



Council of
Deans of Health

The voice of UK university
faculties for nursing, midwifery
and the allied health professions

Education for sustainable healthcare within UK pre-registration curricula for allied health professions

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1. Foreword

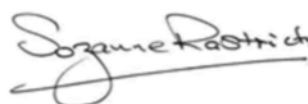
The climate emergency is a health emergency. Progressive environmental degradation threatens the foundations of good health. With the health and care system contributing almost 5% of UK emissions, every health and care professional needs to be part of the climate change solution. Allied health professionals (AHPs) are the third largest workforce in the NHS and are integral in the response to climate change. AHPs must, from the outset, be well equipped with the knowledge and skills to understand and apply sustainable healthcare approaches within complex health and care systems.

Higher education institutions (HEIs) are perfectly situated to contribute to the sustainable healthcare agenda for AHPs. Learners and academics have told us that sustainability is important to them, so we are united in our ambitions to ensure that every graduate has not only the knowledge and skills, but the attitudes that will enable them to protect the planet as well as the health of the population as an integral part of their health and care career.

The responsibility for developing AHP learners' knowledge and skills within sustainable healthcare does not sit exclusively with HEIs, of course. Professional bodies and regulators have a role in setting and monitoring standards, and therefore have a significant contribution to make. We urge leaders everywhere within AHP education (including practice-based learning), professional practice and regulation to support and enable the implementation of education for sustainable healthcare. The current and future learners expect nothing less of us, and the health of our planet and future generations depends on it.



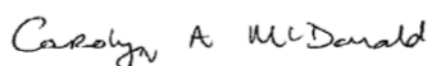
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Planetary health and human health are interconnected. There is an urgent need for the health and care community to take action to protect the planet as part of securing the current and future health of the people we care for.

All healthcare has a carbon cost, and health and care systems are one of the biggest contributors to carbon emissions; so, it is essential that all health professionals understand the impact of the interventions they provide on the environment, the effects of climate change on human health and the actions they can take to provide more sustainable healthcare.

This sustainable healthcare curricula guidance for AHPs sets the groundwork for the next generation of health and care professionals. It will support future AHPs to understand the relationship between health and the environment, to deliver sustainable healthcare and be advocates for environmental sustainability.

Consensus statement | UK Health Alliance on Climate Change

2. Acknowledgements

This guidance document was developed in response to a request by allied health professional (AHP) bodies and academics from higher education institutions (HEIs) to support the incorporation of education for sustainable healthcare within curricula, and in reviewing and developing academic programmes for AHPs.

This guidance was produced in collaboration with an advisory group across the four United Kingdom (UK) home nations: England, Scotland, Wales, and Northern Ireland. It was developed jointly with parties with a direct interest in the development and provision of AHP curricula, including NHS England, the Office for Health Improvement and Disparities (OHID), Scottish Government, Welsh Government and Health Education Improvement Wales (HEIW), Public Health Agency Northern Ireland, AHP Professional Bodies, the Health and Care Professions Council, the Council of Deans of Health, and student representation from the #150 Leaders Student Leadership Programme alumni. Climate and health expertise was sought via the Centre for Sustainable Healthcare, the Greener NHS, and the UK Health Alliance on Climate Change.

The guidance document was authored by Jessie Frost (Chief Sustainability Officer's Clinical Fellow 2022-23) and Linda Hindle (Deputy Chief Allied Health Professions Officer & OHID), with incredible support from the advisory group and other notable contributors. It was revised iteratively during several rounds of consultation, with additional review sought from a range of stakeholders and interested parties through focus groups and individual meetings. The full list of acknowledgements can be found in appendix A.

3. Glossary of terms

Term	Definition
Academic	In reference to educators within HEIs in line with four UK nations' education departments. Some common synonyms: educators / lecturers / professors.
Climate adaptation	Adapting to the inevitable increases in temperature, flooding, diseases etc that are already happening due to climate change.
Climate crisis / climate change / climate emergency	Used interchangeably in the document dependent upon context, in reference to a situation characterised by the threat of highly dangerous and often irreversible changes to the global or regional climate patterns, its impacts and the urgent action required to mitigate or avoid further degradation of the environment.
Climate mitigation	Avoidance or reduction of carbon emissions by changing practices.
Education for sustainable healthcare	The process of equipping current and future health professionals with the knowledge, values, confidence, and capacity to provide environmentally sustainable services through health professions education. <i>The AMEE Consensus Statement on Planetary health and education for sustainable healthcare; 2021₁</i>
Interprofessional education	When two or more professionals learn about, from and with each other to enable effective collaboration and improve health outcomes. Common synonyms: interdisciplinary / collaborative / multidisciplinary / transdisciplinary education. <i>World Health Organization. Framework for action on interprofessional education and collaborative practice. Geneva: World Health Organization; 2010₂</i>
Learner	Learner is used in preference to student in the bulk of the document to align with HCPC terminology, as it is more inclusive of less-traditional routes of study. The term <i>student</i> may appear within references and example documents in appendices.
Net zero	As a concept, net zero is a balance between the quantities of greenhouse gases (also referred to as carbon emissions because they mostly comprise carbon dioxide) released into and removed from the

	atmosphere. Net zero is an internationally agreed goal for avoiding worsening global heating in the second half of the 21st century.
Planetary health	A solutions-oriented, transdisciplinary field and social movement focused on analysing and addressing the impacts of human disruptions to Earth’s natural systems on human health and all life on Earth. <i>The Planetary Health Alliance</i> ³
Practice based educator	In reference to educators on learner placements. Some common synonyms: clinical educators / placement educators / practice educators
Professional bodies	The organisations representing each of the allied health professions in the UK. Some common synonyms: college / royal college / association / society.
Programme	Refers to a pre-registration AHP taught course at a higher education institute. Preferred term to align with HCPC terminology.
Sustainable healthcare / environmentally sustainable healthcare	High-quality healthcare for all, without compromising the ability to meet the health needs of the next generation. <i>Barna et al, 2020</i> ⁴
Triple bottom line	Although there are some limitations to this term, it is used in this document to mean delivering the best possible health outcomes with minimal financial and environmental costs, whilst adding positive social value at every opportunity <i>Centre for Sustainable Healthcare</i> ⁵

SECTION ONE: Background & using the guidance

4. Background

4.1. Introduction

The climate emergency is a health emergency. With all four United Kingdom (UK) health services committing to net zero⁶ healthcare professionals are mission critical in delivering this ambition. Every healthcare professional must commit and act to achieve net zero; the health and quality of life of both current and future generations depends on it.

Allied health professionals (AHPs) are the third largest workforce in the NHS, representing several diverse groups across the four UK nations ^{7 8 9 10}. AHPs work across the breadth of health and care and within non-NHS organisations such as education, academia, research, criminal justice system, voluntary and private sectors. AHPs thus occupy a critical position in the response to climate change, from their commitment to protecting individual and population health, to their broader role in creating a more resilient and environmentally sustainable health and care sector.

AHPs are trusted and respected sources of knowledge and can be key change agents; creating solutions to reduce health care sector emissions and influencing policy to advocate on behalf of patients and communities who are most vulnerable to climate change. AHP support workers also make a significant contribution to improving and protecting the public's health, and this guidance should also be used to develop their skills and knowledge to work alongside AHPs to provide environmentally sustainable health and care services.

The vision of the Global Consortium on Climate and Health Education¹¹ is that *'all health professionals throughout the world will be trained to prevent, mitigate, and respond to the health impacts of climate change'*. A whole system approach to sustainable healthcare as 'everyone's business', recognises the influence of the wider workforce in achieving environmentally sustainable healthcare systems; each group of health professionals will need to be aware of the important role performed by the other and how to synergize¹².

In 2021, a diverse group of healthcare professionals and academics published the AMEE Consensus Statement for Planetary health and education for sustainable healthcare¹, the purpose being to provide a collaborative vision outlining the changes required in healthcare education to develop an interprofessional workforce capable of delivering sustainable healthcare and promoting planetary health, with a timeline for action linked to the internationally agreed United Nation's Sustainable Development Goals Accord¹³.

To address healthcare's impact on climate change, it is essential that AHPs have a common core knowledge of planetary health and sustainable healthcare. The path to net zero will only be possible by ensuring the entirety of the current and future workforce is literate in planetary health and sustainable healthcare principles. Education for sustainable healthcare must be incorporated into all pre-registration AHP curricula and programmes. Furthermore, to comply with the four UK health services' commitments to net zero, healthcare regulators should align their accreditation standards to reflect the environment and climate change as determinants of health, and the responsibility of health professionals to practice sustainable healthcare¹.

The recommendations within this guidance document have a focus on the *future* workforce by supporting the inclusion of education for sustainable healthcare within all AHP pre-registration curricula and programmes. It is recognised that supporting and developing the existing workforce is of equal importance, and whilst that is not the target audience of this guidance, the recommendations are applicable and transferable to the provision of post registration education and continuing professional development.

4.2. Policy and mandate

Climate science is well established; the latest Lancet Countdown report¹⁴ published in October 2022 tracked the links between health and climate change. Its findings reaffirm that globally, climate change is exacerbating food insecurity, health impacts from extreme heat, the risk of infectious disease outbreaks, and life-threatening extreme weather events. The burden of disease attributable to the environment is high and persistent, with a healthy environment vital for human health and development. In 2016 the World Health Organisation estimated that 24% of global deaths are due to modifiable environmental factors¹⁵. Meeting the target of global warming no more than 1.5 °C above pre-industrial levels¹⁶ by 2100 requires immediate and coordinated action.

The Health and Care Professions Council (HCPC), who regulate 13 of the 14 allied health professions across the UK, clearly indicates that *'The curriculum must remain relevant to current practice'* within their Standards of education and training (4.4)¹⁷. The world is rapidly changing, as are the population's health needs consequently. Our health and care systems and professionals within them must in turn keep pace in response to these rapid changes.

Together with the unequivocal climate science and the multitude of legislation and policy across the four UK nations (**appendix E**), it stands to reason that the incorporation of education for sustainable healthcare is as imperative as it is time critical, globally at all levels of training¹⁸.

Without the requisite knowledge base and attitudes, healthcare professional practice will not remain relevant to current practice and healthcare professionals will be unable to adequately mitigate the effects of climate change or adapt and build the required resilience within the health and care sector. This will result in further health and social equity costs to the population.

4.3. Current position

4.3.1. Higher education institutions

For decades, UK universities have led pioneering research¹⁹ into the causes and effects of climate change and shared this expertise with government, businesses, and local communities. Many universities have made great strides in making campuses more sustainable in line with the UN Sustainable Development Goals (UN SDGs)²⁰, but more must be done within taught programmes to ensure graduates are capable of embedding sustainable healthcare into their practice to enhance their employability²¹.

Ahead of the UN's Climate Change Conference in 2021 (COP26), all UK universities signed up to commitments to tackle the existential climate crisis via the 'Confronting the climate emergency'¹⁹ report,

each committing to '*addressing the climate emergency through their teaching, research, leadership, local contributions and campus responsibilities*' and championing the UN SDGs²⁰.

The 17 UN SDGs²⁰ aim to '*meet the needs of the present without compromising the ability of the future generations to meet their own needs*'²². They offer a blueprint to academics to ensure that learners graduate from their programmes with an understanding that '*ending poverty and other deprivations must go hand-in-hand with strategies that improve health and education, reduce inequality, and spur economic growth – all while tackling climate change and working to preserve our oceans and forests*'²².

Education for sustainable development was specifically embedded in Target 4.7 of SDG 4²⁰, whose objective is to '*ensure that all learners acquire the competences, such as knowledge and skills needed to promote sustainable development*'. SDG 4 is understood to be a critical goal²³ that must be realised for the other 16 SDGs to be achieved. Whilst many UK universities have embedded the SDGs through constructive alignment at an institution and discipline level via 'Green Impact' initiatives²⁴, for example, fewer have seized the opportunity to simultaneously enhance planetary health and sustainable healthcare literacy at a programme level by mapping curricula or programme level learning outcomes against them, or truly committing to sustainability in healthcare research, including ensuring research is executed in more sustainable ways as a high priority institutional objective. As Thierry et al (2023)²⁵ adeptly argue through their psychological and sociological analyses of the subject, a maladaptive cognitive-practice gap persists between HEI climate emergency declarations and action, with most academics continuing to operate according to 'business-as-usual'.

4.3.2. Research

Environmental sustainability has become an integral part of academic institutions' strategy, with various levels of commitment and progress. Across a range of academic institutions, we have already seen successful initiatives such as the Laboratory Efficiency Assessment Framework²⁶ and My Green Lab²⁷ prompting researchers to use a structured approach to achieve sustainability in research. Whilst HEIs have a responsibility to set targets and reduce their environmental footprint, non-departmental public body UK Research and Innovation (UKRI) has gathered research and innovation stakeholders to agree on some core sustainability principles and join forces with research organisations to draft a Sustainability Concordat²⁸. The Concordat aims to reach a high-level agreement, from all organisations involved in research or innovation activities on immediate and consistent medium to long-term actions to reduce and eliminate environmental impacts and emissions associated with research and innovation activities, through their signatories and sponsors. The Concordat is scheduled to be launched in the first quarter of 2024 to bring consensus across academic research institutions on their targets, and on objectives towards environmental sustainability in research and innovation activities.

Healthcare research is key to advance care delivery and improve patient care, underpinned by robust evidence to improve the way health and care interventions are delivered. Clinical research enables us to gather insights related to new interventions, care design or treatments, but it is also associated with a high carbon footprint. Lyle et al (2009)²⁹ demonstrated that the average carbon emissions generated by clinical trials was 78.4 tonnes. With over 350,000 national and international trials registered on [ClinicalTrials.gov](https://clinicaltrials.gov), we could estimate the emissions of all global trials to be about 27.5 million tonnes of carbon dioxide

equivalent³⁰. The National Institute for Health and Care Research (NIHR) has issued helpful guidance on reducing the carbon impact of research³¹.

As a result, some research groups have started to focus on measuring the carbon footprint of clinical research, working across triallists, clinicians, commercial companies, and others (³⁰ & Preprint Griffiths et al, 2023) to establish methodologies that aim to measure the carbon footprint of clinical trials. Ideally, such methodology could be used to evaluate the carbon footprint associated with trial designs with a view to mitigate and reduce the carbon emissions associated with clinical research.

4.3.3. Academics

The results of a survey distributed to AHP academic programme leads throughout the four UK nations in 2023 (**appendix F**) demonstrated enthusiasm from academics to incorporate sustainable healthcare within pre-registration curricula, with 89% of 95 AHP programme leads agreeing that education for sustainable healthcare was important to AHP learners. Moreover, 68% of respondents reported already partially or fully incorporating education for sustainable healthcare within AHP programmes, however the content and delivery was inconsistent amongst universities, between professions, and across the four UK nations, with only 63% of those who include this teaching in their programmes directly assessing learner knowledge or skills.

Enablers identified to support delivery included: support from professional bodies, examples of good practice from other HEIs and signposting to knowledge/skills building opportunities for academics and practice-based educators. Barriers included: lack of educator knowledge/skills, a crowded curriculum and uncertainty of how or where to include it within the curriculum.

Respondents to the survey specifically highlighted the need for support from professional bodies and a standardised guidance document to support the integration of sustainable healthcare within AHP programmes.

4.3.4. Learners

Beyond healthcare programmes, there is considerable evidence that learners expect education for sustainable healthcare to be incorporated into their institutional practices and curricula. In the 2022 National Union of Students (NUS) Sustainability Skills Survey³², 88% of over 8,500 respondents agreed their place of study should actively incorporate sustainable development, with 79% reporting that they would like to see sustainable development incorporated and promoted across all courses.

A further survey was distributed to AHP learners throughout the four UK nations in 2023 as part of an MSc project seeking to understand the attitudes and behaviours of AHPs in the UK in relation to environmental sustainability (**appendix G**). The results demonstrated that 87% of respondents had moderate to extreme concern about climate change, with 83% of respondents agreeing somewhat or strongly that AHPs have a responsibility to reduce their impact on climate change. Respondents were asked to select from a list of topics that they would like included in their curricula, to enhance their learning related to planetary health and environmental sustainability and were also asked to suggest additional topics. These topics are ranked in table 1 in order of frequency with which they were selected across the whole sample.

Whole sample (n=292)
Protecting nature and biodiversity (180)
Sustainable food options (165)
The role of businesses and corporations in climate change (164)
Climate justice (Protecting the most vulnerable people from climate change) (153)
How to take action on climate change (152)
Gardening and growing (147)
Sustainable energy (147)
Reducing your plastic waste (134)
Politics and policy about climate change (128)
Fast fashion / sustainable fashion (124)
Sustainable buildings (124)
Lobbying the government about climate change (124)
Circular economy (102)

Table 1: Topics self-selected by AHP learners for inclusion in curricula to enhance learning related to planetary health and environmental sustainability (n=292)

4.3.5. Professional bodies and regulation

It is important to recognise that organisations are all at different stages of the journey to delivering across the range of actions needed to mitigate and adapt to the health impacts of environmental degradation. Whilst many UK AHP professional bodies have stated their position on the climate crisis through releasing sustainability statements, through inclusion in strategies or declaring a climate emergency, some have already taken the next step to incorporate education for sustainable healthcare within professional standards or curricula. Learning from the experiences of others and sharing best practice enables interprofessional learning and working, ensuring all organisations can deliver the changes needed. Examples from the HCPC, professional bodies and specialist interest groups are included within **appendix D**.

5. Using the guidance

5.1. Aims & impact

The aims of this guidance document are to:

- Support AHP professional bodies, academics, and practice-based educators to integrate education for sustainable healthcare into pre-registration curricula and learning programmes, during the process of development, approval, or review.
- Signpost to high quality evidence-based resources and practice, to support the integration of education for sustainable healthcare within AHP pre-registration curricula and programmes.
- Ensure that all future AHPs graduate with the knowledge, skills, and attitudes to deliver sustainable health and care upon entry into the health and care workforce.

5.2. How to use the guidance

This guidance can be used as a:

- a) Comprehensive resource and evidence-based reference guide to support curricula development across HEI's and professional bodies.
- b) Tool to facilitate discussion within AHP programme teams to orientate the curricula to maximise education for sustainable healthcare in pre-registration programmes.
- c) Resource to quality assure the key principles of education for sustainable healthcare are included in AHP pre-registration curricula and programmes.
- d) Springboard for wider national discussion between regulators, professional bodies, academics, practice-based educators, and learners on the integration of education for sustainable healthcare within pre-registration AHP curricula and its application to clinical practice.

SECTION TWO: The model – why and how

6. A model of education for sustainable healthcare for AHPs

AHP learners navigate intricate personal learning pathways from entry into a HEI, through an educational programme and into life-long practice. The employability of graduates has become an aim that governments around the world have, to varying extents, imposed on HEIs^{33,34}.

Employability includes both the disciplinary understanding and skills, but also more generic transferable skills such as communication and team working. Health and care graduates have an ethical responsibility both as citizens and professionals to live and work sustainably. With the four UK nations' health services committing to net zero, institutions who have enabled their learners to graduate with measured competence in sustainable healthcare bring optimal alignment for the learner to enhance their employability in the healthcare sector.

6.1. The overarching model of education for sustainable healthcare for AHPs



Figure 1: A model of education for sustainable healthcare within UK pre-registration curricula for AHPs

The model illustrated above has been developed to describe the core content for education for sustainable healthcare across the allied health professions as well as key principles to support delivery. The centre of the flower shows the 'what': the foundations of education for sustainable healthcare that should be covered within AHP healthcare curricula, all summarised under the umbrella of planetary health

literacy. The outer circle represents the 'how': the principles for incorporation into AHP curricula and programmes. These are each expanded upon in sections 6.2 and 6.3 of the guidance.

6.1.1. Existing frameworks

Designing curricula and determining the content of pre-registration programmes, ensuring newly graduated healthcare professionals have the key knowledge, skills, and abilities to work in complex healthcare environments is not straightforward, and involves a range of stakeholders. Naturally, there will be differing priorities, needs and processes for every professional group, between each university and across all four UK nations.

Available evidence demonstrates that it is fundamentally important for health and care learners to understand the core concepts of planetary health and sustainable healthcare, and how these principles apply to them as professionals¹. Sustainable healthcare is a topic that lends itself to interprofessional learning, which across the four UK nations is increasingly regarded as a marker of training quality³⁵. It is important that in addition to planetary health literacy, emphasis is placed on the specific net zero aspects of sustainable healthcare, as this is the framework through which UK healthcare systems are tackling their environmental impact.

There are several frameworks and resources that have been reviewed in the development of this guidance document listed in **appendix B**, many of whose authors have been generous in sharing their time and expertise to help shape this AHP specific curricula guidance document. These national and international organisations have sought to provide content expertise on frameworks^{36, 37, 23, 38}, core concepts and teaching resources^{39, 40}, learning outcomes examples⁴¹, report cards⁴², and toolkits⁴³ to provide practical help to any professional body or HEI wishing to foster their knowledge, understanding and skills in sustainable healthcare, and are invaluable resources that this guidance has built upon.

6.2. The what: five foundations of education for sustainable healthcare for AHPs

The foundations of education for sustainable healthcare have been divided into five main foundation areas as below and illustrated in figure 2, with an introduction to each foundation and accompanying resources signposted in the remainder of section 6.2.

Foundation one	Nature – Health – Humans
Foundation two	Health impacts of environmental degradation
Foundation three	Impacts of healthcare on environment
Foundation four	Sustainable clinical practice
Foundation five	AHPs as environment & health advocates

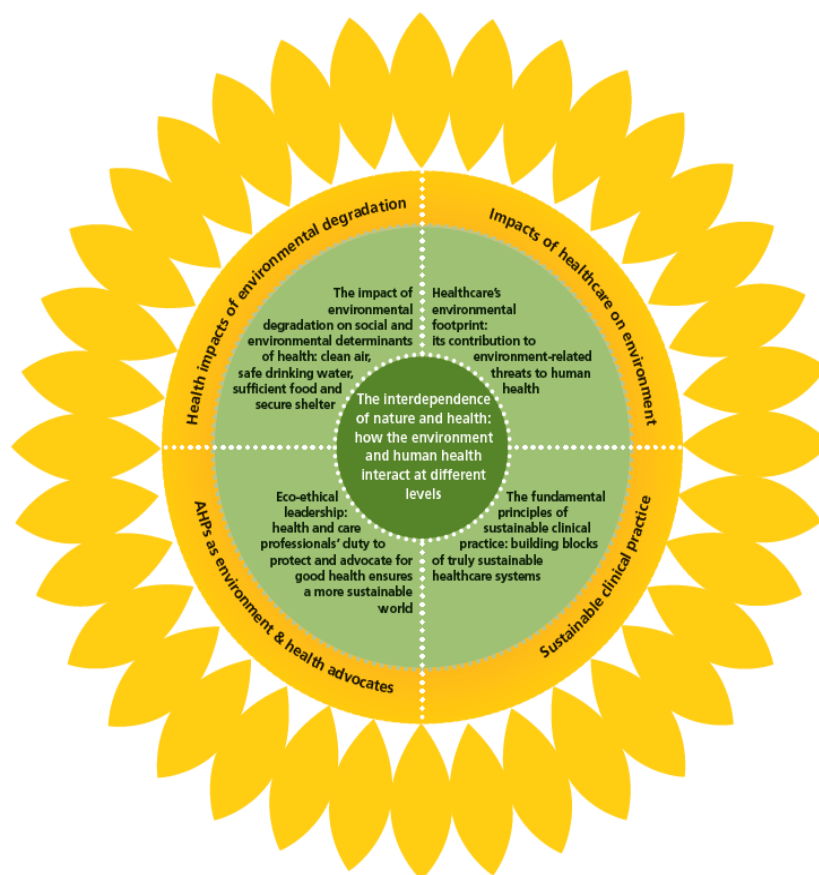


Figure 2: Five foundations of education for sustainable healthcare for AHPs

Foundation one: Nature – Health - Humans: the interdependence of nature and health

Planetary health

The study of planetary health asserts that the scale of human enterprise has outstripped the resources available to it, with human activity driving fundamental changes to the earth's ecosystems at an alarming rate. Human interference with the natural world, such as driving changes in land and sea use, extracting, and using natural resources, and polluting the environment, is causing climate change and the loss of ecosystems and biodiversity. This in turn impacts on air quality, food and water security, risk of infectious disease, and extreme weather⁴⁴. Planetary health research is teaching us that our dismantling of nature has become an urgent threat to human health and wellbeing.

Planetary health is a useful concept for healthcare professional education because it situates health within the broader understanding of the interdependent socio-ecological drivers of human and planetary health⁴. It describes and encourages the intrinsic link between protecting both population health and protecting the natural environment, upon which human health and wellbeing depends. Planetary health recognises the 'socio-ecological drivers of illness and the unequal and unjust distribution with which different people and ecological entities are affected by them'⁴.

Nature and humans

All citizens and healthcare professionals must firstly understand human interconnection within nature⁴⁵. Human societies have traditionally recognised the interdependence of human and ecosystem health, and many Indigenous cultures still do; their land stewardship, moral principles around leadership and relationships with the surrounding ecosystems is something that much of humanity has increasingly forgotten⁴⁶. Early humans once lived in harmony with nature on a planet that supported millions of forms of interconnected life. Humans mobilised resources and appropriated only as much of nature required to support their needs, maintaining balance and interconnection within nature: a symbiotic relationship that continued for thousands of years. As the centuries progressed however, there began a movement towards human exceptionalism, with an attitude that nature was humans for the taking. Individuals and cultures who continued to emphasise the importance of living in harmony with nature and protecting the web of life, were marginalised, or destroyed. In the 1800s, the industrial revolution saw a new direction, where humans became the dominant force shaping the earth's biophysical conditions whilst simultaneously removing us from nature. Although the technological and scientific advances fuelled significant improvements in human development and health, they also accelerated the erosion of our planet's natural systems and are driving exponential climate change. The enormous health gains we have achieved over the last few decades are now threatened by our own transformation of nature's systems⁴⁷.

Climate change

Climate change refers to long-term shifts in temperature and weather patterns⁴⁸. Whilst such shifts historically can be natural, for example due to changes in the sun's activity, over the last 200 years human activities have been the main driver of accelerating climate change, primarily due to the burning of fossil fuels⁴⁹. Burning of coal, oil and gas generates greenhouse gas emissions, the most significant of which are carbon dioxide and methane. Greenhouse gases in the atmosphere trap heat and cause global temperatures to rise, with the average temperature of the Earth's surface now over 1.1°C¹⁶ warmer than it was before the industrial revolution. As the Earth is a system where everything is connected, a change in one area such as global rise in temperature can influence changes in another. The consequences of global warming now include, among others: rising sea levels and ocean acidification, increased frequency of extreme weather events and natural disasters, intense droughts leading to food and water insecurity and environmental degradation and declining biodiversity, upon which human life depends. Climate change affects every area of our lives, from our health to our housing, our security and work. It disrupts our economies, results in mass migration due to saltwater intrusion or protracted drought and can lead to conflict and terrorism¹⁴.

Whilst the contribution to and effects of climate change are not felt equally, globally nowhere and no one is immune from the devastating consequences of climate change or the need to act, with the WHO reporting: "*Climate change is the single biggest health threat facing humanity, and health professionals worldwide are already responding to the health harms caused by this unfolding crisis*"⁵⁰.

Interconnection of human health, nature, and education

The climate crisis is an example of the interconnected relationship between healthcare, education, and environmental change. Everything is connected: the quality of air we breathe and the water we drink, the

quality and quantity of food we produce and our exposure to infectious diseases; thus, changing our planet's natural ecosystems is directly affecting our health. A good understanding of how the environment and human health interact at all levels enables us to act on these challenges and collaborate across disciplinary, national and international boundaries to safeguard population and planetary health³. It is fundamental that learners and clinicians understand the relationship between nature and human health for healthcare professionals to have the requisite knowledge and skills to reduce the environmental impact of health systems and include environmental considerations in clinical ethical reasoning⁵¹.

Education for sustainable healthcare

Education for sustainable healthcare applies planetary health concepts to healthcare education, allowing learners to develop professional attitudes and skills to cope with complex problems in interprofessional collaborations. It is important for programme leads to design practical activities based on their own institutional creativity and regional environmental issues to reinvigorate the links between clinical practice and the health of nature on which we depend.

Without the knowledge and skills developed through education for sustainable healthcare, healthcare professionals will be unable to mitigate and adapt to the increasing shocks and stresses related to climate variability and change, threatening the facilities, staff, and patients, and ultimately increasing the number of people seeking healthcare which is unsustainable.

Resources to support foundation one:

- [The Promise of Planetary Health](#) A 10-minute video overview of planetary health
- [Planetary Health Alliance](#) A website containing lots of regularly updated resources on planetary health
- [Planetary health: protecting human health on a rapidly changing planet](#): An informative article that summarises the key aspects of planetary health and its interactions with human health
- [BBC iPlayer Climate change: the facts](#) A 60-minute David Attenborough documentary on climate change
- [Carbon Brief. In-depth Q&A](#). The IPCC's sixth assessment on how climate change is impacting the world
- [Environmental Protection Agency](#) Climate change indicators: global greenhouse gas emissions
- [Worlds Apart. Geneva: IPCC, 2020](#) A Story of Three Possible Worlds
- [The Climate Dictionary](#) A useful handbook defining 40 frequently used climate terms simply
- [Met Office website](#) A simple explanation of how climate change is linked to extreme weather

Foundation two: Health impacts of environmental degradation on social and environmental determinants of health

The triad of changing climate, air and water pollution and increasing loss of biodiversity have profound implications for human health. The rise in greenhouse gases, global temperature rise, sea level rise and seasonal changes, is leading to an increase in extreme weather events. This in turn is resulting in direct injury and death, changing patterns of infectious disease, food insecurity and the exacerbation of existing health challenges around the world such as increasing mental and psychosocial health problems and cardiorespiratory disease⁵².

Climate change impacts health both directly and indirectly, and is strongly mediated by environmental, social, and public health determinants. Climate change is undermining many of the social determinants⁵³ for good health, such as livelihoods, equity and access to health and care support structures. Figure 3, demonstrates that the health impacts of climate change vary by location and population need, and are not felt equally throughout society, with climate change risks disproportionately¹⁴ affecting the poorest countries and people who are in turn more exposed and more vulnerable to their impacts.

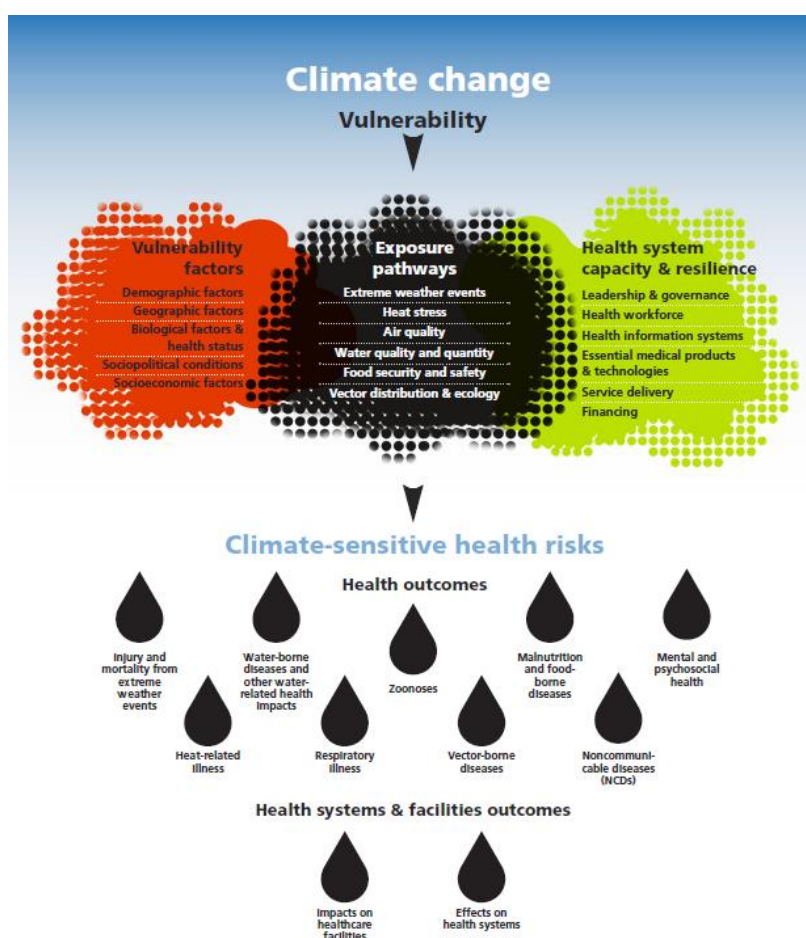


Figure 3: An overview of climate-sensitive health risks, their exposure pathways and vulnerability factors. Adapted from [Climate change and health: World Health Organisation⁵³](#)

AHPs provide system-wide care to assess, diagnose, educate, treat, and discharge patients across the breadth of health and care. AHPs play a significant public health role, often working with communities that are more vulnerable to the health impacts of climate change and its effects on health inequalities. As a result, AHPs will regularly meet people whose conditions are directly impacted by the effects of climate change, thus it is vital that graduates use their knowledge and understanding of the health impacts as part of a holistic assessment and person-centred care e.g., considering what may have contributed to an individual's condition and what factors may impact on the ability to change behaviour or manage their condition. Communication and shared decision-making skills will help support raising such issues sensitively.

Below are examples of some of the health impacts of climate change and the possible consequences to individuals or populations. Each AHP group will be able to recognise where their profession is likely to intersect with the health impacts of climate change illustrated in the examples below.

Heatwaves and health

Population exposure to heat is increasing due to climate change⁵⁴, with this trend set to continue. Exposure to excessive and extended periods of heat creates cumulative physiological stress on the human body, exacerbating the top causes of death globally including respiratory and cardiovascular diseases, diabetes, and renal disease. This can result in increasing hospital admissions, progressive disability, and premature death with associated implications for health and care services. Heatwaves can acutely impact large populations, often triggering public health emergencies, resulting in excess mortality, and cascading socioeconomic impacts of lost work capacity and labour productivity. They can cause loss of health service delivery capacity, with power shortages disrupting health facilities⁵⁵, transport⁵⁶ and water infrastructure⁵⁷.

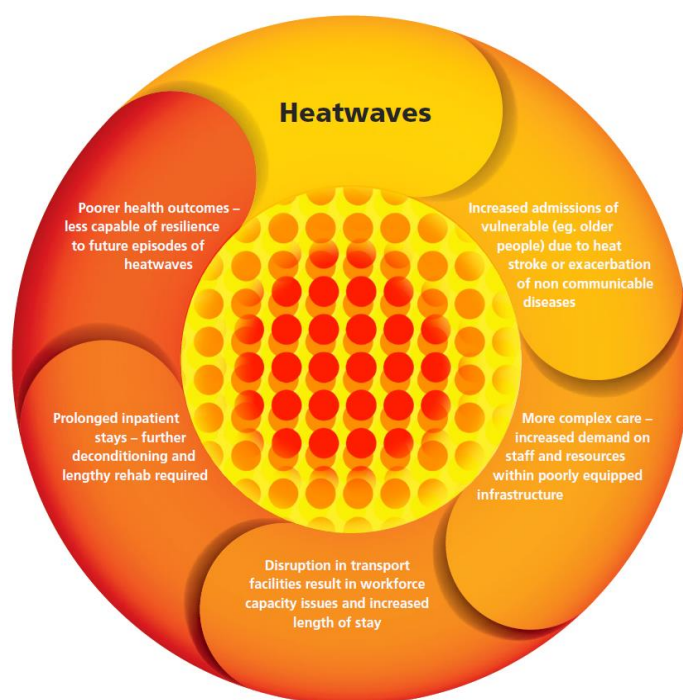


Figure 4: An illustration of possible health impacts and potential consequences of heatwaves

Extreme weather events and mental & psychosocial health and wellbeing

Aside from the more obvious impacts of injury and mortality as a result of extreme weather events, it is well evidenced that almost all people affected by emergencies⁵⁸, including natural disasters like flooding, forest fires and typhoons, will experience psychological distress. Additionally, people with existing mental ill health are particularly vulnerable to deteriorating health impacts. Good mental health and wellbeing is crucial to the overall social and economic recovery of individuals, societies, and countries after emergencies. With the increased frequency and severity of extreme weather events predicted to continue, it is essential that access to services to support mental health and wellbeing is a key component of disaster preparedness plans and healthcare adaptation. AHPs will increasingly meet victims of extreme weather events in the course of their work, whether as the primary, secondary, or an unrelated referral reason. Thus, all healthcare professionals must be aware of the signs and symptoms of the more common emergency-induced mental ill health problems like anxiety and depression, acute stress reactions and post-traumatic stress disorder, and have an awareness of the services required to manage these conditions.

Air pollution and health

Air pollution, the second highest risk factor for non-communicable diseases⁵⁹, is one of the greatest environmental risks to human health. The World Health Organisation in 2019⁶⁰ estimated that ambient air pollution was responsible for 4.2 million premature deaths worldwide, with those living in low and middle-income countries experiencing a disproportionate burden of 89% of all cases. High income countries are not immune from the effects of air pollution: many will be familiar with the tragic death of Ella Kissi-Debrah⁶¹ in 2013; the first person ever to have air pollution listed as a cause of death at an inquest in the UK.

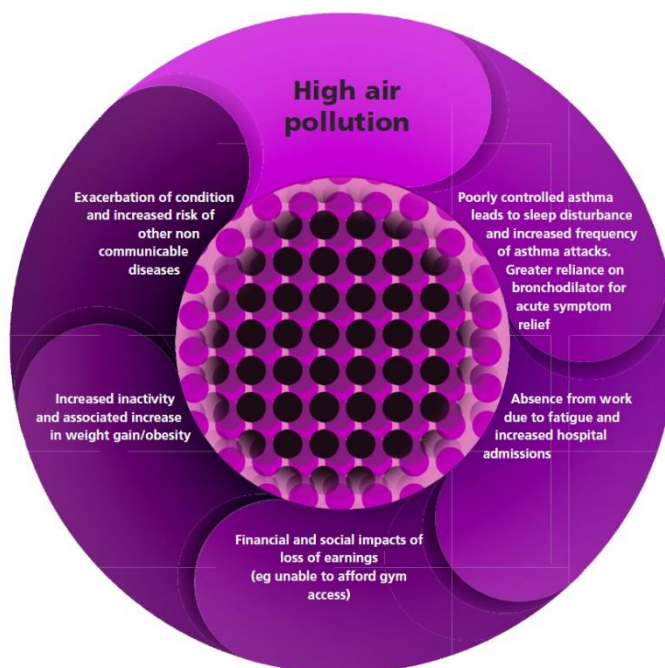


Figure 5: An illustration of some possible health impacts and potential consequences of high air pollution

There are many examples of successful policies⁶⁰ that reduce air pollution and the subsequent burden of disease from its associated consequences e.g. stroke, dementia, heart disease, lung cancer and both chronic and acute respiratory disease. However, until the adoption of such policies is widespread, healthcare professionals must continue to respond to the health impacts of air pollution and utilise their knowledge and skills as part of evidenced based assessments and person-centred care.

Resources to support foundation two:

- [Health professionals describe climate change impacts on health](#) A series of videos of health professionals describing climate change impacts on health
- [Health hazards, exposures and impacts of climate change](#) The Lancet countdown website that details in bitesize sections the health impacts of climate change
- [Environmentally Sustainable Healthcare - elearning for healthcare](#) Three bitesize e-learning for healthcare packages from NHS England, with the 'Building a Net Zero NHS' introducing how the climate emergency affects health. Requires an elfh account.
- [Climate Effects on Health](#) The US based Centre for Disease Control and Prevention with a useful diagram illustrating climate change impacts on health, National health topics and regional health impacts in the US of climate change.
- [The Lancet countdown on health and climate change: 2022 report](#) A 3-minute animation summarising the IPCC report 2022
- [Air pollution and health training toolkit for health workers](#) A newly developed toolkit from the WHO designed for health workers designed to enable health workers to understand the health risks of air pollution and identify risk reduction measures. [All our health air pollution training](#) A bite-sized training session to give health and care professionals an overview of air pollution and its impacts on health.
- [Climate change: health effects in the UK](#) A UK wide report providing evidence, recommendations and research gaps (from 2012) [Chief Medical Officer's \(England\) Annual Report 2022](#)

Foundation three: Impacts of healthcare on the environment

Healthcare's environmental footprint

The healthcare sector has begun to quantify its own contribution to the carbon emissions that drive global warming, and it is clear that carbon is in some ways the foundation of the professional services and technological advances of modern healthcare⁶².

Healthcare services are necessary for sustaining and improving human health, yet emissions from the healthcare sector globally are estimated to account for almost 5% of global greenhouse gas emissions worldwide; if healthcare were a country, it would be fifth-largest emitter on the planet⁶³. Healthcare is among the most important sectors in managing the effects of climate change, whilst simultaneously having an important role in reducing its own emissions.

Before tackling the principles of sustainable practice, it is first important to note that the UK healthcare systems are currently focusing most of their environmental effort on decarbonising or reaching net zero. Therefore, AHPs will need to have good carbon literacy and a well-established understanding of how it relates to their professional setting to drive effective action.

As an illustrative example, Figure 6 from NHS England's Delivering a net zero NHS report⁶⁴ show the breakdown of the NHS in England's scopes of carbon emissions, with Figure 7 demonstrating how the NHS in England is specifically contributing to greenhouse gas emissions in each of these areas.

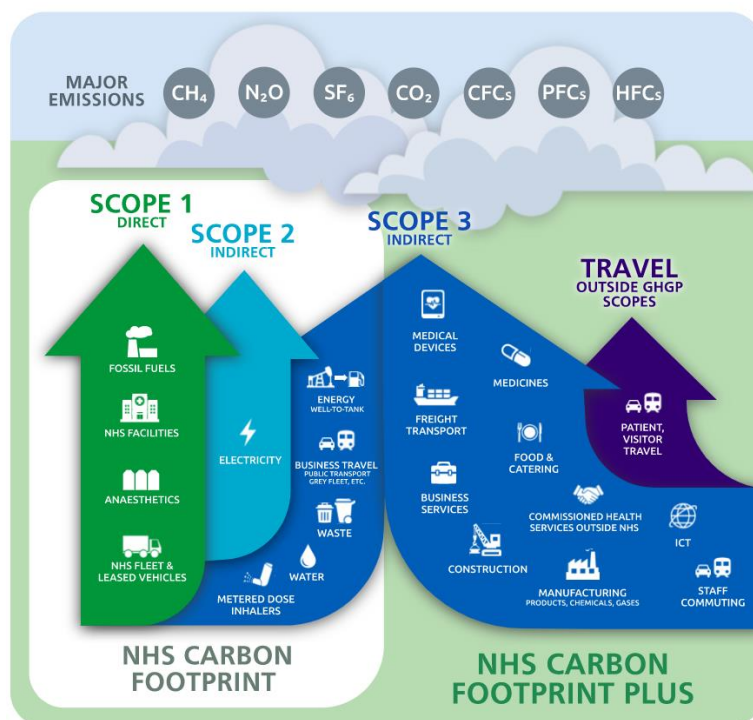


Figure 6: Greenhouse gas potential scopes in the context of the NHS, taken from [NHS England's Delivering a net zero NHS report](#)

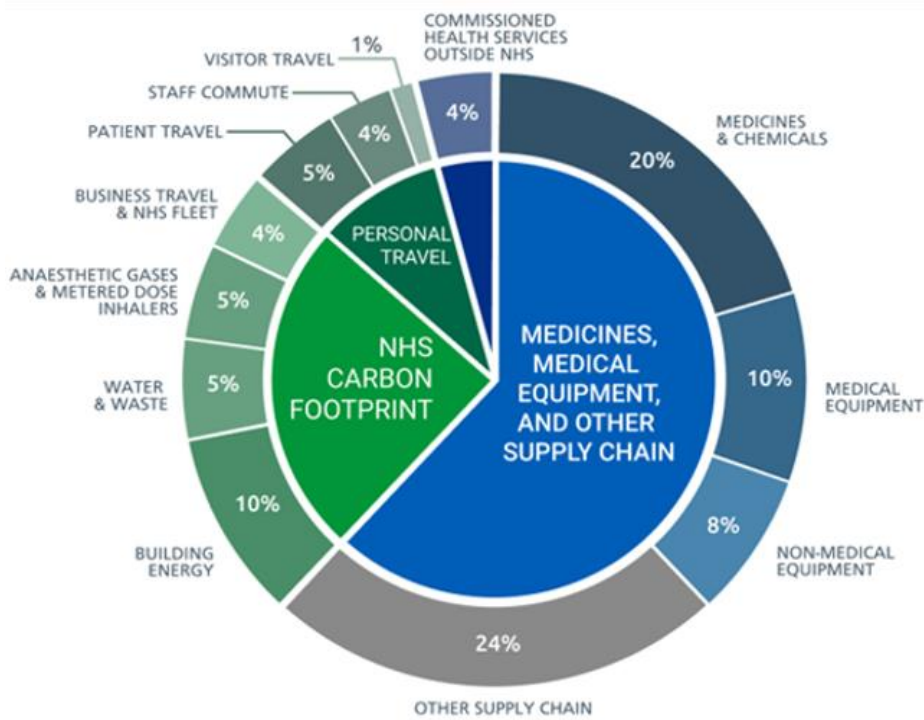


Figure 7: Sources of carbon emissions by proportion of the NHS Carbon Footprint Plus, taken from [NHS England's Delivering a net zero NHS report](#)

Healthcare's contribution to environmental threats to human health

With the average spending on healthcare at about 9% of gross domestic product⁶⁵, there is a pressing need to understand the health impact and the environmental footprint of healthcare. As healthcare investment increases around the world there is significant potential for increasing harm to health from pollution and environmental change if its impacts on the environment are not adequately understood and mitigated.

Beyond regulatory compliance, healthcare professionals are trained to 'First, do no harm'⁶⁶. Given the context of healthcare's impact on the environment and the resultant harms to health, this innately places both a practical and ethical responsibility on every healthcare professional to understand, measure where possible, and address the environmental footprint of the healthcare they provide.

While many policies to date are top down with interventions focusing on healthcare facility operations such as estates, facilities, and energy reduction interventions, optimising how care is delivered is at the heart of healthcare services' mission and this must be led by clinicians and staff through principles of sustainable clinical practice.

Resources to support foundation three:

- [HealthCare's climate footprint](#) Arup and Health Care Without Harm's estimate of the healthcare sector's global climate footprint
- [Healthcare Sector Emissions](#) The Lancet countdown website with data exploring healthcare sector emissions by country
- [The environmental footprint of health care: a global assessment](#) A useful article using multiregional input-output analysis to evaluate the contribution of healthcare sectors in driving environmental damage impacting human health
- [The 2018 report of the Lancet Countdown on health and climate change: shaping the health of nations for centuries to come](#) A useful article published by The Lancet discussing the global monitoring system dedicated to tracking the health dimensions of the impacts of, and in response to, climate change.
- [Carbon Cost of Healthcare Lancet video](#) A 15-minute video from the Lancet explaining the carbon cost of healthcare
- (Refer to each of the four UK Nation's net zero reports in **appendix E**)

Foundation four: Sustainable clinical practice & the triple bottom line co-benefits of action

Having established humanity's inextricable connection with and dependence on the environment, a recognition of the contribution healthcare activity is having on the environment, and an understanding of the subsequent health impacts of environmental degradation, it becomes clear that wasted or low value healthcare activity is, as Mortimer (2010)⁶² describes it, "*a double sin – triple, if you count the risks to patient safety*". Every component of care has an associated financial cost and carbon footprint, thus the more intense the health or care activity, the greater both the cost and carbon footprint, as illustrated in figure 8. This explanation provides the foundation for the principles of sustainable clinical practice.

Sustainable clinical practice will contribute significantly towards sustainable healthcare by improving population health and minimising unnecessary healthcare, improving the efficiency of healthcare delivery, and utilising the lowest carbon options wherever possible⁶². These principles are illustrated in figure 9, and further expanded upon in the subsequent text.

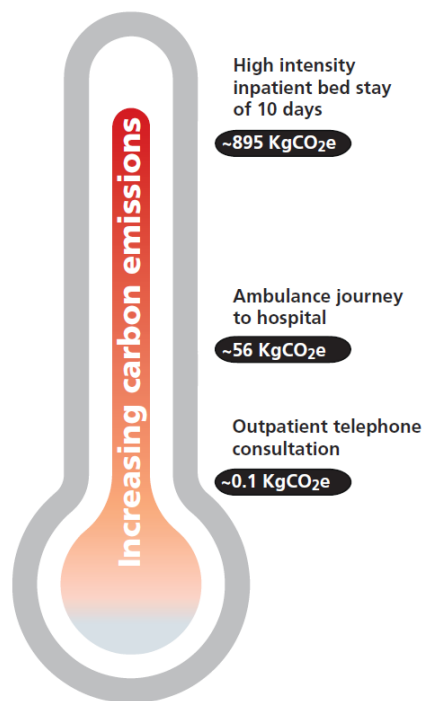


Figure 8: An illustration of the carbon equivalent of common NHS healthcare interventions

Carbon factor	Data source
In-patient bed days	Sustainable healthcare coalition
Ambulance: see, treat, and convey	PSSRU
Video and telephone consultations	Greener NHS modelling

Table 2: Summary of data sources used in figure 8 from the 'Greener care at home' guide⁶⁷.



Figure 9: Principles of sustainable clinical practice. Adapted from work by Mortimer, F (2010)⁶² and the Greener NHS knowledge hub – FutureNHS Collaboration Platform, accessible to all NHS staff)

Keeping people healthy: Prevention and health promotion

As every component of care has a carbon footprint, efforts to improve population health and reduce the need for care is paramount. Looking upstream at population public health initiatives such as health promotion and primary preventative interventions will simultaneously reduce the burden of disease, healthcare activity and cost, with the co-benefit of reducing carbon⁶⁸. Public health services across the four UK nations work hard to protect and improve the nations' health and reduce health inequalities, with strategies designed to reduce the threats of environmental hazards such as air pollution, among others, and are key to instigating a strategic approach to mitigating the effects of climate change on health inequalities.

Furthermore, secondary prevention interventions that focus on reducing disease progression and pre-empting complications, empower individuals to take on a greater role in the self-management of their own health and the care they receive. People who are well-informed are better able to advocate for themselves or loved ones, improving the coordination between clinical teams, and reducing misunderstandings or duplication²³.

AHPs are widely recognised as an integral part of the public health workforce⁶⁹. AHPs can work with local communities and people with lived experience to identify needs and co-produce interventions aimed at improving health and wellbeing and reducing health inequalities, through for example, service re-design, increasing access, and enabling opportunities. Preventative approaches improve health and wellbeing alongside the co-benefits of reduced healthcare activity and thus improved cost realisations and reduced carbon emissions.

Healthy conversations⁷⁰ are an example of common AHP interventions that take place opportunistically, and involve a professional with permission raising lifestyle issues sensitively and appropriately with an individual with potential to identify and agree small, realistic changes in a supportive environment. In an AHP survey conducted in 2014, almost 9 in 10⁷⁰ participants agreed that their role should include an element of preventing ill health, complemented by a willingness from members of the public surveyed, 86% of whom responded that they would trust such advice if it came from AHPs.

By understanding how the environment and human health interact, AHPs can use this knowledge when working with patients to help drive change for a healthier, greener future to fulfil their responsibility to protect and promote good health.

Efficiency: Right care, right place, right time

Reducing inefficient and inappropriate care involves using evidence-based practice and efficient and lean pathways to ensure that every patient receives the right care, delivered in the right place, provided at the right time. For example, the NHS Long Term Plan⁷¹ looks to mainstream digitally-enabled care and bring care closer to home across all areas of the NHS, with ongoing digital transformation playing an important role in the delivery of the wider net zero agenda, for example by reducing travel.

Where possible, the Getting It Right First Time (GIRFT)⁷² methodology of care delivery should be followed: data-driven and clinically led with a focus on reducing unwarranted variation thus improving patient outcomes and increasing efficiency. Strategies to reduce duplication and waste, for example when booking appointments, requesting investigations, prescribing, allocating resources, and arranging patient or staff travel, are key. This ensures best possible outcomes for patients, with the co-benefits in many instances of reducing extraneous healthcare activity and its associated financial and carbon costs.

Low carbon alternatives: Treatment and settings

Much is being done in the area of estates and travel and transport, for example greening the fleet by introducing electric vehicles, or introducing solar panels⁷³ to estate roofs to generate greener electricity. Healthcare interventions, however, are less straightforward to measure and decarbonise.

Reducing the carbon and resource intensity of care is an area of growing research and innovation that clinicians must play a fundamental part of to prioritise solutions. This principle looks less at how or why we provide the services we do but explores what we provide and whether there are equally effective more sustainable or lower carbon alternatives. Actions to identify lower carbon treatment options and to better optimise the use of medicines and treatments will bring co-benefits to patient outcomes, cost, and carbon reductions.

Theoretically, the aim would be to quantify the carbon footprint of every component of care to accurately interpret the carbon impact of the care we deliver. Realistically however, this is an impossible task, with a lack of standards for measurement and reporting leading to studies using different boundaries, with the contextual element of the evidence making comparison between interventions difficult.

Furthermore, attempting to measure patient outcome per resource input is much more challenging than traditional methodology that measure outcomes alone. In addition, when studying an intervention or procedure, as well as trying to quantify the object itself in terms of cost and carbon (a piece of equipment or drug, for example), it is also important to assess its production and implementation, which may involve raw material extraction, energy and water use for production, staff and patient time, transportation and disposal, all of which adds significant complexity. There are however lots of things that *don't* require measurement of the carbon impact to initiate positive action to reap triple bottom line co-benefits, for example by creating less waste, encouraging active travel, and reducing overprescription.

Despite these limitations, some specific healthcare intervention comparisons are emerging, including studies of how one intervention differs from another in terms of patient outcomes, financial cost, and carbon emissions. Some recent examples of this are the carbon and cost intensity of desflurane⁷⁴ versus alternative equally effective green anaesthesia⁷⁵, that has subsequently resulted in plans to decommission its use in England⁷⁶. Another example is the comparisons between metered dose and dry powder inhalers⁷⁷ leading to national targets and Greener Practice guidance to reduce the carbon footprint of inhaler prescribing⁷⁸.

Clinical leadership, systems, and workforce

Sustainable health and care must be underpinned by what McKimm & McLean⁷⁹ describe as 'eco-ethical leadership', its principles embedded throughout governance structures and policies, and its effectiveness enhanced through an environmentally literate workforce via supported training and development.

The scope of leadership required to enable progression towards truly sustainable health and care systems is broad and refers to leaders in multiple roles and contexts spanning the entirety of the system. AHPs at every level can provide leadership to support sustainable healthcare. This could range from role modelling and advocating for sustainable healthcare as an individual clinician; providing leadership to develop lower carbon care pathways; or embedding a sustainable quality improvement approach (SusQI) throughout an academic AHP programme, an entire directorate, or a particular specialty's governance processes.

Eco-ethical leadership is described as an approach requiring compassionate leaders to role model the behaviours and actions necessary to bring people along with them, offering an integrated approach centred around sustainability, values, collaboration, justice, advocacy and if required activism⁷⁹. Leading with compassion involves a focus on relationships through careful listening to, understanding, empathising with, and supporting colleagues and learners, enabling those that we lead to feel valued, respected, and cared for⁸⁰. This is, of course, important in every aspect of healthcare but even more so within sustainable healthcare where the existential threat of climate change is the everyday.

Training and development of the current workforce is paramount, as without requisite workforce knowledge and skills, engagement and delivery will not succeed. This may involve inclusion within onboarding processes, access to postgraduate training, or incorporation within organisational values among others.

NHS staff report that lack of time is the most common barrier to taking action to address climate change at work (*The Greener NHS Survey 2023, conducted in partnership with YouGov*). Ongoing research, innovation, and the development and adoption of the technologies, systems, and healthcare supplies required to ensure our health and care systems can continue to adapt at pace and be more resilient to the impacts of a rapidly changing world and climate, will require the commitment of dedicated financial resource and workforce capacity.

Adaptation, and resilience

It is important to acknowledge that whilst climate mitigation actions tend to bring with them health and financial co-benefits, many climate adaptation and resilience measures do not have a direct carbon saving; indeed, some can increase carbon emissions, for example the installation of air conditioning units in IT servers to adapt to the impact of heatwaves on NHS infrastructure. They often tend to overlap with many of the other areas of focus, most commonly estates and facilities. It is necessary to ensure that adaptation and resilience to the effects of climate change have become part of 'business as usual', and viewed as an essential and cross-cutting theme across all areas of health and care in order to truly deliver sustainable healthcare.

N.B. Further examples of **sustainable AHP practices** have been included in **appendix C**. It is by no means intended as an exhaustive list but is provided as a prompt for academics and practice-based educators to 'join the dots' and recognise areas of current teaching that can be used to explicitly illustrate sustainable healthcare within AHP professions.

Resources to support foundation four:

- [The sustainable physician](#) One of the earlier journal articles from 2010 setting out the vision of a low carbon, sustainable health service.
- [Planet centred care](#) A short series of six podcasts from the BMJ interviewing people from around the world who have made changes to the way they provide healthcare.
- [Sustainable practice: what can I do?](#) A BMJ series of publications offering clinicians tangible actions to take to reduce the carbon footprint of healthcare.
- [Operational framework for building climate resilient and low carbon health systems](#) The WHO operational framework document whose aim is to increase the climate resilience of health systems and improve the health of communities.
- [Sustainability in Quality Improvement](#) A 12-minute video explaining sustainable healthcare and how to use it in quality improvement
- [A 5-minute video clip on green social prescribing](#)

Foundation five: AHPs as environment & health advocates

Climate action & political agency

The Alliance for Sustainability Leadership in Education exists to lead and empower the post-16 sector to make sustainability 'just good business'³¹. The organisation seeks to provide a greater voice at the societal level to support, educate and inform the leaders of HEIs and society about the value of sustainability and advocate for a sustainable future. The Confronting the climate emergency¹⁹ commitment from all UK universities highlights that HEIs must play a key role, not only in committing to increasing climate literacy within their programmes, but also being integral in leading global efforts through research and innovation, national and global leadership, and contributing locally to make their campuses more sustainable and supporting student-led initiatives.

Acting for sustainability encourages learners to take action at both individual and collective level to shape sustainable futures. It also invites learners to demand action from those responsible to make change happen²³.

Political agency is the capacity to positively influence the collective future, by mobilising those at political level to take action for change. Political agency requires the capacity to analyse the context, spot avenues to move the sustainability agenda forwards, and identify key stakeholders that can be brought on board to help achieve sustainability goals. This might look like advocating for a change in rules, regulations, policy, or institutional commitment for sustainability. It could also be directed towards the market to encourage green innovation or the promotion of lifestyle and behavioural changes. Political agency empowers learners to become agents of change and take part in discussions that will affect their futures²³.

HEIs are uniquely placed to enable collective positive climate action both for the institution and for their learners, for example by supporting student-led climate groups, helping learners to understand how to navigate political systems, identify political responsibility and accountability for unsustainable behaviour, and strategically demand effective policies for sustainability.

Grassroots examples of young people who have been especially vocal and effective in demanding political action on this agenda include the Fridays for Future³² movement and Extinction Rebellion³³. This engagement in action has been shown to help people regain power and build agency, which in turn may be associated with easing eco-anxiety and better mental health outcomes³⁴.

Communicating about climate change

Communicating about climate change is as important as the message itself but it can be challenging to engage others on this agenda. Each person has the power to affect the people in their lives, and as trusted healthcare professionals AHPs can inspire action, influence policy and drive change as environment and health messengers⁷⁰.

Research shows that 92% of the public believe it is important for the health system to work in a more sustainable way, with NHS staff overwhelmingly backing action. A YouGov survey conducted in August 2021, found that 87% of NHS staff supported the NHS net zero ambition⁸⁵.

Healthcare professionals have a duty of care to respond to concerns from patients, colleagues and the wider public about the health effects of climate change. A good understanding of the foundations of planetary health and climate science will equip AHPs to give responses that are well-informed, helpful and provide hope; for example, being able to support and empower patients with severe asthma to exercise safely in areas with high air pollution, or by supporting colleagues to be active in mitigating climate change, helping them to feel part of the solution and not the problem, thus reducing their climate-anxiety.

Some *top tips* on communicating with people about climate change are below:

1. Find a value that you have in common when discussing climate action with others:
"The amount of paper waste in our department was driving me crazy – there were always piles of paper left uncollected on the printer. It turns out our printers have a follow-me function, so IT have helped us to make all users default to that, and the procurement team have made a simple swap to recycled from virgin paper."
2. Connect that value to climate change with a story that resonates. Storytelling⁸⁶ is a powerful tool, with research⁸⁷ demonstrating that our brains respond differently when we receive information in the form of a narrative rather than a list of facts.
"Our respiratory ward is full! Are you seeing more frequent COPD exacerbations too? I had a look online and the air pollution levels near the hospital are awful this summer."
3. Inspire practical and attractive solutions:
"Our organisation has just introduced a walking aid recycling scheme. It means there is always a walking aid available for me to issue on discharge without having to order one. This saves me loads of time and prevents delayed discharge for patients. Patients and carers have fed back that they love how easy it is to arrange collection of the equipment when they no longer need to use it."
4. Keep ideas local as well as global. Identify opportunities for influencing decision making locally: for example, highlight the co-benefits for health and the environment of better active travel infrastructure and improved access to green space.
"My trust has just introduced the cycle to work scheme together with bike storage and showering facilities; it's meant that I can afford a folding bike so that I don't have to drive to and from the train station anymore, saving me money and keeping me fit on my commute!"
5. Highlight the positive opportunities that exist to both improve health and nature by taking steps to mitigate and adapt to climate change.
"By switching to a dry powder inhaler, not only is your symptom control just as good, but there is much less impact of the medicine on the environment; that in turn helps to minimise the harmful impacts of climate change on your respiratory condition".

Resources to support foundation five:

- [The sustainable physician](#) One of the earlier journal articles from 2010 setting out the vision of a low carbon, sustainable health service.
- [Planet centred care](#) A short series of six podcasts from the BMJ interviewing people from around the world who have made changes to the way they provide healthcare.
- [Talking climate handbook](#) A useful handbook on how to have conversations about climate change in your daily life
- [Living with the Climate Crisis](#) A website that provides a wealth of materials and resources for living with the climate crisis, from facilitators guides to participant handbooks and psychological guides to carbon reduction at home.
- [System progress & case studies](#) A look at system wide progress stories and more specifically [AHP case studies](#)
- [Climate outreach](#) A really useful website with lots of resources about climate communication and public engagement
- [UK Health Alliance on Climate Change](#) A UK organisation that coordinates action, provides leadership and amplifies the voice of health professionals across the UK.
- [Health Declares](#) A voluntary UK organisation that brings together health professionals from across the UK who are committed to acting and advocating to protect planetary and human health.

6.3. The 'how': six principles for incorporation into AHP curricula and programmes

Suggestions for incorporation of **education for sustainable healthcare** into curricula and programmes have been divided into six main principles as below and illustrated in Figure 10, with an introduction to each principle and accompanying resources signposted in the remainder of section 6.3.

Principle one	Golden thread throughout curricula
Principle two	Learning outcomes
Principle three	Embracing complexity
Principle four	Assessment
Principle five	Interprofessional learning
Principle six	Learner/educator wellbeing



Figure 10: The 'how': Six principles to support the integration of education for sustainable healthcare into AHP curricula and programmes

Principle one: Golden thread throughout curricula

Academics who responded to the HEI survey 2023 (appendix F) identified that one of the main barriers to incorporation of education for sustainable healthcare into programmes was a crowded curriculum. However, a considerable number of respondents also identified that the main enabler to its inclusion was the ability to easily incorporate the topic into multiple existing areas of the curriculum or programme.

Bruner's spiral curriculum (1960)⁸⁸ is an educational approach used in many UK HEIs where key concepts are revisited at intervals through a learner's education, with each encounter increasing in complexity and building upon prior knowledge to ensure deeper understanding and retention of subject matter over time. It is suggested in the literature that education for sustainable healthcare should be a cross-cutting theme, similar to communication skills or professionalism, and thus incorporated into all relevant aspects of education rather than via standalone lectures or modules, for example³⁶.

The diagram below from Jowell et al (2023)⁸⁹ is an example of learners and academics working together using a spiral or longitudinal approach to curriculum, to incorporate the effects of climate change on human health within existing subject areas, including the disproportionate effects on communities made vulnerable by social determinants of health such as racism and poverty. They were able to integrate the effects of climate change on health into more than a dozen courses without placing additional burden into a crowded curriculum, but rather changing the narrative of the teaching so that the impacts of climate change on health and health inequalities were ‘business as usual’.

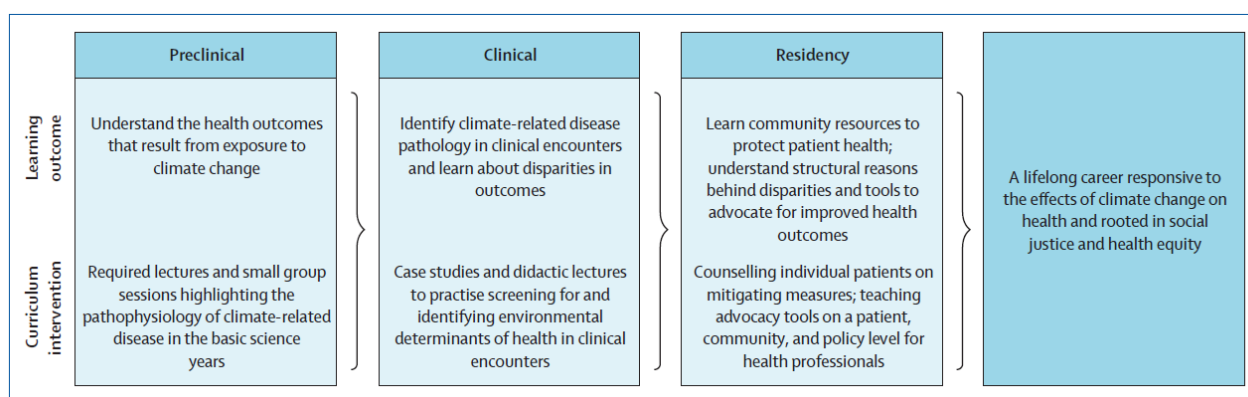


Figure 11: Providing an equity frame to medical training through climate and health education, taken from Jowell et al, (2023) ⁸⁹

The interdisciplinary and interconnected focus of the SDGs makes them an important and useful tool for the current mapping and future development of education for sustainable healthcare within AHP curricula and programmes, particularly [SD4](#) and [SDG13](#). Within healthcare programmes, this presents opportunities to commit to the incorporation of the SDGs whilst simultaneously enhancing planetary health literacy and principles of sustainable clinical practice within teaching.

A broad range of pedagogical approaches can support education for sustainable healthcare and, whilst not intended to be exhaustive, some examples of these are included in table 3.

Pedagogical approach examples	Area of education for sustainable healthcare
Didactic teaching	Establish importance of planetary health and describe the interconnection between environmental degradation and its connection to human health
Case-based approach	Engage learners with topics in more depth by exploring environmental risk factors alongside social determinants of health in patient case studies, e.g., air pollution and respiratory health, to establish relevance to future AHP practice. Case study example from Charles Sturt University, Australia
Population based learning	Exploration of specific environment-related illnesses within populations e.g., the impact of floods on the health of the local community
Simulation opportunities and formative assessments	Portfolios or OSCEs to introduce principle of sustainable clinical practice skills including behaviour change techniques; supporting self-care & active participation in disease management; procurement of sustainable materials; efficient use of resources to reduce healthcare waste including medicines.

Debate and ethics	Incorporation into topical debates e.g., around social justice, health inequalities, universalism, solutions to environmental problems. Role plays adopting different stakeholder perspectives.
Student centred learning: practical and skill-based	Self-directed research projects and reflective exercises. Individual or group work: audits, QI projects.
Experiential learning	Promoting good practice on reducing waste, reusing, repairing, or sharing among learners Case study examples from University of Plymouth

Table 3: Examples of pedagogical approaches to support the incorporation of education for sustainable healthcare in AHP curricula and programmes

There are numerous examples of the integration of education for sustainable healthcare within global physiotherapy programmes that can be found on the Environmental Physiotherapy Association website⁹⁰ which whilst only a single AHP profession, may be extrapolated to other AHP courses.

Principle two: Learning outcomes

It is universally accepted in healthcare education, that well-crafted learning outcomes are important. The Quality Assurance Agency for Higher Education (QAA) define learning outcomes as a, 'Statement of what a learner is expected to know, understand and/or be able to demonstrate after completion of a designated programme of study (which leads to a qualification)'⁹¹.

Learning outcomes are vital as they tell learners what is important, enable good assessment development, encourage reflection and good course design and development, and drive learning. It is essential within the context of education for sustainable healthcare that this is worked into learning outcomes at curriculum level with careful thought and planning to build upon concepts each year to avoid a scatter-gun approach or 'greenwashing' with tokenistic inclusion in one or two areas of pre-registration curricula.

Some well-established frameworks and tools used in other parts of the healthcare education, detailed in **appendix B** of this document, may serve as useful blueprints for academics looking for examples to craft bespoke learning outcomes for their professional programme. Furthermore, some examples from within different healthcare specialisms such as geriatrics, musculoskeletal, respiratory, cardiology, paediatrics are referred to within several of the frameworks and tools, which may be useful for module leads within programmes.

The Planetary Health Report Card⁴², originally founded in 2019, is one such metric-based tool, that was developed between academics and learners to evaluate and improve planetary health content for health professional programmes. Its original target was medical schools, but it has now been extended to nursing, pharmacy and for the first time in 2022-2023 a [physiotherapy programme](#) at the University of Brighton participated. Whilst it currently only represents one allied health profession, this could be used as closer proxy to provide ideas and suggestions regarding how and where sustainable healthcare can be incorporated into other AHP programmes and learning outcomes, as can some aspects of the original [medicine](#) report card, with particular reference to those high scoring institutions who provide excellent examples of incorporation in their report card submissions.

As this guidance is so broad with its purpose to reach across the 14 AHP groups, it is not within scope to suggest learning outcomes for each professional group, nor would it be appropriate to do so as the lead

authors are not academics. We have however tried to give examples of learning outcomes from across healthcare education that could be used as a generic starting point for any of the AHP professional groups during curricula redesign or programme development within table 4.

Area of education for sustainable healthcare	Example learning outcomes
Health impacts of environmental degradation	Describe the mechanisms by which human health is affected by environmental degradation (e.g., changes in disease vectors, exposure to extreme weather, migration, reduced food security).
	Describe the impacts of global and local environmental degradation as they relate to specific areas of specialty (including but not limited to: cardiology, respiratory, mental ill health, child health and maternity, epidemiology).
	Identify the environmental determinants of health in a range of geographic, socioeconomic, and cultural contexts.
	Demonstrate the ability to take an environmental health history within a patient consultation.
	Design individual and population-focused strategies for AHPs to reduce the health impact of environmental change (in both clinical practice and public health advocacy).
Impacts of healthcare on environment	Evaluate the environmental, health and economic costs and benefits of different models of healthcare delivery (including but not limited to: resource distribution between prevention and treatment, and between primary and tertiary care).
	Design and conduct an audit and deliver recommendations to identify economic, health and environmental savings of specific sustainability initiatives in a local health service context.
	Apply systems thinking and multidisciplinary perspectives to patient care and resource management, to promote the environmental sustainability of health services.
Sustainable clinical practice: keeping people healthy	Explain the concept of 'health co-benefits' by considering how lifestyle choices can simultaneously promote both patient wellbeing and a healthy local and global environment.
	Demonstrate health promotion communication skills which encourage patients to contemplate and maintain healthier and more sustainable behaviours.
AHPs as environment & health advocates	Identify different ways in which AHPs can contribute to the delivery of sustainable healthcare systems (including clinical, professional, academic and leadership roles).
	Explain the concept of "health in all policies," giving examples of how policy can affect the social and environmental determinants of health, as well as healthcare delivery
	Identify the role of healthcare professionals in advocating for policies and infrastructure that promote availability, accessibility, and uptake of healthy and sustainable behaviours.

Table 4: Examples of learning outcomes that could be applied to some of the foundations of education for sustainable healthcare for AHPs

Further examples of learning outcomes were provided by AHP academics who responded to the survey, and are detailed in **appendix F**, table 13.

Principle three: Embracing complexity

Issues of environmental sustainability within the context of healthcare are often considered ‘wicked’ problems; problems with no single optimal solution, the possible solutions of which will significantly affect a wide range of stakeholders, and cannot be separated from human ethics, values, and social equity. As such, education for sustainable healthcare requires the application of higher-order complex learning, involving not only the acquisition of knowledge and skills, but the application of this learning using complex systems and critical thinking, and problem framing.

Systems thinking is critical as it allows us to approach a sustainability problem from all sides and to consider time, space, and context to understand how elements interact within and between systems. Thinking in systems can be understood as a tool for evaluating options, decision-making and taking action, and is based on the assumption that parts of a system act differently when taken apart from the system²³.

Critical thinking allows us to assess information and arguments, identify assumptions, challenge the status quo, and reflect on how personal, social, and cultural backgrounds influence thinking and conclusions in relation to sustainability problems. Problem framing then allows us to formulate current or potential challenges to the sustainability problem in terms of difficulty, people involved, time and geographical scope, to identify suitable approaches to anticipating and preventing problems, and to mitigating and adapting to already existing problems.

The incorporation of this complex thinking and knowledge integration into curricula is essential to ensure graduates can collaborate across disciplines to develop sustainable solutions in the face of planetary health challenges to overcome existing gaps in research design and policy development.

Principle four: Assessment

As it has been acknowledged that education for sustainable healthcare requires complex thinking, it will come as no surprise that it is therefore challenging to assess by conventional means (Tun & Martin, 2022). The model of education for sustainable healthcare for AHPs illustrated in section 6.1 is underpinned by Miller’s prism of clinical competence: that well-crafted learning outcomes and variety of assessment are a critical component of all healthcare education⁹².

Sustainable healthcare is fundamentally just ‘good care’, which serves to illustrate that learning outcomes must be assessed using a variety of different approaches in order for AHP graduates to meet the professional Standards of proficiency⁹³ and practice⁹⁴ in order to become registered and remain on the Register. Martin and Tun (2022) demonstrate many examples of assessment modalities within their Medical Schools Council Education for Sustainable Healthcare curriculum for the UK³⁶ some of which we have summarised and expanded upon in table 5.

Assessment modalities	Example where applicable
Practice based	Awareness of upstream determinants of health and preventable causes of disease in every clinical scenario
	Taking a comprehensive environmental or exposure history during patient consultations
	Accurate planetary health knowledge and its application to sustainable clinical decision making
Practice based / debate / presentation	Communication skills with fellow learners, staff, patients, practice-based educators: sustainability related information giving e.g., communicating about the health effects of the climate crisis and health co-benefits of biosphere-friendly lifestyles
Short answer questions	Questions crafted to assess deeper learning
Academic written assignments	Considerations required regarding the environment and sustainability within e.g., a menu planning assignment
Poster presentations	Detailing the health of the population of the United Kingdom with explanations for health inequalities.
Formative assessments	Engagement with education for sustainable healthcare within reflective pieces / portfolio / case studies / OSCEs
Practice based / project based	Supporting learners to notice unsustainable practices when on placement and supported to explore solutions through quality improvement or research projects

Table 5: Examples of assessment modalities that could be used to demonstrate competence in education for sustainable healthcare

Further examples of assessments were provided by AHP academics who responded to the survey, and are detailed in appendix F, table 13.

Principle five: Interprofessional learning

It is important to reiterate that all organisations, including regulators, professional bodies, and HEIs are at different stages in their journey regarding their own internal decarbonisation strategies and inclusion within standards, curricula, and programmes. Interprofessional collaboration is therefore critical if organisations wish to move at pace to incorporate education for sustainable healthcare.

Planetary health literacy necessitates engaging with many disciplines and stakeholders to understand and propose solutions to complex challenges⁹⁵. Exploratory thinking is required to adopt a relational way of thinking by exploring and linking different disciplines, using creativity and experimentation with novel ideas or methods.

Necessary transformations for sustainability are not only enabled by technological changes, but also by cultural and social changes as well as behavioural shifts and institutional reforms. As such, a multitude of stakeholders at local level must be actively engaged to shape and achieve global transformations for a sustainable health and care systems. Every individual in the system makes everyday decisions which have impacts and consequences for sustainability, whether you are a learner, academic, consumer, producer, employee, or a community. If learners are engaged with interprofessional learning from the beginning on this topic, they will graduate with an understanding of collaborative work across disciplines to create new paradigms that can lead to global sustainability via consistent and long-term approaches, rather than through small one-off actions or professional siloes.

Principle six: Learner/educator wellbeing

A growing body of research has documented eco-anxiety as negative cognitive, emotional, and behavioural responses associated with concerns about environmental degradation and the impact on the changing climate⁹⁶. Both learners and educators can be affected by eco-anxiety, *solastalgia* and climate grief, and education for sustainable healthcare may bring this to the fore. It is important that this is a subject that is covered in teaching, and that there is support available and signposted to throughout programmes.

UK-based research⁹⁷ using a measure of 'global warming worry' found that whilst this was associated with psychological distress, it also associated strongly with pro-environmental action, suggesting that it may be a constructive form of worry.

Given our need to effectively mobilise in response to environmental degradation and its impact on climate change, the Climate Psychology Alliance suggests that we should not aim to get rid of climate anxiety, but instead '*support individuals and communities to build strong containers that allow the expression and exploration of their emotions without collapsing under it or turning away*'⁹⁸.

Research conducted in Germany, Australia and New Zealand concluded that '*eco-anxiety and climate change anxiety are largely rational responses, given the enormity of the crisis*'. Focusing on solutions, positive actions and their co-benefits can provide a sense of hope and optimism, particularly when done collectively⁸⁴.

Community is crucial for collective resilience, thus developing and fostering strong social networks of supportive relationships and a living relationship with the natural world can function as one of these containing spaces. This in turn can help to develop meaningful action and positive social, psychological, and ecological change. It is thus essential that there is space and time dedicated to this topic within AHP programmes.

Additional resources:

[Mental health and our changing climate: impacts, implications, and guidance \(2017\)](#) A US produced guidance document providing evidence of the impacts of climate change on mental health, the implications of these and guidance for management

[TED talk: Ayana Elizabeth Johnson: How to find joy in climate action](#) A 10-minute TED talk discussing how we can each play a role in the climate movement by tapping into our own skills, resources and networks in ways that bring us satisfaction.

SECTION THREE: Conclusion, references & appendices

7. Guidance scope, review, & conclusion

7.1. Scope and review

This guidance document aims to demonstrate how education for sustainable healthcare can be embedded into AHP curricula and programmes with teaching delivered by 'non-experts' in this area. Whilst this guideline aims to support embedding education for sustainable healthcare into the AHP curricula and act as a reference guide and resource signposting tool, it is **not** intended as a substitute for formal learning or training.

Numerous climate and health training already exists to support academics, clinicians, and learners to develop familiarity with the subject area. Many of these resources are linked throughout the document, and within the references and appendices. It is important to highlight that as the body of climate science, health knowledge and literature grows, so too will the development of learning resources. Every effort has been made to link to websites or resources that will continue to be regularly updated, whilst appreciating that those involved with or interested in curriculum design should remain vigilant for emerging issues, thinking, and opportunities to keep AHP education for sustainable healthcare current and dynamic.

As with any emerging topic area, interactive and experiential learning between learners, academics, practice-based educators, and other relevant stakeholders e.g., external experts on sustainable healthcare, often results in the co-production of new learning³⁶. This can be a stimulating and practicable solution to plug the gaps in this fast-moving area of science, and consideration should be given to the establishment of interprofessional and cross-institution collaboration to expedite knowledge sharing and save 'reinventing the wheel'.

This document will be kept under review to ensure that as the climate and health literature and policy continues to gather pace, any necessary amends are made so that it stays relevant to current practice. We would welcome any feedback you may have on the use of this document to enable ongoing improvements. You can do so by completing [this short online survey](#).

7.2. Conclusion

A sustainable healthcare service will be better at preventing illness, empowering people to self-manage their health, improve efficiency through leaner and lower carbon care design and delivery, and consequently be less harmful to the environment. This will all impact positively on both the health of people and the planet.

There is still much to do in all areas of healthcare, and as high prescribers of equipment, imaging, and medicines, AHPs must play their part. AHPs must graduate with good planetary health literacy, actively participate in research and innovation, and adopt, apply and embed the principles of sustainable healthcare to daily practice in order to protect the health of our planet and future generations.

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9. Appendices

Appendix A: Acknowledgements

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Dr Rammina Yassaie	Senior Lecturer in Healthcare Leadership & Medic	Sheffield Hallam University

Appendix B: Key existing guidance, frameworks, tools & resources

Frameworks / curriculum guides (some including learning outcomes)	Publisher
Education for Sustainable Healthcare: A curriculum for the UK (2022) ³⁶	Medical Schools Council
Education for Sustainable Development (2021) ³⁷	The Quality Assurance Agency for Higher Education (QAA)
GreenComp: the European sustainability competence framework (2022) ²³	European Commission
Climate & Health curriculum reform in medical schools (2022) ³⁸	Medical Students for Sustainable Future
The Planetary Health Education Framework (2021) ³⁹	Planetary Health Alliance
The Planetary Health Report Card Initiative ⁴²	Planetary Health Report Card
Learning outcomes / education resources / toolkits	
Climate Change - Planetary Health Alliance ³⁹	
Global Consortium on Climate and Health Education resource bank ⁴¹	
International Medical Education Collaboration on Climate and Sustainability ⁴⁰	
Climate Change Toolkit for Health Professionals (2019) ⁴³	
General Pharmaceutical Council: Environmental sustainability in pharmacy education	

Appendix C: Sustainable AHP practice examples

The table below lists examples of current sustainable clinical practice across the AHP professions.

This is **not** intended to be an exhaustive list, rather it is a **call to action** for each professional group to identify where their profession or sub-specialty can contribute in other innovative ways to help to reach the UK's net zero ambitions, with particular focus on low carbon alternatives.

This list was compiled and reviewed by one or more representatives of each of the 14 AHP professions.

Other key AHP resources from England can be found on the [Greener Allied Health Professional hub](#) with links to AHP [case studies](#) hosted on the [Centre for Sustainable Healthcare website](#).

Principle of sustainable clinical practice	Subdomain	Sustainable AHP practice examples
Keeping people healthy Triple bottom line benefits: Improves health outcomes for patients by preventing disease onset or progression, making care more personalised and empowering patients to take charge of their health. Decreases the amount, intensity, complexity, and cost of care. Reduces the associated carbon footprint of care.	Disease/injury prevention Prevention measures reduce the incidence and/or severity of disease.	<i>Profession specific descriptors of AHPs in public health, including numerous examples of preventative interventions can be found in the Royal Society of Public Health (RSPH) Handbook</i>
		MDT falls prevention
		Social prescribing e.g., green walking groups for mental health
		Public health campaigns e.g., breastfeeding
		Pressure ulcer management and wound care
		Breast screening
		Vascular screening and early management of peripheral arterial disease
		Atrial fibrillation screening
		Diabetic foot screening
		Routine vision screening and screening for high-risk groups
	Patient empowerment & health promotion Promotion of low carbon activities and lifestyles.	Physical activity campaigns and exercise prescription schemes
		Healthy and sustainable lifestyle advice e.g., interventions to support dietary change incorporating increased plant-based diet.
		Making every contact count conversations e.g., smoking cessation advice, health promotion advice

		Therapeutic growing / horticulture activities, communication groups	
	Personalised care Delivering personalised care that includes self-management and supporting patients to make decisions that are right for them.	Social prescribing e.g., art therapies	
		Supported self-management education programmes for long term conditions	
		Individualised supply of bespoke prosthetic limbs	
Efficiency Triple bottom line benefits: Improves health and health outcomes for patients by reducing delays in diagnosis and treatment. Decreases resource waste, travel, duplication and unnecessary healthcare contact reducing cost of care. Reduces the associated carbon footprint of care.	Right time, right care, right place Efficient or lean care reduces delays in diagnosis and treatment but also resource waste, duplication and unnecessary healthcare contact and visits.	Community rehabilitation in community facilities e.g., schools, day centres	
		Pre-habilitation prior to surgery	
		Multidisciplinary assessment clinics	
		AHPs working in primary care	
		Digital assessment and treatment pathways and use of innovative technologies e.g., HoloLens/Real wear	
Low carbon alternatives Triple bottom line benefits: Improves outcomes for patients by ensuring availability of the appropriate equipment and best treatment. Decreases the financial cost of unnecessary equipment procurement, transport and poor energy and estates usage. Reduces the associated carbon footprint of care.	Settings, energy, and consumables Ensuring our procurement practices drive sustainable healthcare by reducing demand and transitioning away from single-use consumables and medical equipment by supporting a circular economy of reduce, reuse, and remanufacture.	Equipment recycling schemes e.g., walking aids & activity of daily living aids	
		Transition away from single use consumables e.g., reusable surgical instruments, reusable visual aids	
		Appropriate waste segregation in theatres and other clinical spaces	
		Onsite manufacture and 3-D printing of prosthetics & orthotics	
		Regular preventative maintenance of imaging machinery e.g., MRI scanners with daily correct shut-down and warm up procedures	
		Recycling schemes for unused contrast media	
	Low carbon treatment Every part of healthcare has an associated carbon footprint. In addition to ensuring it is the right assessment or treatment, reduce excessive or inappropriate use or switch to a lower carbon alternative where possible.		Green and blue social prescribing
			Risk assessment and identification of barriers to participation
			Switching to lower carbon anaesthetics or pain relief
			Deprescribing
		Day case podiatric surgery under local anaesthesia	

	Travel and transport Identifying where travel can be reduced, or lower carbon transport alternatives could be introduced.	Promoting active travel to patients and staff
		Switch to ULEV or electric vehicles
		Commissioning services to grow a local workforce to commission from rather than regional or national delivery

Appendix D: Examples from AHP professional standards and curricula

The following regulatory, professional body and specialist interest group examples demonstrate ways in which organisations have already begun to incorporate education for sustainability within standards and curricula. They are by no means represented as an exhaustive list of ways, nor do they cover all areas of education or practice that sustainable healthcare can be incorporated within, rather they are provided as a reference point for organisations yet to begin this process. Whilst this guidance is aimed at pre-registration education, we have also included examples from post-graduate education for context.

Professional standards

[HCPC Standards of proficiency](#) (2023) for 13 of 14 Allied health professions

Standard 15. Promote health and prevent ill health

15.2 Understand how social, economic, and environmental factors (wider determinants of health) can influence a person’s health and wellbeing.

Professional AHP curricula

- [British Dietetic Association](#)

[A curriculum framework for the pre-registration education and training of dietitians](#)

Page 10

Produce dietitians who improve the nutritional health and wellbeing goals of individuals, groups and populations, in a holistic manner, with due consideration given to planetary health and environmental sustainability.

Page 21

Knowledge and understanding of

- j. Types, uses, sustainability and financial implications of nutritional products.

Page 23

Knowledge and understanding of

- g. Food provision, including production, procurement and delivery and food security and sustainability.
- l. The range, suitability, sustainability and costs of foods for dietetic treatment.

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Demonstrate the ability to:

- c. Understand the importance of sustainability by focussing on reducing the environmental impacts on the workplace.

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Links to key documents:

[One Blue Dot - the BDA's Environmentally Sustainable Diet Project | \(2018\)](#)

- [Society of Radiographers](#)

[Education and Career Framework for the Radiography Workforce](#)

Pages 65 & 77

The impact of healthcare on planetary health, the sustainability of resources and the effects on human health within own scope of practice

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Links to key documents:

[Practitioner Indicative Curriculum Mapping document](#)

Page 116 (N.B. Advanced practitioner / post-graduate level)

Recognise the sustainability and environmental impact of decisions and actions and demonstrate a commitment to minimise any resultant negative effects on planetary health

- [Royal College of Occupational Therapy](#)

[Learning and development standards pre-registration education](#)

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Standard 4.4 The curriculum must remain relevant to current practice

4.4.3 Learners are capable of incorporating current and emerging data on social, economic, organisational, environmental and health disparities into the design and prioritisation of occupational therapy services.

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Standard 4.4 The curriculum must remain relevant to current practice

4.4.4 & 4.4.5 Guidance and evidence: Programme documentation incorporates the five guiding principles for sustainability in occupational therapy practice education and scholarship (WFOT 2018).

Specialist professional interest groups

- MSK Advanced Practice (*N.B. Advanced practitioner / post-graduate level*)

[U.K. Musculoskeletal Advanced Practice Standards](#)

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E2.K14 Demonstrate the knowledge and skills needed to improve the environmental sustainability of health systems, and describe how the environment and human health interact at different levels

Appendix E: Supporting legislation & policy

Supporting document	Nation applicable			
	England	Scotland	Wales	Northern Ireland
Government legislation				
Climate Change Act (Scotland) 2009		x		
The Climate Change Act (Northern Ireland) 2022				x
Climate Change Act (England) 2008	x			
Environment (Wales) Act 2016			x	
Health and Care Act 2022 (Part 1 section 9: 13NC)	x			
Well-being of Future Generations (Wales) Act 2015			x	

Health and care system specific policy				
NHS Scotland climate emergency and sustainability strategy	x			
NHS Wales decarbonisation strategic delivery plan			x	
Delivering a net zero NHS	x			
Higher education specific policy				
Confronting the climate emergency	x	x	x	x
Carbon reduction target and strategy for higher education in England	x			
Universities and Colleges Climate Commitment for Scotland (UCCCFs)		x		
Sustainability and climate change: a strategy for education	x			

Appendix F: Academic survey

A survey was used to gain an understanding of the views, attitudes, and current delivery of education for sustainable healthcare on AHP programmes within the UK. It was clarified to participants that the intention of the survey was to use the data to help guide the next steps for curricula and programme development to ensure AHP graduates have the requisite knowledge, skills and attitudes required for sustainable practice in healthcare settings.

The online Typeform survey, intended for completion by pre-registration AHP programme leads / course directors across UK higher education institutions, was distributed in March – April 2023. A total of 95 complete responses were received from all four countries of the UK. Thirteen professions were represented in the survey (Table 1).

All tables with quantitative information are organised in order of percentage of total sample.

Table 1: Professional AHP programme*

Physiotherapy	n=29 (30.5%)
Speech and Language therapy	n=12 (12.6%)
Radiography	n=10 (10.5%)
Operating Department practitioners	n=8 (8.4%)
Dietetics	n=7 (7.4%)
Prosthetics & Orthotics	n=7 (7.4%)
Occupational therapy	n=6 (6.3%)
Paramedics	n=5 (5.3%)

Art therapy	n=3 (3.2%)
Podiatry	n=3 (3.2%)
Osteopathy	n=2 (2.1%)
Drama therapy	n=1 (1.1%)
Music therapy	n=1 (1.1%)
Orthoptics	n=1 (1.1%)

*N.B Where respondent was lead for more than one AHP professional programme, they were requested to complete the survey for each professional programme separately

Table 2: Level of study

BSc	n=64 (67.4%)
Pre reg MSc	n=36 (37.9%)
Other:	n=6 (6.3%)
MA	n=5 (5.3%)
MSci	n=5 (5.3%)
MDiet	n=2 (2.1%)
BOst/MOst	n=2 (2.1%)

Table 3: Length of programme (with multiple choice)

3 years	n=60 (63.2%)
2 years	n=38 (40.0%)
4+ years	n=17 (17.9%)
Other	n=3 (3.2%)
1 year	n=1 (1.1%)

Table 4: Proportion of programme's taught content delivered virtually

0 – 25%	n=81 (85.3%)
25 – 50%	n=38 (10.5%)
> 50%	n=17 (4.2%)

Of those who responded to the question regarding whether environmental sustainability was an important area of knowledge required for AHP learners (table 5 n=95), the overwhelming majority of the sample reported that environmental sustainability was important or partially important to AHP learners (n=85 [89.5%]) with only (n=9 [9.5%]) unsure, and (n=1 [1.4%]) who felt it was not important.

Table 5: Is environmental sustainability an important area of knowledge required for AHP learners.

Yes	n=73 (76.8%)
Partially	n=12 (12.6%)
Not sure	n=9 (9.5%)
No	n=1 (1.1%)

Table 6: Is environmental sustainability currently covered within the AHP programme.

Partially / somewhat	n=44 (46.3%)
No	n=25 (26.3%)
Yes	n=22 (23.2%)
Don't know / other	n=4 (4.3%)

Table 7: When was environmental sustainability first introduced into the programme.

Not applicable / not taught on programme	n=25 (26.3%)
More than 24 months ago	n=22 (23.2%)
Less than 12 months ago	n=18 (18.9%)
Between 12 and 24 months ago	n=15 (15.8%)
Not sure	n=15 (15.8%)

Table 8: The stage in the programme environmental sustainability is introduced.

Year 1	n=48 (50.5%)
Not applicable / not taught on programme	n=29 (30.5%)
Year 2	n=9 (9.5%)
Year 3+	n=9 (9.5%)

Table 9: The current priority given to environmental sustainability within the programme.

We can see its growing importance but have yet to reflect this in our programme	n=45 (47.4%)
We include environmental sustainability within our programme and plan to do more	n=25 (26.3%)
It is not considered a priority compared to other aspects of the programme	n=20 (21.1%)
We are confident that our programme has a strong environmental sustainability component already	n=3 (3.2%)
Other	n=2 (2.1%)

Table 10: How environmental sustainability is taught on the programme (with multiple choice).

Threaded through several modules	n=43 (45.3%)
Not currently taught on the programme	n=29 (30.5%)
Within one specific module	n=18 (18.9%)
A one off lecture / seminar / webinar	n=7 (7.4%)
Other	n=2 (2.1%)

Table 11: Whether learning outcomes / learning standards / competencies on environmental sustainability are used within the programme

No	n=52 (54.7%)
Yes	n=26 (27.4%)
Not applicable, not taught on the programme	n=17 (17.9%)

Table 12: Whether environmental sustainability is formally assessed on the programme, and how (with multiple choice).

Taught on programme but not assessed	n=43 (45.2%)
Not applicable, not taught on programme	n=29 (30.5%)
Yes, assessed by essay / assignment / portfolio	n=9 (9.5%)
Yes, assessed via poster / presentation	n=3 (3.1%)
Yes, assessed on clinical placement	n=2 (2.1%)
Yes, assessed via vlog / learning log / project work	n=2 (2.1%)
Yes, embed throughout everything rather than having specific assessment	n=2 (2.1%)
Yes, assessed by viva	n=1 (1.1%)
Yes, assessed by MCQ	n=1 (1.1%)
Yes, assessed by OSCE	n=1 (1.1%)
Yes, education leaflet production	n=1 (1.1%)
Other	n=1 (1.1%)

Table 13: Examples of learning outcomes and assessment of environmental sustainability within AHP programmes (free text responses).

<p>Example 1:</p> <p><i>Programme learning outcome:</i> Engage with cultural, environmental, political, ethical, legal, and economic factors that impact health and wellbeing.</p> <p><i>Module learning outcome:</i> Demonstrate an understanding of the role of the physiotherapist in empowering the individual to sustainably manage their health condition.</p>
<p>Example 2:</p> <p><i>Module:</i> Promoting Health and Wellbeing module 1, level 4: <i>Learning Outcome 1:</i> Identify the determinants of health and well-being in the context of Physiotherapy practice locally, nationally, and globally, through engagement with literature, legislation, and contemporary practice. <i>Learning Outcome 2:</i> Demonstrate and apply an understanding of health and wellbeing promotion, illness and disease prevention and protection through the creation of resources for individuals, communities, or populations.</p>
<p>Example 3:</p> <p>Module descriptor: This module will facilitate an honest evaluation of individual professional development needs to enhance a commitment towards contemporary career-long development and practice. It will provide opportunities to use sustainable quality improvement methodology to equip the students to be able to advocate and implement service improvements appropriate for newly qualified clinicians so that they can contribute towards services which are committed to excellence. AND Students will have the opportunity to enhance skills in:</p>

<p>Leadership Essential professional communications skills e.g., collaboration & negotiation Identifying personal development plans based on an analysis of performance against professional standards of practice. Concepts of sustainable service improvement</p>
<p>Example 4: Debate the ethical, legal, political, social, economic, environmental, cultural, and institutional issues related to your professional practice to develop your professional responsibility. Discuss, and respond to changes in, the political, social, economic, environmental, and institutional factors that shape delivery of physiotherapy services.</p>
<p>Example 5: Describe the health of the population of the United Kingdom and offer explanations for health inequalities.</p>
<p>Example 6: To introduce the student to the processes and theory associated with technologies that are used to assist device design and manufacture within prosthetics and orthotics. To ensure that the student is aware of the importance of legislation, regulations, and standards relevant to the manufacture of devices in the P&O sector.</p>
<p>Example 7: Considerations required regarding the environment and sustainability within a menu planning assignment in the first year.</p>
<p>Example 8: SDG challenge to apply relevant goals to university environment; essay assignment to consider environmental impact of students' dietary choices</p>
<p>Example 9: Student focus on global challenges during a first-year module titled 'Scientific and Professional Communication'. Environmental sustainability is central to this.</p>
<p>Example 10: Food and sustainability considerations, including range, suitability, and costs of dietetic treatment</p>
<p>Example 11: Critically reflect on the role of the physiotherapist in implementing public health and health promotion strategies at individual, group, community, and population level.</p>
<p>Example 12: Students must produce an educational leaflet on the importance of physical activity in a certain demographic as part of the health promotion element of the module health across the lifespan.</p>
<p>Example 13: Critically evaluate relationships between health, occupation, global climate change and sustainability over the life course.</p>
<p>Example 14: Learning outcomes within modules and learning objectives to understand, for example how the environment and in particular one immediate environment can impact on their health. Additionally, what environmental factors affect pathophysiology and how our decisions and advice may provide positive impact through our assessment and intervention beyond physiotherapeutic skills.</p>
<p>Example 15: Design and present a safe, effective and sustainable rehabilitation programme, in line with relevant policies/guidelines and evidence-based practice, which shows an ability to problem solve, make informed decisions and evaluate and monitor outcomes.</p>
<p>Example 16: Students work in groups to develop a public health intervention and accompanying business plan as part of the module assessment, incorporating sustainability as a key focus</p>
<p>Example 17: Demonstrate an understanding of sustainability in Health care through discussion and debates considering both sides of the arguments in relation to rehabilitation and the WHO Sustainable Development Goals</p>

Table 14: The likelihood of including environmental sustainability on the programme if not currently taught.

Not applicable, currently taught on programme	n=35 (36.8%)
Recognise it is important to include, but haven't yet begun the planning or implementation stage	n=25 (26.3%)
Identified where and how to include it, and are in the process of incorporating	n=13 (13.7%)
Haven't yet considered whether it needs to be included, but want to explore this further	n=13 (13.7%)
We do not consider that this is a priority for inclusion on the programme, and are unlikely to incorporate in the near future	n=2 (2.1%)
Other	n=7 (7.4%)

Table 15: The support needed to deliver content on this topic if environmental sustainability not already taught on the programme (with multiple choice)

Support from professional body to identify where within the programme / learning standards / competencies environmental sustainability could be incorporated	n=65 (68.4%)
Exemplars from other institutions where environmental sustainability is already being delivered as part of an AHP programme	n=50 (52.6%)
A generic guidance document and/or generic competencies / learning outcomes that could be adapted to suit the programme	n=49 (51.6%)
Increased knowledge and/or skills for those delivering the content	n=49 (51.6%)
Resources developed by external 'experts'	n=38 (40%)
Support to develop appropriate assessment methods	n=26 (27.4%)
Resources developed internally by partners within our institution e.g. planetary health department	n=22 (23.2%)
Not applicable, it is currently taught on the programme and/or we do not need support to deliver it	n=21 (22.1%)
External 'experts' to deliver content	n=19 (20%)
Other	n=3 (3.2%)

Table 16: Current or possible enablers to the inclusion and delivery of environmental sustainability content within programme (with multiple choice)

The topic can be easily incorporated into one or more modules within the programme	n=52 (54.7%)
AHP learners are enthusiastic to learn about environmental sustainability	n=50 (52.6%)
Educators are enthusiastic to teach about environmental sustainability	n=44 (46.3%)

Our professional body is supportive to include content on environmental sustainability on the programme	n=31 (32.6%)
There are lots of resources available both internally and externally to support delivery	n=31 (32.6%)
Other	n=7 (7.4%)

Table 17: Current or possible barriers to the inclusion and delivery of environmental sustainability content within programme (with multiple choice)

Educators don't currently have the knowledge / skills to deliver content on environmental sustainability	n=60 (63.2%)
The curriculum is too crowded	n=50 (52.6%)
Unsure how and where it is most appropriate to fit environmental sustainability into the programme	n=42 (44.2%)
No barriers to inclusion on the programme	n=10 (10.5%)
This isn't an important issue for AHP learners	n=5 (5.3%)
If it is not recommended by professional body curriculum guidance	n=2 (2.1%)
Time required to develop resources including teaching and assessment	n=2 (2.1%)
Other	n=2 (2.1%)

Appendix G: Learner survey

Please cite this appendix as:

Hess, K., & Rihtman, T. (2023). An exploration of UK allied healthcare students' experiences, views, attitudes, and behaviours towards environmental sustainability: Summary report. In *Education for sustainable healthcare within UK pre-registration curricula for Allied Health Professions* (pp.64-76). Council of Deans of Health.

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In partnership with Jessie Frost, Chief Sustainability Officer's Clinical Fellow, NHS England.

Led by faculty from the Occupational Therapy Team at Oxford Brookes University (Ka Yan Hess and Dr Tanya Rihtman), a survey co-created with MSc (Occupational Therapy) students (Diana Kerekesova, Yik Hoi Lai, Neale Mendiola and Felicity Murray) was used to gain an understanding of the experiences, views, attitudes, and behaviours of allied healthcare students within the UK in relation to environmental sustainability. It was clarified to participants that the intention of the survey was to use the data to help

guide education providers in how best to prepare students for environmentally sustainable practice in healthcare settings.

Across two rounds of survey distribution (Jan-Feb, 2022 and June-July, 2023), a total of 292 complete responses were received from health care students from all four countries of the UK. Thirteen professions were represented in the survey (Table 1), of which six professions attained sample sizes of $n \geq 20$ (Table 2).

Table 1: Geographical location distribution (organised in order of percentage of total sample):

		England	Scotland	Wales	Northern Ireland
Occupational therapists	n=113 (38.7%)	n=88 (77.9%)	n=6 (5.3%)	n=11 (9.7%)	n=8 (7.1%)
Speech and language therapists	n=43 (14.7%)	n=32 (74.4%)	n=9 (20.9%)	n=2 (4.7%)	
Physiotherapists	n=33 (11.3%)	n=27 (81.8%)	n=1 (3%)	n=5 (15.2%)	
Radiographers	n=28 (9.6%)	n=25 (89.3%)	n=2 (7.1%)	n=1 (3.6%)	
Dietitians	n=22 (7.5%)	n=15 (68.3%)	n=3 (13.6%)	n=1 (4.5%)	n=3 (13.6%)
Chiropodists / podiatrists	n=20 (6.8%)	n=18 (90%)	n=1 (5%)	n=1 (5%)	
Paramedics	n=12 (4.1%)	n=5 (41.7%)	n=7 (58.3%)		
Operating department practitioners	n=8 (2.7%)	n=8 (100%)			
Music therapists	n=7 (2.4%)	n=5 (71.4%)		n=2 (28.6%)	
Orthoptists	n=3 (1%)	n=3 (100%)			
Arts therapists	n=1 (0.3%)	n=1 (100%)			
Osteopaths	n=1 (0.3%)	n=1 (100%)			
Prosthetists / orthotists	n=1 (0.3%)	n=1 (100%)			
	n=292 (100%)	n=229 (78.4%)	n=29 (9.9%)	n=23 (7.9%)	n=11 (3.8%)

Table 2: Level of study distribution (organised in order of percentage of total sample)

	Percentage of total sample	Undergraduate (percentage of profession-specific sample)	Masters (percentage of profession-specific sample)	Doctorate (percentage of profession-specific sample)	Apprenticeship/ PgDip/Integrated masters (percentage of profession-specific sample)
Occupational therapists	n=113 (38.7%)	n=63 (55.8%)	n=44 (38.9%)	n=0	n=6 (5.3%)
Speech and language therapists	n=43 (14.7%)	n=34 (79.1%)	n=7 (16.3%)	n=0	n=2 (4.7%)
Physiotherapists	n=33 (11.3%)	n=17 (51.5%)	n=15 (45.5%)	n=1 (3.0%)	n=0
Radiographers	n=28 (9.6%)	n=23 (82%)	n=5 (17.9%)	n=0	n=0
Dietitians	n=22 (7.5%)	n=17 (77.3%)	n=5 (22.7%)	n=0	n=0
Chiropodists / podiatrists	n=20 (6.8%)	n=18 (90%)	n=2 (10%)	n=0	n=0
Paramedics	n=12 (4.1%)				
Operating department practitioners	n=8 (2.7%)				
Music therapists	n=7 (2.4%)				
Orthoptists	n=3 (1%)				
Arts therapists	n=1 (0.3%)				
Osteopaths	n=1 (0.3%)				
Prosthetists / orthotists	n=1 (0.3%)				
	n=292 (100%)	n=195 (66.8%)	n=87 (29.8%)	n=2 (0.7%)	n=8 (2.7%)

For anonymity reasons, age (Table 3) and ethnicity (Table 3) are described across the whole sample (n=292). In total, n=242 (82.9%) of the respondents identified as female, n=43 (14.7%) identified as male, n=6 (2.1%) identified as non-binary, and n=1 (0.3%) did not provide this information.

Table 3: Age group distribution

18-24	n=100 (34.2%)
25-29	n=72 (24.7%)
30-34	n=36 (12.3%)
35-39	n=26 (8.9%)
40+	n=58 (19.9%)

Table 4: Ethnicity

British	n=148 (50.7%)
English	n=54 (18.5%)
Welsh	n=12 (4.1%)
Scottish	n=15 (5.1%)
Irish	n=11 (3.8%)
White (other)	n=13 (4.5%)
Black Caribbean & White	n=2 (0.7%)
Black African & White	n=1 (0.3%)
Asian & White	n=6 (2.1%)
Other Mixed/Multiple Ethnic Background	n=3 (1.0%)
Indian	n=5 (1.7%)
Pakistani	n=2 (0.7%)
Chinese	n=2 (0.7%)
Other Asian/Asian British Background	n=4 (1.4%)
African	n=5 (1.7%)
Caribbean	n=3 (1.0%)
Other Black/African/Caribbean/ Black British Background	n=1 (0.3%)
Arab	n=3 (1.0%)
Prefer not to say	n=2 (0.7%)

Of those who responded to the question regarding concern about climate change (n=289), the overwhelming majority of the sample reported feeling very concerned (n=150 [51.9%]) or fairly concerned (n=121 [41.9%]) about climate change. Only n=14 (4.8%) were not very concerned, and n=4 (1.4%) not concerned at all. This was explored according to professional group for those with samples of $\geq n=20$ and combined for the rest of the sample (Table 5).

Table 5: Self-reported level of concern about climate change (organised in order of percentage of total sample)

		Very Concerned	Fairly Concerned	Not Very Concerned	Not at All Concerned	Missing
Occupational therapists	n=113 (38.7%)	n=58 (51.3%)	n=47 (41.6%)	n=5 (4.4%)	n=3 (2.7%)	N/A
Speech and language therapists	n=43 (14.7%)	n=30 (70%)	n=12 (28%)	n=1 (2%)	n=0	N/A
Physiotherapists	n=33 (11.3%)	n=15 (45.5%)	n=16 (48.5%)	n=1 (3%)	n=0	n=1 (3%)
Radiographers	n=28 (9.6%)	n=14 (50%)	n=12 (42.8%)	n=1 (3.6%)	n=1 (3.6%)	N/A
Dietitians	n=22 (7.5%)	n=8 (36.4%)	n=12 (54.5%)	n=2 (9.1%)	n=0	N/A
Chiropodists / podiatrists	n=20 (6.8%)	n=10 (50%)	n=8 (40%)	n=0	n=0	n=2 (10%)
Other	n=33 (11.3%)	n=15 (45.5%)	n=14 (42.4%)	n=4 (12.1%)	n=0	N/A
Total	n=292 (100%)	n=150 (51.3%)	n=121 (41.4%)	n=14 (4.8%)	n=4 (1.3%)	n=3 (1%)

Participants were asked to rate the extent of their agreement with a variety of statements derived from a number of published sources (Sustainability Consciousness Scale [Gericke, et al, 2018], UK-specific public view about climate change [IPSOS, 2021]; climate justice survey for young people [Climate Change Survey, 2021]).

Table 6: Extent of agreement with environmental sustainability-related statements for whole sample only.
***N. B** The extent of agreement to these statements by geographical area and by professional groups (for those with samples of >n=20) is available by contacting the authors directly.*

		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
Reducing water consumption is necessary for sustainable development	Whole sample (n=292)	n=9 (3.1%)	n=25 (8.6%)	n=41 (14.0%)	n=102 (34.9%)	n=115 (39.4%)
Preserving the variety of living creatures is necessary for sustainable development (preserving biological diversity)	Whole sample (n=292)	n=8 (2.7%)	n=3 (1%)	n=5 (1.7%)	n=44 (15.1%)	n=232 (79.5%)
For sustainable development, people need to be educated in how to protect themselves against natural disasters	Whole sample (n=292)	n=9 (3.1%)	n=16 (5.5%)	n=36 (12.3%)	n=120 (41.1%)	n=111 (38%)
A culture where conflicts are resolved peacefully through discussion is necessary for sustainable development	Whole sample (n=292)	n=8 (2.7%)	n=10 (3.4%)	n=22 (7.5%)	n=75 (25.7%)	n=177 (60.6)
Respecting human rights is necessary for sustainable development	Whole sample (n=292)	n=8 (2.7%)	n=4 (1.4%)	n=20 (6.8%)	n=53 (18.2%)	n=207 (70.9%)
To achieve sustainable development, all the people in the	Whole sample (n=292)	n=7 (2.4%)	n=12 (4.1%)	n=18 (6.2%)	n=78 (26.7%)	n=177 (60.6)

world must have access to good education						
Sustainable development requires that companies act responsibly towards their employees, customers, and suppliers	Whole sample (n=292)	n=6 (2.1%)	n=6 (2.1%)	n=2 (0.7%)	n=45 (15.4%)	n=233 (79.8%)
Sustainable development requires a fair distribution of goods and services among people in the world	Whole sample (n=292)	n=6 (2.1%)	n=6 (2.1%)	n=19 (6.5%)	n=94 (32.2%)	n=167 (57.2%)
Wiping out poverty in the world is necessary for sustainable development	Whole sample (n=292)	n=8 (2.7%)	n=18 (6.2%)	n=35 (12%)	n=87 (29.8%)	n=144 (49.3%)
I think that using more natural resources than we need does not threaten the health and well-being of people in the future	Whole sample (n=292)	n=178 (61%)	n=56 (19.2%)	n=14 (4.8%)	n=25 (8.6%)	n=19 (6.5%)
I think that we need stricter laws and regulations to protect the environment	Whole sample (n=292)	n=5 (1.7%)	n=8 (2.7%)	n=12 (4.1%)	n=75 (25.7%)	n=192 (65.8%)
I think that it is important to take measures against problems which have to do with climate change	Whole sample (n=292)	n=4 (1.4%)	n=2 (0.7%)	n=6 (2.1%)	n=62 (21.2%)	n=218 (74.7%)

I think that everyone ought to be given the opportunity to acquire the knowledge, values and skills that are necessary to live sustainably	Whole sample (n=292)	n=3 (1%)	n=1 (0.3%)	n=6 (2.1%)	n=71 (24.3%)	n=211 (72.3%)
I think that we who are living now should make sure that people in the future enjoy the same quality of life as we do today	Whole sample (n=292)	n=2 (0.7%)	n=6 (2.1%)	n=14 (4.8%)	n=70 (24%)	n=200 (68.5%)
I think that women and men throughout the world must be given the same opportunities for education and employment	Whole sample (n=292)	n=3 (1%)	n=1 (0.3%)	n=2 (0.7%)	n=31 (10.6%)	n=255 (87.3%)
I think that companies have a responsibility to reduce the use of packaging and disposable articles	Whole sample (n=292)	n=3 (1%)	N/A	n=2 (0.7%)	n=25 (8.6%)	n=262 (89.7%)
I think it is important to reduce poverty	Whole sample (n=292)	n=4 (1.4%)	n=1 (0.3%)	n=6 (2.1%)	n=43 (14.7%)	n=238 (81.5%)
I think that companies in rich countries should give employees in poor nations the same conditions as in rich countries	Whole sample (n=292)	n=4 (1.4%)	n=8 (2.7%)	n=24 (8.2%)	n=58 (19.9%)	n=198 (67.8%)

I recycle as much as I can	Whole sample (n=292)	n=4 (1.4%)	n=12 (4.1%)	n=3 (1%)	n=121 (41.4%)	n=152 (52.1%)
I always separate food waste before putting out the rubbish when I have the chance	Whole sample (n=292)	n=29 (9.9%)	n=38 (13%)	n=15 (5.1%)	n=65 (22.3%)	n=145 (49.7)
I have changed my personal lifestyle in order to reduce waste (e.g., throwing away less food or not wasting materials).	Whole sample (n=292)	n=6 (2.1%)	n=17 (5.8%)	n=23 (7.9%)	n=123 (42.1%)	n=123 (42.1%)
When I use a computer or mobile to chat, to text, to play games and so on, I always treat others as respectfully as I would in real life	Whole sample (n=292)	n=2 (0.7%)	n=4 (1.4%)	n=6 (2.1%)	n=42 (14.4%)	n=238 (81.5%)
I support an aid organisation or environmental group	Whole sample (n=292)	n=35 (12%)	n=49 (16.8%)	n=71 (24.3%)	n=65 (22.3%)	n=72 (24.7%)
I show the same respect to men and women, boys and girls	Whole sample (n=292)	n=3 (1%)	n=1 (0.3%)	n=1 (0.3%)	n=29 (9.9%)	n=258 (88.4%)
I do things which help poor people	Whole sample (n=292)	n=8 (2.7%)	n=20 (6.8%)	n=54 (18.5%)	n=122 (41.8%)	n=88 (30.1%)
I often purchase second-hand goods over the internet or in a shop	Whole sample (n=292)	n=15 (5.1%)	n=34 (11.6%)	n=29 (9.9%)	n=92 (31.5%)	n=122 (41.8%)
I avoid buying goods from	Whole sample (n=292)	n=11 (3.8%)	n=29 (9.9%)	n=50 (17.1%)	n=113 (38.7%)	n=89 (30.5%)

companies with a bad reputation for looking after their employees and the environment						
The world's climate is changing	Whole sample (n=292)	n=3 (1%)	n=2 (0.7%)	n=5 (1.7%)	n=52 (17.8%)	n=230 (78.8%)
The UK is already feeling the effects of climate change	Whole sample (n=292)	n=2 (0.7%)	n=7 (2.4%)	n=12 (4.1%)	n=87 (29.8%)	n=184 (63%)
Climate change is caused by human activities	Whole sample (n=292)	n=2 (0.7%)	n=6 (2.1%)	n=21 (7.2%)	n=88 (30.1%)	n=175 (59.9%)
Climate change is a global emergency	Whole sample (n=292)	n=3 (1%)	n=6 (2.1%)	n=17 (5.8%)	n=49 (16.8%)	n=217 (74.3%)
I have a responsibility to help tackle climate change	Whole sample (n=292)	n=5 (1.7%)	n=7 (2.4%)	n=13 (4.5%)	n=115 (39.4%)	n=152 (52.1%)
I am prepared to make changes to my lifestyle to help tackle climate change	Whole sample (n=292)	n=4 (1.4%)	n=5 (1.7%)	n=15 (5.1%)	n=123 (42.1%)	n=145 (49.7%)
I have made changes to my lifestyle to help tackle climate change	Whole sample (n=292)	n=4 (1.4%)	n=13 (4.5%)	n=26 (8.9%)	n=131 (44.9%)	n=118 (40.4%)
Tackling climate change is far down my list of priorities right now	Whole sample (n=292)	n=62 (21.2%)	n=104 (35.6%)	n=64 (21.9%)	n=44 (15.1%)	n=18 (6.2%)
The NHS has a responsibility to reduce its impact on climate change	Whole sample (n=292)	n=15 (5.1%)	n=11 (3.8%)	n=25 (8.6%)	n=88 (30.1%)	n=153 (52.4%)

The NHS is contributing to climate change	Whole sample (n=292)	n=13 (4.5%)	n=17 (5.8%)	n=65 (22.3%)	n=110 (37.7%)	n=87 (29.8%)
The NHS should make reducing its impact on climate change one of its top priorities	Whole sample (n=292)	n=19 (6.5%)	n=36 (12.3%)	n=65 (22.3%)	n=84 (28.8%)	n=88 (30.1%)
Allied health professions have a responsibility to reduce its impact on climate change	Whole sample (n=292)	n=14 (4.8%)	n=19 (6.5%)	n=18 (6.2%)	n=105 (36%)	n=136 (46.6%)
Allied health professions should make reducing their impact on climate change one of their top priorities	Whole sample (n=292)	n=18 (6.2%)	n=41 (14%)	n=64 (21.9%)	n=89 (30.5%)	n=80 (27.4%)
Allied health professions are contributing to climate change	Whole sample (n=292)	n=17 (5.8%)	n=22 (7.5%)	n=80 (27.4%)	n=113 (38.7%)	n=60 (20.5%)
It is challenging for HCPs to enable person centre care whilst promoting environmentally sustainability	Whole sample (n=292)	n=14 (4.8%)	n=53 (18.2%)	n=93 (31.8%)	n=99 (33.9%)	n=33 (11.3%)

Respondents were asked to select from a list which topics they would like included in their curricula, to enhance their learning related to planetary health and environmental sustainability. They were also asked to suggest additional topics. Topics are ranked in Table 8 in order of frequency with which they were selected across the whole sample, and according to professional group.

Table 7: Topics of interest for inclusion in pre-registration curricula, across the sample and according to professional groups

Whole sample (n=292)	Occupational therapy (n=113)	Speech and language therapy (n=43)	Physiotherapy (n=33)	Radiographers (n=28)	Dieticians (n=22)	Chiropodists/ Podiatrists (n=20)	Other (n=33)
Protecting nature and biodiversity (180)	Protecting nature and biodiversity (70)	How to take action on climate change (32)	The role of businesses and corporations in climate change (23)	Protecting nature and biodiversity (18)	Sustainable food options (16)	Protecting nature and biodiversity (14)	Gardening and growing (19)
Sustainable food options (165)	Climate justice (Protecting the most vulnerable people from climate change) (68)	Climate justice (Protecting the most vulnerable people from climate change) (28)	Sustainable energy (20)	Sustainable food options (18)	The role of businesses and corporations in climate change (16)	Reducing your plastic waste (14)	Climate justice (Protecting the most vulnerable people from climate change) (18)
The role of businesses and corporations in climate change (164)	Gardening and growing (62)	Sustainable food options (27)	Protecting nature and biodiversity (20)	The role of businesses and corporations in climate change (17)	Protecting nature and biodiversity (14)	Sustainable energy (13)	The role of businesses and corporations in climate change (16)
Climate justice (Protecting the most vulnerable people from climate change) (153)	How to take action on climate change (60)	Protecting nature and biodiversity (26)	Lobbying the government about climate change (18)	Sustainable buildings (15)	How to take action on climate change (12)	Sustainable food options (10)	Protecting nature and biodiversity (18)
How to take action on climate change (152)	Sustainable food options (60)	Lobbying the government about climate change (25)	Fast fashion / sustainable fashion (16)	Sustainable energy (14)	Gardening and growing (12)	How to take action on climate change (8)	Sustainable food options (18)
Gardening and growing (147)	The role of businesses and corporations in climate change (59)	The role of businesses and corporations in climate change (25)	Sustainable buildings (16)	How to take action on climate change (13)	Climate justice (Protecting the most vulnerable people from climate change) (9)	Lobbying the government about climate change (8)	Fast fashion / sustainable fashion (14)
Sustainable energy (147)	Sustainable energy (58)	Politics and policy about climate change (22)	Sustainable food options (16)	Reducing your plastic waste (13)	Fast fashion / sustainable fashion (9)	The role of businesses and corporations in climate change (8)	Lobbying the government about climate change (14)

Reducing your plastic waste (134)	Reducing your plastic waste (55)	Reducing your plastic waste (21)	Gardening and growing (16)	Fast fashion / sustainable fashion (11)	Sustainable buildings (9)	Gardening and growing (8)	Politics and policy about climate change (14)
Politics and policy about climate change (128)	Politics and policy about climate change (53)	Sustainable energy (20)	Politics and policy about climate change (16)	Gardening and growing (10)	Sustainable energy (9)	Climate justice (Protecting the most vulnerable people from climate change) (7)	How to take action on climate change (13)
Fast fashion / sustainable fashion (124)	Fast fashion / sustainable fashion (49)	Gardening and growing (20)	How to take action on climate change (14)	Lobbying the government about climate change (10)	Reducing your plastic waste (8)	Fast fashion / sustainable fashion (7)	Sustainable energy (13)
Sustainable buildings (124)	Sustainable buildings (49)	Fast fashion / sustainable fashion (18)	Climate justice (Protecting the most vulnerable people from climate change) (13)	Politics and policy about climate change (10)	Politics and policy about climate change (7)	Politics and policy about climate change (6)	Reducing your plastic waste (12)
Lobbying the government about climate change (124)	Circular economy (43)	Sustainable buildings (17)	Circular economy (12)	Climate justice (Protecting the most vulnerable people from climate change) (10)	Lobbying the government about climate change (7)	Sustainable buildings (6)	Sustainable buildings (12)
Circular economy (102)	Lobbying the government about climate change (42)	Circular economy (16)	Reducing your plastic waste (11)	Circular economy (9)	Circular economy (7)	Circular economy (4)	Circular economy (11)
Additional:	*How to pressure businesses to make change *Thorium-based nuclear energy	*Reducing food waste/buying sustainable food *Overall / predicted impact	*Resilience and community building in the face of inevitable climate warming (e.g. hurricane-proof polytunnels for growing food *Leadership and morale boosting in the face of feelings of apocalypse	*I have enough to do and climate change is the absolute bottom of my priority *We don't need to learn more; we need to act NOW on what we already know	*Sustainable fashion that's cheaper *Sustainable transport and infrastructure	*Renewable energy such as wind power and hydro power	

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