be worn when there is a risk to health and safety such as contact with bodily fluids or hazardous medications or chemicals.

Plastic gloves are one of the most common single-use plastic items in healthcare settings, and both the manufacture of gloves, as well as the transport of gloves made elsewhere, contribute to emissions and ultimately climate change

The Royal College of Nursing has created a range of resources such as posters and toolkits, to help guide healthcare professionals on reducing their use of gloves.

Cannulation and venepuncture are also common everyday clinical tasks that contribute to single use plastic consumption (and resultant waste). A quality improvement project undertaken at Charing Cross Hospital demonstrated that 86 % of patients attending ED were cannulated, but more than 40 % of these cannulas were not used. Using a 'contemplate before you cannulate' campaign, staff demonstrated a 25 % reduction in cannulation, and a reduction in unused cannulas. This has both an environmental and financial impact, as well as reducing risks of complications for patients.

References for this section

- Royal College of Nursing. *Glove awareness resources*. RCN, 2025. www.rcn.org.uk/Get-Involved/Campaign-with-us/Glove-awareness/resources#GAWresources
- NHS England. *Standard infection control precautions: national hand hygiene and personal protective equipment policy*. NHS England, 2019.
- NHS England. *Reducing unnecessary cannulation at Charing Cross Hospital*. www.england.nhs.uk/greenernhs/whats-already-happening/reducing-unnecessary-cannulation-at-charing-cross-hospital/

Actions to improve the sustainability of your practice – medical equipment

- > Think about diagnostic activities
- > Consider Royal College of Pathologists' guidance on minimum retesting intervals in pathology

Think twice	Is the test being requested essential? Will it influence the patient's management?
Check twice	Ensure that the requested test has not recently been carried out elsewhere Check you are ordering the correct test/using the correct equipment, eg appropriate blood bottle
Order once	Combine blood tests if possible Check with the lab if a test can be added on to an existing sample

From: Royal College of Physicians. *Green physician toolkit*. RCP, 2024. Royal College of Pathologists. *National minimum retesting intervals in pathology*. RCP, 2021. www.rcpath.org/static/253e8950-3721-4aa2-8ddd4bd94f73040e/g147_national-minimum_retesting_intervals_in_pathology.pdf



Actions to improve the sustainability of your practice – medical equipment

Slide: 28 | Estimated time allocation: 3–5 minutes

Appropriate use of gloves is one example of where waste can be reduced, but the same observation and consideration can be applied to all sorts of clinical interventions and procedures. The 'think twice, check twice, order once' approach can help you reflect on your choices when it comes to diagnostic clinical activities.

Always consider whether a test being requested is required. Whether it's a blood test, swab, imaging or something else, take a moment to consider whether it will influence the patient's management. Unnecessary tests can be stressful and uncomfortable for patients, as well as wasteful of resources.

Where there are several potential imaging options, for example, discuss with an expert colleague to decide on the most appropriate way forward, and make sure request information is clear, so that the receiver can make a thorough assessment of which modality may be the most helpful for your patient. This ensures that the correct test can be carried out from the outset, rather than undertaking several different investigations which are unable to answer the clinical question.

Where blood tests are concerned, consider whether tests have recently been carried out elsewhere. If a patient is being cared for under multiple specialist teams, communicate with them to establish if different blood tests could be combined rather than sending multiple samples over a short period of time. It may be possible to add some tests on to an existing sample, rather than repeat a blood test.

The Royal College of Pathologists has published national guidance on minimum retesting intervals in pathology, including for common biochemical and haematological parameters, as well as therapeutic drug monitoring, immunology, microbiology and virology.

References for this section

- > Royal College of Physicians. *Green physician toolkit*. RCP, 2025.
- > Royal College of Pathologists. *National minimum retesting intervals in pathology*. RCP, 2021. https://www.rcpath.org/static/253e8950-3721-4aa2-8ddd4bd94f73040e/g147_national-minimum_retesting_intervals_in_pathology.pdf

Guidance on delivery

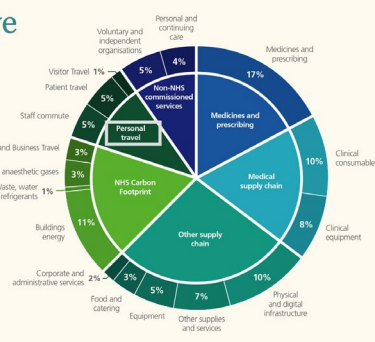
Is there a clear process for working with laboratory colleagues to achieve this? If not, could this be improved in your area of work?

The RCP, guidance could form the basis of a local QI project, or be used within a department to highlight recommendations for common test requested within the ward/specialty.

Actions to improve the sustainability of your practice

- > Consider whether remote consultations (telephone/video) are feasible and clinically appropriate
- > Can appointments be coordinated to fall on the same day?
- > Review whether digital communication is possible – rather than postal, reducing transport-related pollution, energy use and printing costs

Adapted from: NHS England. *Delivering a 'net zero' National Health Service*. NHS England, 2022:14.



Actions to improve the sustainability of your practice – travel

Slide: 29 | Estimated time allocation: 1 minute

Reducing unnecessary travel can help reduce carbon emissions, and pollutant emissions associated with motorised vehicle travel.

It may be more convenient for patients to have a remote consultation, particularly if they need to balance work, family and other commitments. Of course, this should only be done if safe and appropriate. If possible, digital communications with patients can also help reduce carbon emissions and resource use from postal transport and letter printing. As with many sustainable choices, the benefits are not confined to the environment but may also have positive outcomes for the individual too.

References for this section

- > NHS England. *Delivering a 'net zero' National Health Service*. NHS England, 2022:14

Sustainable quality improvement

- > Sustainability is a domain of quality and can be embedded in QI activities
- > An approach to improving healthcare holistically
- > Outcomes assessed against 'triple bottom line' of financial, social and environmental impact

$$\text{Sustainable value} = \frac{\text{Outcomes for patients and populations}}{\text{Environmental + social + financial impacts}}$$

- > The Centre for Sustainable Healthcare provides guidance on using a SusQI approach

Centre for Sustainable Healthcare.
What is SusQI? www.susqi.org/the-susqi-education-project



Sustainable quality improvement

Slide: 30 | Estimated time allocation: 3 minutes

Quality improvement is an integral part of our role as healthcare professionals, and sustainability is a dimension of quality.

SusQI is an approach to improving healthcare holistically, by considering the environmental, social and financial impacts, or 'triple bottom line'.

Sustainability can be embedded into existing quality improvement practice, recognising that there are finite financial, social and environmental resources available to deliver high quality healthcare. The overall goal is to increase sustainable value, delivering the best possible health outcomes with minimum financial and environmental costs.

Although the 'sustainable value equation' shown here, from the Centre for Sustainable Healthcare, is not designed to be solved, or to produce a single number, it can be used to guide holistic thinking when undertaking QI projects, so that all aspects are considered.

The Centre for Sustainable Healthcare hosts the 'SusQI' website, which has step-by-step guides as to how to undertake a SusQI project. The guide can be accessed via the QR code on the slide.

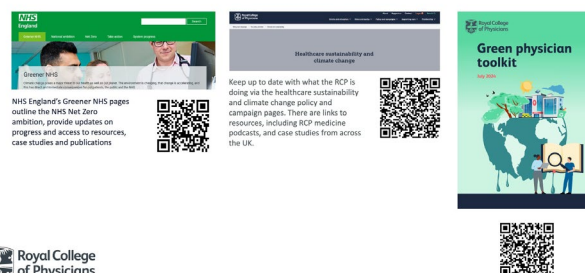
References for this section

- > Centre for Sustainable Healthcare. *What is SusQI?*
www.susqi.org/the-susqi-education-project

Guidance on delivery

This slide offers a very brief introduction to sustainable QI, with a much broader range of resources and guidance available through the Centre for Sustainable Healthcare.

Find out more...



Find out more...

Slide: 31 | Estimated time allocation: 1 minute

The above were just some examples of the way the NHS carbon footprint can be reduced.

'Net zero' is embedded in legislation through the Health and Social Care Act 2022, and all trusts, foundation trusts and integrated care boards have a duty to consider environmental targets, emissions and climate impact in the decisions they make.

All trusts and integrated care systems should develop a green plan, updated in 3 yearly cycles.

There are many other examples across the health service of changes, both large and small, that can contribute to the achieving net zero.

This slide provides links to further information to provide ongoing inspiration for practical change.

Guidance on delivery

Participants may wish to review the green plan for their own organisation to understand what is being done locally to contribute to a 'net zero' NHS.

What's next?



Summary and close

- > The climate emergency is a health emergency
- > Climate change and air pollution have detrimental effects on human health
- > Healthcare contributes to climate change but the NHS has ambitious 'net zero' targets
- > Individual actions can make a difference



What's next?

Slide: 32 | Estimated time allocation: <1 minute

Summary and close

Slide: 34 | Estimated time allocation: 1 minute

The climate emergency is a health emergency.

This session has explored the link between healthcare and climate change. There is a vicious cycle whereby climate change worsens health outcomes, leading to increased demands on health services, which then exacerbates climate change – and so it continues.

It is easy to feel disheartened given the size and scale of the NHS, however, individual actions can make a difference, and small individual changes have an impact.

Activity 5: Reflect on the issues discussed during the session in pairs or small groups

- > Are there areas you'd like to find out more about?
- > Plan at least one change you are considering to improve the sustainability of your own, or your department's, practice.



What's next?

Slide: 33 | Estimated time allocation: 3–5 minutes

Activity 5. Reflect on the issues discussed during the session and plan at least one change you are considering to improve the sustainability of your own, or your department's practice.

Guidance on delivery

Ask participants to reflect on the issues discussed during the session in pairs or small groups. Request feedback from the groups – whether there are areas they will go away and research, whether they will review their own trust's green plan, or investigate local sustainable healthcare groups. Ask participants to consider a change they might make within their own department (this may vary depending on the specialty/seniority of individual participants) or how they could share the key messages.

Further resources

- > UK Health Alliance on Climate Change – <https://ukhealthalliance.org/>
- > Our Health, Our Planet – <https://ourhealthourplanet.co.uk/>
- > NHS England elearning for healthcare 'Environmentally sustainable healthcare' programme – www.e-lfh.org.uk/programmes/environmentally-sustainable-healthcare/

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References

Slides: 35–38

Find out more about the RCP's commitment to sustainability.

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