Climate Change and Sustainability Toolkit for Public Health Registrars

2025

FPH Sustainable Development SIG

Greenwich Park, August 2022

Credit: Alisdare Hickson / Climate Visuals

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Foreword

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Kayakers moving large bales of marine plastic waste totalling one ton, collected from the canal and the river in Exeter.

Foreword

This toolkit has been developed by registrars for registrars, with support from the Faculty of Public Health (FPH)'s Sustainable Development Special Interest Group. Toolkit working group members: Alyssa Ralph (project leader), Rachel Cullum, Alice McGushin, Pankhuri Sahare, Hannah Booth and Alice Harpur. Each placement chapter has been reviewed by a public health consultant with experience working on environmental issues within public health.

Chapter reviewers:

- Local government chapter: Eleanor Roaf, public health consultant
- Health protection chapter: Paul Fisher, public health consultant
- Healthcare public health chapter: Frederike Garbe, public health consultant and Stella Cockerill, NHS England net zero programme lead for East of England
- Academic chapter: James Smith, public health consultant

We are extremely grateful to the chapter reviewers for providing their time and expertise to strengthen this toolkit. We would also like to thank the individuals who contributed case studies, which demonstrate the breadth of environmental public health work registrars can undertake.

Introduction

Why was this toolkit written?

It is important that public health professionals have the skills to tackle the health effects of climate change and to consider the environmental sustainability of new and existing services.

The Faculty of Public Health's Climate and Health Strategy[1] vision is for the public health workforce to "lead on strategies to protect health and wellbeing for current and future generations", a sentiment supported by the national public health training programme requirement for registrars to demonstrate leadership in environmental sustainability[2].

However, public health consultants, who supervise registrars during training, often have limited experience in this area, leading to a lack of inclusion of climate change and sustainability in public health training.

This toolkit has therefore been created to support registrars in developing knowledge, expertise and leadership skills around the intersections between environmental and public health.

How should the toolkit be used?

The toolkit is structured by common UK public health training placements (local government, health protection, academic and healthcare public health). Therefore, registrars undertaking one of these placement may find the chapter relevant to that placement most helpful.

Since many types of public health work are undertaken in multiple settings (for example, healthcare public health work may be undertaken in local government or in an NHS organisation), the toolkit should be used flexibly, choosing from the sections that are most applicable to the registrar's work. The toolkit is also likely to provide information relevant to work outside these core placements.

Each placement chapter provides an overview of how work in that placement overlaps with climate and sustainability and suggests ways to include climate and sustainability in projects to fulfil learning outcomes. Where possible, example case studies from public health registrars have been included (with full case studies published in the appendix).

Feedback and contribution

This is the first version of the toolkit and we would like to continue to improve it, to make the resource as useful as possible for registrars. Links to two forms are therefore provided at the end of every chapter: 1) a feedback form for the toolkit, and 2) a case study submission form. Please submit case studies on any piece of work carried out during training that has linked environmental and public health. If you would like to be involved in developing future iterations of the toolkit, please contact the FPH Sustainable Development Special Interest Group via sdsig@fph.org.uk.

[1] Faculty of Public Health Climate and Health Strategy 2021-25. URL: https://www.fph.org.uk/media/3401/fph-climate-health-strategy-final.pdf

[2] Public Health Specialty Training Curriculum 2022, Faculty of Public Health. URL: https://www.fph.org.uk/media/4ojeo5bk/public-health-curriculum-2022-v13_final.pdf

Key definitions

Term	Definition
Adaptation	Anticipating the adverse effects of climate change and taking appropriate action to prevent or minimise the damage they can cause or taking advantage of opportunities that may arise. It has been shown that well planned, early adaptation action saves money and lives in the future. (1)
Anthropocene epoch	An unofficial unit of geological time, used to describe the most recent period in Earth's history when human activity started to have a significant impact on the planet's climate and ecosystems. (2)
Climate injustice	Black, Indigenous and People of Colour and socioeconomically disadvantaged communities are disproportionately affected by environmental health hazards, systemic and structural racism and disinvestment, negatively impacting their health and well-being. (3) The Intergovernmental Panel on Climate Change (IPCC) highlights three principles of climate justice: distributive justice, procedural justice and recognition. Distributive justice refers to the allocation of burdens and benefits among individuals, nations and generations. Procedural justice refers to who decides and participates in decision-making. Recognition entails basic respect and robust engagement with, and fair consideration of, diverse cultures and perspectives. (4)
EcoHealth	An approach that integrates natural and social sciences to understand and manage ecosystems and the interactions among human, animal, and environmental health. (5) *See also planetary health and one health.*[3]
Ecological economics	An alternative to neoliberalist economics. Argues that excessive resource extraction has led to many of our current environmental problems. Prioritises other indicators of economic success than growth in gross domestic product (GDP). (6) Underpins several economic discourses, including doughnut economics, a framework for creating an economy within both social and planetary boundaries. (7)
Environmental determinants of health	Regional, national, and local environmental factors that influence human physical, chemical, and biological health, and all related behaviours. (8)
Global health	An area for study, research, and practice that places a priority on improving health and achieving health equity for all people worldwide. (9)

[3] For discussion about the similarities and differences between EcoHealth, One Health and Planetary Health, see (5) and (46).

Health co-benefits	The benefits to health of climate action. Health co-benefits can arise through several pathways, including through reduced air pollution, increased physical activity, and dietary change, and provide added justification for policies to cut greenhouse gas emissions. (10)
Loss and damage	Refers to the negative effects of climate change that occur despite mitigation and adaptation efforts. (11)
Mitigation	Making the impacts of climate change less severe by preventing or reducing the emission of greenhouse gases into the atmosphere. Mitigation is achieved either by reducing the sources of these gases — e.g. by increasing the share of renewable energies or establishing a cleaner mobility system — or by enhancing the storage of these gases — e.g. by increasing the size of forests. (12)
Neoliberal economics	The dominant economic paradigm of our time. An economic ideology that focuses on sustained growth in gross domestic product (GDP) as a means of achieving human progress. Emphasises free markets, deregulation and privatisation. (13)
One health	An integrated, unifying approach that aims to sustainably balance and optimise the health of people, animals and ecosystems. One health recognises that the health of humans, domestic and wild animals, plants, and the wider environment (including ecosystems) are closely linked and interdependent. (14) *See also ecohealth and planetary health.*[4]
Planetary boundaries	A set of nine thresholds for Earth systems (air pollution, ozone layer depletion, climate change, ocean acidification, chemical pollution, nitrogen and phosphorus loading, freshwater withdrawals, land conversion and biodiversity loss) identified by Rockström and colleagues that must not be transgressed in order to preserve human life. (15)
Planetary health	The achievement of the highest attainable standard of health, wellbeing, and equity worldwide through judicious attention to the human systems – political, economic, and social – that shape the future of humanity and the Earth's natural systems that define the safe environmental limits within which humanity can flourish. Put simply, planetary health is the health of human civilisation and the state of the natural systems on which it depends. (16) *See also ecohealth and one health.*[5]

[4] For discussion about the similarities and differences between EcoHealth, One Health and Planetary Health, see (5) and (46).
[5] ibid.

Tips for all placements

Some general tips for successfully integrating climate change and environmental sustainability work into all placements are as follows:

1. **Make a plan with your supervisors**
    - The vast majority of public health training curriculum learning outcomes (LOs) can be achieved with environment and health work. The curriculum provides an environment-related project example for every LO.
    - Speak with your educational/clinical/academic supervisor to plan involvement in one or more sustainability projects during your placement. Build this into your workplan, learning agreement etc.
2. **Make early links with experts or others who are passionate**
    - Seek out individuals and teams within your placement who are doing environment and health work. If the relevant individuals with expertise are not present within your placement location, reach out to external stakeholders to collaborate with them. A key strength of public health is systems working and the ability to bring together external stakeholders – and capacity building through collaboration is crucial to climate change and sustainability work.
    - Identify regional and local sustainability leads and other key advocates for climate change and sustainability to understand the local landscape.
    - Identify a permanent member of staff to continue any longer-term projects that are likely to continue following the placement.
3. **Build your own knowledge and support network**
    - Join the FPH's Sustainable Development Special Interest Group to gain support and knowledge from other public health professionals across the UK.
    - Identify any pre-existing sustainability-related interest groups or events that you could join or attend to increase your knowledge and involvement in the area.
    - Read pre-existing published literature in your area(s) of interest, speak to academics who have published in these areas and brainstorm ideas for further exploration. The UKHSA's Health Effects of Climate Change (HECC) in the UK: 2023 report[6] provides robust information on the health effects of environmental exposures from climate change in the UK, plus implications for public health interventions to be delivered by multiple organisations.
    - Identify local green plans and understand regional priorities that can then be incorporated into projects.
    - Identify any regional or local green newsletters relevant to the placement/organisation.
4. **Focus on advocacy**
    - Consider where there are opportunities to do advocacy work around changing organisational and staff behaviours, for example, reducing road miles, publicising the cycle to work scheme, encouraging energy efficiency practices etc. Develop and disseminate information about quick wins for reducing greenhouse gas emissions in the workplace and at home.

[6] Health Effects of Climate Change (HECC) report, 2023. URL: https://www.gov.uk/guidance/health-effects-of-climate-change-hecc-report

- Carry out advocacy work related to the specifics of the placement, for example, investigating the practicality of disinvestment in fossil fuel companies, embedding sustainability into infection prevention control, evaluating the environmental co-benefits of public health interventions.
- Advocate for sustainability to be a regular item on meeting agendas (both internally and with providers)

5. Share information and knowledge to upskill staff

- Communicate and share reports/journal papers relevant to climate change – for example, a sustainability focused journal club.
- Consider setting up regular team meetings, e.g., a 'green coffee morning', where staff can share ideas and thoughts about climate change and sustainability in a non-judgemental space
- Encourage staff to sign up to any green newsletters
- Develop relevant CPD sessions around climate change, including ensuring local teams are aware of regional green priorities and how to implement these in local work

6. Think strategically

- Take advantage of any strategic opportunities that arise while you are in your placement. For example, if there is an organisational need to develop a strategy or plan, think about how sustainability will interplay with this and advocate for a 'sustainability in all policies' approach.
- Sometimes there may be an opportunity to bring in sustainability and climate change related issues where it initially appears less than directly relevant (for example, when working on air quality issues). Take any opportunities available to do this.

7. Demonstrate personal leadership

- Become a Sustainability Representative for the registrars in your deanery. This could involve setting up regular meetings for registrars to share project opportunities or carry out joint projects, providing peer-to-peer support, and inviting external speakers. You could survey the registrars in your region to determine the remit of your role.
- Hold climate change sessions with consultants and registrars across your region, e.g. including local authority, UKHSA, academia, OHID, NHS etc, to foster system working
- Demonstrate personal leadership and sustainable habits where possible: use your car less and walk/cycle more, go on one less aeroplane each year, eat more meat-free meals, reduce food waste, put on a jumper or blanket instead of the heating, and reduce, re-use and recycle.
- Be vocal and ready to champion sustainability wherever possible to empower others to do the same, in a way that is appropriate for your level and seniority and position/workplan/the culture within the placement.

General project ideas

Each chapter provides detail on the links that can be made between placement work and climate change and sustainability. However, a few general ideas for projects are as follows:

- Carry out a stakeholder analysis to increase the chance that project objectives are met, for example to support the development of an organisation's sustainability strategy. This may involve identifying key stakeholders and their influence on the project, then developing strategies for engaging with them.
- Use a framework to consider different dimensions of and to structure a project, such as the WHO's operational framework for building climate resilient and low-carbon health systems[7] or the framework for sustainable health systems published in the Lancet[8].
- Map work being carried out in a placement to the United Nation's Sustainable Development Goals (SDGs)[9]. This involves aligning existing policies, plans, and priorities with the SDGs to identify areas where the organisation is contributing to achieving the SDGs and where more action might be needed.
- Carry out an audit against a set of environmental standards. For example, the Task Force on Climate-related Financial Disclosures sets out recommendations for public sector bodies to follow and against which their work can be audited.
- Carry out climate and health teaching or training for fellow registrars, wider placement colleagues or clinicians in your deanery, to increase capacity. *See also 'teaching' section within academic placements chapter*.
- Take a systems approach to a piece of work to maximise its impacts. This may involve setting out the system within which you are working and its limits, mapping relationships between multiple influences on health and the environment within the system, identifying points of potential intervention, and developing interventions that maximise positive outcomes and minimise negative consequences.[10]

Dedicated climate and health placements

Climate and health work can be carried out in any placement and can contribute to most learning outcomes. However, registrars may also carry out dedicated climate and health placements and projects in the following locations:

- Faculty of Public Health's Sustainable Development Special Interest Group
- Environment Agency
- UK Met Office
- UKHSA's Centre for Climate and Health Security (S*ee Health Protection chapter for more detail)*

[7] Operational framework for building climate resilient and low carbon health systems, WHO, 2023. URL: https://www.who.int/publications/i/item/9789240081888
[8] MacNeill et al, 2021. Planetary health care: a framework for sustainable health systems (47)
[9] United Nations Sustainable Development Goals. URL: https://www.undp.org/sustainable-development-goals
[10] Systems-based approaches in public health: Where next? Canadian Academic of Health Sciences. URL: https://cahs-acss.ca/wp-content/uploads/2021/09/CAHS-Report-EN-Sep-16.pdf

Local government placements

Credit: Credit: Aji Styawan / Climate Visuals

A view of the solar panel system on the rooftop of Istiqlal Mosque area in Jakarta, Indonesia, November 2023.

1. Local government placements

1.1 Introduction

Local public health teams work on a wide range of issues, often in partnership with other local government departments, healthcare providers, and professionals from other sectors, including environmental health, housing, transport, and planning. Given the breadth of public health work at local level, registrars working in local public health teams are often in an optimal position to learn about and advocate for environmental sustainability in their work.

This chapter aims to be applicable to registrars undertaking UK local public health placements regardless of training location. Given that public health structures differ across England, Scotland, Wales and Northern Ireland, we do not refer to specific organisations and agencies, which exist only in some areas and are liable to change, and instead provide more generic topic and project-based guidance.

1.2 Sustainability and local government

It is important that public health teams have processes in place to ensure that both the public health effects of environmental issues, and the environmental impacts of public health work, are systematically considered.

Public health registrars can advocate for and support each of the below activities to take place within their local public health teams[11]:

- Processes to consider environmental impact whilst developing and signing off new policies, strategies and programmes.
- Ensuring that one or more members of the public health team has responsibility for promoting / considering environmental sustainability.
- Consideration of environmental impact when writing service specifications.
- Consideration of environmental policies of providers as part of commissioning processes, such as mention within the social value statement.
- Setting environmental sustainability or becoming carbon neutral as a strategic priority by public health and setting actions to achieve this.
- Ensuring the most important public health impacts of climate change for the local government are included in their strategy, with links made to other departments/services.
- Public health action to raise the profile of the importance of climate impacts on health within local government.
- Public health input into the local government climate change plan.

[11] Measures included in a local authority climate change, sustainability and public health framework created by East of England public health registrars. Publication: Loud et al, Climate change and public health: An evaluation framework for local government, 2024. (48)

- Ensuring public health representation on the local government climate change committee.
- Ensuring the local government climate plan recognises and proposes actions on key impacts of climate change on health locally (e.g. air pollution / transport / active travel, housing / insulation / fuel poverty, cold snap/ flooding / heat waves).

Case study 1, Samuel Hayward: *Incorporation of sustainability into procurement contracts*

The challenge: North Somerset Council declared a "climate emergency" in 2019. There had previously been a lack of incorporation of sustainability into procurement contracts.

The solution: We identified the opportunity to embed sustainability into the procurement of the public health nursing contract.

The impact: This provided a practicable and tangible example for others to follow, and for the Council to learn from.

Lessons learned: To change systems you need to identify leverage points and focus action in those areas to have bigger impact. That leveraged action then cascades change elsewhere.

See Appendix for full case study.

Case study 2, Emily Loud: *Climate emergency network impacts in local authority*

The challenge: There was a lack of senior leadership and commitment to tackling the climate emergency as a public health priority within the local authority public health team.

The solution: I identified people in the department who had an interest (not a remit) in the climate emergency and set-up a network between them and members of the local authority green teams.

The impact: The network continues to meet and has identified several joint pieces of work: an opportunity to include climate and health within a joint strategic needs assessment; staff carbon literacy training; a new NHS procurement policy that gave weighting to sustainability.

Lessons learned: You need a coalition of people to push the climate emergency agenda and to make the effort itself sustainable. Ideally this should include a group of people from different departments to build a system-wide community.

See Appendix for full case study.

Local government policy is also hugely influential when it comes to public health. Links between local public health teams and local government will differ according to training location. However, public health registrars may be able to encourage greater local government action and leadership in climate change and sustainability, using the following checklist of actions to guide their activity[12]:

- Local government should have declared a climate emergency.
- Local government should have assigned an elected member to lead for climate change.
- Local government should have assigned an officer for climate change/sustainability.

[12] Measures included in a local authority climate change, sustainability and public health framework created by East of England public health registrars. Publication: Loud et al, Climate change and public health: An evaluation framework for local government, 2024. (48)

- Public Health teams should work with both the elected member and with the Council officers to promote effective action; in particular, providing information on high impact evidence-based actions.
- Local government should have established a clear link with sustainability leads in public sector organisations locally, for example including the National Health Service Integrated Care Boards, and be exploring collaboration opportunities.
- Local government should calculate and accurately report its carbon footprint.
- A local government climate change plan should exist and be being monitored.
- Local government should have a policy not to invest in fossil fuels.
- There will be opportunities for public and community engagement
- The Director of Public Health's Annual Report is a good vehicle for including advice and information on climate change impacts, mitigation, and adaptation linked to the topic of the report (or the whole report could be on this)
- Staff should have training on the importance of climate change on public health.
- Travel / commuting policies should recognise the importance of sustainable travel / remote working.
- Office factors should be considered (if relevant) – lights / computers off at end of day, recycling, use of renewable energy.

Case study 3, Emily Tweed: *Involvement in local development consultations*

The challenge: There was an opportunity to increase the involvement of the health improvement team in spatial planning and built environment through responding to local and regional development consultations.

The solution: The registrar led a rapid health impact assessment of a local development plan, working with both the health board's health improvement team and with the local authority's planning team.

The impact: Closer relationships with three local authority areas were formed. Led to the public health team's involvement in the development of planning consultations, increasing opportunity for influence.

Lessons learned: Talk about sustainability in a way that links with partners' areas of work and their priorities/motivators; be open to unforeseen opportunities; focus on relationship building, not just the immediate piece of work.

See Appendix for full case study.

1.3 Climate change, sustainability and local public health work: making the links

Registrars should initially identify key individuals and teams working on environment and health within local government. For example, identify which director holds the lead for sustainability, air pollution and climate change, and which councillor leads on these areas. Identify if there are separate teams (some councils are big enough for separate adaptation

and mitigation teams). Public health teams have a role and should be able to help the registrar, but registrars can also consider spending time outside of the public health department. Also, there are often grants within local government for climate change work that registrars can help apply for.

Common areas of local public health work in which registrars may be involved, and especially areas in which there is major overlap with climate and sustainability, are provided in Table 1. The ways in which each function links with climate change and sustainability are outlined next.

Table 1: Common local public health team functions

Function(s)	Brief description
Health improvement	Assessing the needs of the local population, including reducing health inequalities, evaluating public health programmes and working to improve health-related behaviours, for example, around smoking, alcohol intake, diet or physical activity.[13]
Public heath commissioning	Local public health teams have responsibility for commissioning (and sometimes providing) a number of core public health services. These include, for example, sexual and reproductive health, health visiting and school nursing, stop smoking, drugs and alcohol, weight management.
Healthcare public health	Commissioning and evaluating health services for the local population.
Health protection	Protecting the population from health threats, emergencies, and disasters. Developing emergency response plans, coordinating preparedness efforts, and providing guidance on managing public health emergencies.
Built environment	Partnership work between public health and transport, planning, housing and homelessness teams to improve housing, transport, places of education and places of work and leisure.[14]
Local food system	Work to increase access to healthy food for the local area and reduce dietary inequalities. This may include work around provision of healthy food and cooking skills for deprived communities, healthy school meals, and collaboration with local food partnerships and networks.[15]
Commercial determinants of health	Working with businesses in the local area to improve health, for example, through changing products being sold in food and drink outlets, business pledges for wider services (e.g. a supermarket chain funds a local sports facilities), or by providing healthier workplaces.[16]

[13] Key areas of work in public health, Faculty of Public Health. URL: https://www.fph.org.uk/what-is-public-health/key-areas-of-work-in-public-health

[14] The Association of Directors of Public Health Policy Position: Built Environment. URL: https://www.adph.org.uk/wp-content/uploads/2023/10/Built-Environment-Policy-Position-Statement-2023.pdf

[15] Public health annual report 2023: Supporting communities in difficult times, Local Government Association. URL: https://www.local.gov.uk/publications/public-health-annual-report-2023-supporting-communities-difficult-times

[16] Localising the Public Health Responsibility Deal – a toolkit for local authorities, Department of Health. URL: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/193106/130408-RD-Toolkit-Web-version.pdf

Population health intelligence	Combining intelligence, evidence, and research to translate data on a given population into effective public health action.

1.3.1 Health improvement

Local public health teams will generally be responsible for the health improvement strategy for their local area, usually overseen by the Health and Wellbeing Board and informed by the Joint Strategic Needs Assessment. The Health and Wellbeing Board, and the Joint Strategic Needs Assessment, should give opportunities for including actions to mitigate and/or adapt to climate change. There are opportunities to identify differential climate change impacts on different groups through these processes, and to develop appropriate mitigation and adaptation responses. Registrars may undertake public and community engagement as part of this work.

There are also opportunities, when carrying out health improvement work, to stress the co-benefits that interventions or campaigns to improve health and wellbeing (for example, encouraging physical activity and active travel) may have for the local environment (reducing emissions and improving air quality) and vice-versa.

1.3.2 Public health commissioning

Public health teams in local authorities are responsible for commissioning services such as weight management, stop smoking, and drug and alcohol services. There are opportunities to use the commissioning process to build mitigation and adaptation actions into service specifications. The FPH Sustainable Development SIG has produced some guidance on sustainable planning, procurement and commissioning.[17] This includes a definition of sustainable commissioning as an approach that takes account of environmental considerations, utilises local assets and empowers local people and communities.

There is potential to use commissioning and procurement levers to encourage suppliers to incorporate environmental sustainability into their bids. The Public Services (Social Value) Act 2012 requires public authorities (including local authorities) to 'have regard to economic, social and environmental wellbeing in connection with public services contracts'.[18] The Local Government Association (LGA) and the Social Value Portal have put together a 'TOMS framework' for local councils to review social value, which includes the theme of 'protecting and improving the environment'.[19,20]

More broadly, local authorities can be considered 'anchor institutions', organisations with sizeable assets and the ability to significantly contribute to both public and environmental health of the local community. (17) Registrars can consider framing their work in local authorities in terms of supporting anchor priorities, with a focus on environmental impact.

[17] Sustainable Planning, Procurement and Commissioning, Sustainable Development Special Interest Group. URL: https://www.fph.org.uk/media/3127/a7-fph-sig-planning-procurement-commissioning-final.pdf
[18] Public Services (Social Value) Act 2012. URL: https://www.legislation.gov.uk/ukpga/2012/3
[19] What is social value? (Procurement Act 2023). URL: https://www.tussell.com/gov/blog/what-is-social-value
[20] A Social Value Toolkit for District Councils, Local Government Association. URL: https://www.local.gov.uk/sites/default/files/documents/District%20Councils%20Social%20Value%20Toolkit%20Final_0.pdf

1.3.3 Health protection

See Health Protection chapter (page 22).

1.3.4 Healthcare public health

See Healthcare Public Health chapter (page 40).

1.3.5 Built environment

Public health teams can encourage a built environment that is good for both public and environmental health. Public health can be involved in local planning by[21]:

- Engaging in the planning process to inform planning policy development, for example by responding to planning applications and planning policy consultations, and carrying out Health Impact Assessments of development plans[22].
- Making recommendations to planning authorities and developers on how to positively incorporate health and wellbeing into proposals.
- Not only focusing on health and wellbeing outcomes. For example, creating a safe environment for active travel, and ensuring there are good public transport links, should reduce air pollution and physical inactivity and thereby improve health. However, it will also reduce congestion and social isolation, and improve educational and employment opportunities; some of these measures may be of more interest to the planning team / local government than health impacts.

i. Buildings[23]

Buildings may include housing, health and social care infrastructure, and places of education, work and leisure. Public health can advocate for new developments to be built sustainably, for example by including the features provided in Table 2.

Table 2: Features of sustainable buildings

Feature	Description
Climate change adaptation	Developments should be adaptable to our changing climate to be sustainable and protect human health. A framework for local and regional adaptation action is provided in the Climate Change Adaptation by Design report[24].
Carbon reduction	All developments should be designed to minimise greenhouse gas emissions, through: • Consideration of overall layout and orientation to reduce emissions and energy use, e.g. creating a passive solar design and natural ventilation

[21] Public Health and planning, Hertfordshire County Council. URL: https://www.hertfordshire.gov.uk/services/health-in-herts/healthy-places/the-role-of-public-health-in-planning.aspx
[22] Health Impact Assessment in spatial planning, Public Health England, 2020. URL: https://assets.publishing.service.gov.uk/media/5f93024ad3bf7f35f184eb24/HIA_in_Planning_Guide_Sept2020.pdf
[23] Cambridge Local Plan, Cambridge City Council, 2018. URL: https://www.cambridge.gov.uk/media/6890/local-plan-2018.pdf
[24] Climate change adaptation by design, TCPA, London, 2007. URL: https://www.preventionweb.net/files/7780_20070523CCAlowres1.pdf

	• Minimising the energy demands of new buildings • Having an energy efficient supply through low carbon technologies, and • Using energy from new, renewable energy sources • Ensuring availability of sustainable modes of transport.
Water management	All developments should be designed to optimise the opportunities for efficient water use, reuse and recycling, including integrated water management and water conservation.
Site waste management	Developments should be designed in a way that reduces the amount of construction waste, and maximises the reuse and recycling of materials at all stages of a development's lifecycle
Use of materials	Principle considerations are as follows: • Responsible sourcing; • Use of secondary materials, for example from existing buildings following demolition; • Using materials with a low embodied carbon impact; • Materials should pose a low risk to constructions workers and occupants e.g. use materials with zero or low volatile organic compound.

Some groups of individuals are more likely to live in poorly adapted and energy-inefficient housing or be homeless. These groups will be more likely to face housing-related environmental hazards, including but not limited to the following:

- Cold, e.g. due to fuel poverty, inadequate energy efficiency
- Heat, e.g. due to large south facing aspect, poor ventilation
- Damp and mould, e.g. due to poor ventilation, overcrowding
- Flooding, e.g. due to higher risk in coastal communities where inequalities are more pronounced[25]
- Homelessness leads to higher exposure to environmental harms, including heat, cold, air pollution.

All these can have detrimental physical and mental health effects. Building sustainable housing accessible to these groups can help to redress inequalities.

ii. Green and blue spaces:

Living in places with access to green and blue spaces can lead to better mental and physical health and provide opportunities for social inclusion.[26] Green and blue spaces are often not equitably spatially or socially distributed, and therefore public health work to increase access to these spaces is an important tool to reduce health inequalities.

[25] Social deprivation and the likelihood of flooding, Chief Scientist's Group report, Environment Agency, 2022. URL: https://assets.publishing.service.gov.uk/media/6270fe448fa8f57a3cdbbeb9/Social_deprivation_and_the_likelihood_of_flooding_-_report_2.1.pdf

[26] Hunter al, 2023. Advancing urban green and blue space contributions to public health. (49)

Ways in which local green and blue space can be improved by local public health teams in partnership with local government[27]:

- Consider local green (and blue) space to be critical assets for maintaining and supporting health and wellbeing in local communities.
- Ensure that local policies and strategies are informed by evidence of need for sufficient access to greenspace
- Prioritise improving access to greenspace and creating greener communities especially in areas of deprivation or where there is poor or unequal access, as part of the wider plan to reduce health inequalities locally.
- Support meaningful engagement across local government functions and the community to understand the actual and potential local benefits of greenspace and reveal the complex and diverse ways greenspace is thought about and used.
- Consider whether a formal valuation of benefits is necessary to strengthen the case for the creation, revitalisation and maintenance of greenspace. This may be done using monetary, non-monetary or a combination of valuation techniques. Natural capital accounting is one approach supported by Government.
- Identify and factor in resilient funding arrangements for the maintenance of greenspace as early as possible, so that it can continue to provide benefits in the long term.
- Establish interventions, such as green social prescribing initiatives, that will support people who do not use greenspace to begin using it.
- Work with local NHS systems and professionals, including Sustainability and Transformation Partnerships and Integrated Care Systems, to promote the role greenspace plays in both individual and population health outcomes.
- Develop persuasive, evidence-informed case studies that highlight the impact that accessible greenspace has on local health outcomes, especially for disadvantaged groups. Monitoring and evaluating local changes in access to greenspace, in conjunction with health data over time, will improve understanding of what works, for whom and how.
- Support robust evaluation of local greenspace interventions to help build a broader evidence base

iii. Transport

Transport is currently the biggest emitter of carbon of any sector in the UK.[28] Public and environmental health will both improve through decarbonising transport and promoting active travel.

Public health teams can work with planning teams to increase the healthiness and sustainability of transport systems. The following features should be considered when planning transport systems[29]:

[27] Improving access to greenspace, A new review for 2020, Public Health England. URL: https://assets.publishing.service.gov.uk/media/5f202e0de90e071a5a924316/Improving_access_to_greenspace_2020_review.pdf
[28] Toolkit: Decarbonising transport, Local Government Association. URL: https://www.local.gov.uk/decarbonising-transport
[29] A healthy and sustainable transport system, The Health Foundation. URL: https://www.health.org.uk/sites/default/files/2019-03/190325_THF_Infographic_No.7_Transport_AW03.pdf

1. The transport system should support safe and community-friendly spaces, with a view to improving health and connectedness, and decreasing social isolation. For example, new transport provision should enable easier and safer access to shops, schools and other amenities.
2. The transport system should enable active travel and public transport use, thereby reducing road congestion and air pollution, and enabling people to incorporate physical activity into their daily lives.
3. The transport system should be accessible and efficient for everyone. Individuals on lowest incomes rely on public transport far more than those on higher incomes, and therefore high cost of transport has the potential to widen inequalities.
4. The transport system should minimise harmful impacts on the environment and on health. Currently, transport is the largest source of greenhouse gas emissions in the UK, and also produces particulate matter, noise and light pollution. Research has shown that the effects of traffic have a greater impact on households in poverty than those that are more affluent, but that more affluent households contribute most to traffic pollution through owning greater numbers of vehicles and generating higher emissions.[30]

iv. Air pollution

Often connected with transportation, air pollution is a major environmental contributor to cardiovascular disease, lung cancer and respiratory diseases for the UK population.

Public health teams can work with partners in local government to improve air quality. General approaches to interventions to improve outdoor air quality recommended by Public Health England are as follows[31]:

1. Taking a hierarchical approach, by prioritising measures to prevent or reduce pollution over those that reduce air pollution once it has occurred or rely on avoiding existing pollution.
2. Adopting a 'net health gain' principle in any new policy or work programme which affects air pollution, thereby ensuring that any development delivers an overall benefit to public health.
3. Embedding evaluation in the design and costing of all future interventions, to systematically gather evidence to inform best practice in the future.

Specific interventions proposed by Public Health England to improve air quality are given in table 3.

[30] Barnes et al, 2017. An Environmental Justice Analysis Of Exposure To Traffic-related Pollutants In England And Wales. (50)
[31] Review of interventions to improve outdoor air quality and public health: Principal interventions for local authorities, Public Health England, 2020. URL: https://assets.publishing.service.gov.uk/media/5fbb876be90e077edb1e3678/Principal_interventions_for_local_authorities-air_quality_public_health.pdf

Table 3: Interventions to improve air quality

Type of intervention	Detail
Vehicle/fuel interventions	Evidence shows the following to be effective in improving air quality: • Promotion of low and zero-exhaust emission vehicles, particularly electric vehicles • Low Emission Zones (LEZ) if combined with the newer emission standards of road vehicles (Euro 6) • Traffic management interventions, e.g. road pricing and access restrictions • Active travel interventions may not improve air quality significantly but benefit public health outcomes through physical activity • Road transport interventions should be combined as individually they often lead to a small reduction in road vehicle emissions • Aviation sector: electrification of Ground Support Equipment, reduction in Auxiliary Power Units, pushback control, take-off thrust reduction and alternative aviation jet fuels • Maritime sector: regulation of the sulphur content in marine fuels can lead to sulphur dioxide emission reduction; fuel-based interventions can reduce other pollutants • Rail sector: introduction of bi-mode trains (diesel/electric hybrid) and electrification of the fleet would be effective measures at reducing emissions • The greatest impact on reducing emissions from road transport and improvement in public health outcomes is from the co-implementation of a package of policy measures (transport and non-transport related interventions) designed according to the local area's requirements, e.g. a low emission zone co-implemented with appropriate retrofit or scrappage schemes.
Planning/structural design interventions	• Interventions with highest potential to be effective are related to traffic. Driving restrictions lead to the largest and most consistent reductions in air pollution levels. • Benefits are gained from co-implementation of multiple measures that provide/improve green and active travel infrastructure, prioritise road safety, provide public transport and discourage travel in private cars, together with policies focussing on reducing the emissions of vehicles Green infrastructure: can improve air quality, decrease health inequalities, impact positively on urban heat islands and reduce the negative impacts of flooding.
Industrial interventions	• Since public health benefits of improved air quality occur even when ambient air pollutants are reduced below air quality

	standards, a shift in emphasis from compliance with nationally set limit values is required.
	• Approaches that account for changes in population level exposure rather than changes in emissions is desirable.
	• Industrial and regulatory interventions that may provide highest public health benefits include:
	  o Diffuse and secondary dust abatement
	  o Primary and secondary nitrogen oxides and sulphur oxide abatement
	  o Installation concentration limits: BAT-based permitting
	  o Inspections and enforcement actions

Agricultural interventions	• Farming interventions found to reduce ammonia emissions include urease inhibitors and slow-release nitrogen (N) fertilisers; slurry acidification; low NH3 emission storage and spreading; air filtration systems; and low protein feeding. • Exhaust air scrubbing and biofilters likely to provide greatest public health benefit • Strategic tree planting improves public health whilst reducing health inequalities • Other agricultural interventions with the potential to improve both public health include: choice of litter material; change of cattle diet; poultry manure removal time; low emission slurry spreading; manure/slurry storage methods; rapid incorporation of solid manure; livestock building design; manure additives.
Behavioural interventions	• The highest potential to improve air quality and public health outcomes is associated with combining behavioural interventions with other policy or infrastructure-based interventions, (e.g., improving public transport or cycling infrastructure and then using behavioural interventions to maximise its use) • For most behavioural interventions, the effectiveness to reduce emissions of air pollution is likely to be low and uncertainty around effectiveness is high. • Three interventions have the greatest likelihood of public health benefit: public engagement; eco-driver training and investment in public transport. • Exposure reduction programmes can improve inequalities as well as public and environmental health.

1.3.6 Local food system

Unhealthy food consumption is a major risk factor for obesity and non-communicable diseases in the UK. In 2017, the percentage of deaths caused by diet were 44% for cardiovascular disease, 33% for Type 2 Diabetes and 7% for cancers[32]. The UK is also a leading consumer of ultra-processed food (UPF), with UPFs now exceeding 50% of daily caloric intake[33]. National consumption of UPFs has been found to be directly associated with obesity[34], a risk factor for the above non-communicable diseases[35]. In England in 2021, around 26% of adults were obese and a further 38% overweight. Dietary and resultant health inequalities are widening (18); currently, 72% of individuals in the most deprived areas of England have obesity compared to 58% in the least deprived[36].

Registrars within local government public health teams can take a sustainable food systems approach to contribute to the development of a food system that is economically, socially and environmentally sustainable. The Food and Agriculture Organization (FAO)'s framework[37] sets out the features of a sustainable food system and ways to work towards this. More specifically and within this, registrars might carry out work to:

- Increase opportunities for employment in more sustainable food practices
- Increase the availability of affordable plant-rich options, including vegetables, fruit, beans, pulses, nuts, seeds and wholegrain foods. This may include school meals, private vendors and workplaces;
- Decrease meat consumption, and red meat in particular;
- Promote consumption of sustainably-sourced fish;
- Minimise food waste from households and businesses;
- Increase access to food grown by regenerative farming, and locally where appropriate;
- Increase knowledge around food and cooking through community food growing and cooking enterprises;
- Promote use of Roundtable on Sustainable Palm Oil (RSPO)-certified palm oil in the place of unsustainable palm oil;
- Decrease calorie intake to reduce energy wastage and target obesity;
- Promote less packaging, especially plastic packaging, of food by retailers and encourage use of reusable shopping bags;
- Promote use of renewable energy in food supply chains

[32] Afshin et al, 2019. Health effects of dietary risks in 195 countries, 1990–2017: a systematic analysis for the Global Burden of Disease Study 2017. (51)

[33] Chang et al, 2023. Ultra-processed food consumption, cancer risk and cancer mortality: a large-scale prospective analysis within the UK Biobank. (52)

[34] Vandevijvere et al, 2019. Global trends in ultraprocessed food and drink product sales and their association with adult body mass index trajectories. (53)

[35] Health matters: obesity and the food environment, Public Health England, 2017. URL: https://www.gov.uk/government/publications/health-matters-obesity-and-the-food-environment/health-matters-obesity-and-the-food-environment--2

[36] Obesity statistics, House of Commons Library, 2023. URL: https://commonslibrary.parliament.uk/research-briefings/sn03336/#:~:text=Adult%20obesity%20in%20England,BMI)%20of%2030%20or%20above

[37] Sustainable food systems, Concept and framework, FAO. URL: https://openknowledge.fao.org/server/api/core/bitstreams/b620989c-407b-4caf-a152-f790f55fec71/content

Case study 4, Simon Harvey: *Development of a local food network*

The challenge: There was an impending food chain and food access crisis that appeared at the start of the first pandemic lockdown. This exposed the vulnerabilities of poorer sections of the community and vulnerabilities in the local food supply chain.

The solution: I worked closely with VCSE partners who were organising the food bank response, supporting the development of a vision for a local food network based on the Soil Association's Sustainable Food Places model.

The impact: Derby City became a formal member of the Soil Association's Sustainable Food Places network. It has maintained a thriving network, which includes food bank, commercial and community partners as well as links into the health and wellbeing board.

Lessons learned: The importance of developing a wider vision of public health that is owned by wider community; seeing beyond immediate crisis to root causes and longer-term ambitions; having the courage to take public health into new arenas.

See Appendix for full case study.

1.3.7 Commercial determinants of health

The commercial sector, in the process of generating a profit for shareholders, creates huge impacts on the health of people and the environment, not paid for by industry. Some of these effects, or "externalities", are positive, for example the health benefits derived from food outlets selling affordable fruit and vegetables. However, businesses also produce considerable negative health and environmental externalities, which can occur both locally and remotely.

Examples include high sales of unhealthy foods which are a major risk factor for non-communicable diseases; alcohol, smoking and gambling industries profiting from addiction; oil, gas and petrochemical firms producing greenhouse gas emissions and air particulates which cause climate change and respiratory and cardiovascular diseases. The effects of these industries often disproportionately affect those at the lowest end of the socio-economic spectrum, locally and globally, widening inequalities.

Local public health teams may work to reduce or counteract negative health and environmental externalities produced by commercial enterprises serving the local area. Examples of actions include[38,39]:

- Supporting business engagement with the local area's climate reduction targets.
- Encouraging adoption of corporate social responsibility (CSR) business models, to increase business accountability to shareholders in relation to environmental impact.
- Changing the language used by public health teams around health behaviours, to reframe health away from the NHS response and instead towards the food environment and structural / commercial causes of consumption.
- Banning advertisements of products that are unhealthy for people and the planet.
- Working to understand, and to prevent, industry tactics and interference to increase sales of harmful products.

[38] Director of Public Health Annual Report, Sunderland City Council, 2023. URL: https://www.sunderland.gov.uk/media/30278/Director-of-Public-Health-Annual-Report-2022-2023/pdf/DirectorOfPublicHealthAnnualReport2022-2023.pdf?m=1692712817833

[39] Salisbury. The commercial determinants of health, 2022. (54)

- Developing active travel and micro-mobility initiatives, and promoting these to increase take-up by partners, people and businesses across the area.
- Supporting the transition to ultra-low/zero emission vehicles across the city by residents, partner organisations and businesses.
- Enhancing green infrastructure and increasing urban greening to facilitate climate adaptation and carbon offsetting.

1.3.8 Local population health intelligence

Climate change, water and air quality data are available to local authorities (likely as data that comes to or is collected by their 'Place' directorates (planning; environmental services etc).

The quality and granularity of these data are likely to be variable: public health teams can assist by identifying other data sets that can be used to supplement the data, in particular, to consider how demographic differences between local neighbourhoods may affect how the impacts of climate change are felt and ensure that local partners can effectively respond to the public health impacts of climate change.

Improving datasets (and people's ability to interpret these) could also allow local authority based public health teams to support work on environmental hazard management with transport, spatial planners and Environmental Health Officers[40], as well as with specialist health protection teams.

1.4 Advice on incorporation of climate change into specific project types

Table 4 provides examples of work that could be undertaken in local public health teams to fulfil curriculum learning outcomes.

[40] The Association of Directors of Public Health Policy Position: Climate Change, 2023. URL: https://www.adph.org.uk/wp-content/uploads/2023/06/Formatted-FINAL-Climate-Change-Policy-Position-Statement-1.pdf

Table 4: Examples of local government projects incorporating climate change and sustainability		
Area	**Examples in curriculum**	**Specific ideas for projects/work in a local public health team**
1.1: Address a public health question using data and intelligence by refining the problem to an answerable question or set of questions, determining the appropriate approach and applying that approach by accessing data and information from a variety of organisations and sources (local, national and / or global)	Undertake a health inequalities audit. Write a report that considers longer term trends and the health needs of future generations, including the impacts of climate change.	Undertake a health inequalities assessment of a new green spaces initiative Undertake analysis and write a report outlining the changes in climate, such as temperature and rainfall, over the coming years and resultant health impacts
1.6 Use and interpret quantitative and qualitative data, synthesising the information to inform action.	Impact assessment of the development of new build development on an existing community.	Carry out a climate impact assessment of a new development proposal. Climate impact assessments should be referred to and reviewed by multi-disciplinary teams in the implementation as well as initiation phases[41].
1.7 Undertake a health needs assessment for a defined population for a specific purpose, use systems thinking approach (where appropriate)	Alcohol health needs assessment. Strategy to reduce harm from alcohol consumption presented to Board of organisation.	Include environmental determinants of health in a health needs assessment, e.g. respiratory disease related to pollution or poor housing, heat-related morbidity and mortality
3.5 Write a strategy [action plan] to address a need for change to improve a public health or health care issue	Develop a local decarbonisation strategic delivery plan Develop an action plan for a charity to move towards being carbon-neutral Contribute to or write an air quality action plan. Support the development of/response to an organisation's climate emergency declaration and/or plan	Develop a local decarbonisation strategic delivery plan to move towards a local sustainable, low-carbon economy. This might include initiatives around buildings, transport, procurement and healthcare. Develop an action plan for a charity to move towards being carbon-neutral. This could include[42] training of staff on climate action; decarbonisation of buildings and systems; management of resources and waste;

[41] Literature review of impact assessments in governments, 2021. URL: https://digital.nls.uk/pubs/scotgov/2021/225100292.23.pdf
[42] Net Zero Carbon and the Third Sector, Shropshire Voluntary Community Sector Assembly, 2021. URL: https://www.vcsvoice.org/media/d5mptgeb/net-zero-carbon-and-the-third-sector-guide.pdf

		environmentally sustainable procurement; ethical investment and funding streams; and supporting local communities.
5.1 Influence or build healthy public policies across agencies, demonstrating an awareness of structural determinants to health, and different social, cultural, political and religious perspectives on health.	Ensuring health impacts and health co-benefits are captured in climate change policy	Include public health adaptation and mitigation measures in local climate strategy.
5.2 Be an advocate for public health principles and action to improve the health of the population or subgroup	Advocacy for proposal regarding the impact of environmental factors, such as air pollution, on a particular population or subgroup Advocating for the importance of recognising climate change as a health issue	Advocate for a proposal regarding improvement of air quality for schools, for example including reduction in car idling near school premises, reducing nearby traffic flow and improving the active travel environment.
8.9 Deliver and evaluate education and training activities for academic or service audiences in a wide range of virtual and in person formats, for large and small groups	Devises, plans and delivers a community or public health education (e.g. sexual health at youth group) Leading support for Registrars preparing for FPH Diploma exam	Devise and deliver a continuing professional development (CPD) programme for local public health consultants on climate and health.

Toolkit feedback and case study collection

We would be grateful for your feedback on the toolkit so that we can make it as useful as possible for registrars. Also, if you have done a project that incorporates climate change or environmental sustainability, we would love to include it as a case study.

Please use the QR code or web links below to access each form:

Feedback form

https://forms.gle/KSFXLidXHdaECEKA7

Case study form

https://forms.gle/czsQUszY7JZ2rmTM6

Health protection placements

Credit: Nuno Vasco Rodrigues / Climate Visuals Countdown

Underwater kelp forest, Portugal, 2019. Magical kelp forests create beautiful habitats and shelter for a whole host of sea life, but they also reduce the rate of global warming.

2. Health protection placements

2.1 Introduction

Health protection is one of the three domains of public health and a staple part of training for registrars. The minimum requirement for public health registrar training in health protection is a three-month placement with a health protection team during Phase 1 of training. Longer and more specialist health protection placements may be available in Phase 2 of training, enabling registrars to further develop their skills in this area.[43]

Climate change and sustainability are directly relevant to many areas of health protection practice. The WHO exposure pathways for climate change vulnerability are all relevant to health protection: extreme weather events, heat stress, air quality, water quality and quantity, food security and safety, and vector distribution and ecology.[44] The recent Health Effects of Climate Change (HECC) in the UK report clearly elucidates some of these issues and is a key resource on this topic.[45]

This chapter makes explicit the links and outlines some potential opportunities to work on climate change/sustainability projects during health protection placements.

2.2 Climate change and sustainability as health protection strategic priorities

The FPH 2022 curriculum specifically highlights the importance of climate change as a cross-cutting theme that includes health protection: "the issues of climate change, biodiversity loss, environment degradation and sustainable development are inextricably linked and underline the need to take a One Health approach to population health"[46]. The concept of planetary health is linked with One Health and should be considered alongside this[47]. Climate change and sustainability are also a notable part of the strategies for organisations providing the health protection functions across the four nations of the UK:

- In England, UKHSA's strategic priority 1 is "be ready to respond to all hazards to health" and this includes specific reference to climate change: "we will keep the growing and harmful health impacts of climate change and the forefront of our preparedness".[48] The UKHSA strategy also states "we will ensure sustainable development in all of UKHSA's activities by implementing the UKHSA sustainable development management plan and acting in accordance with the UKHSA's environmental policy. These activities will support our commitment to be operationally net zero by 2035".

- In Northern Ireland, the Public Health Agency (which hosts mandatory three-month health protection placements) has taken 'building sustainable communities' as one of

[43] Please see the FPH Specialist Interest Group on Health Protection handbook for more details of what health protection placements look like across the UK. URL: https://www.fph.org.uk/media/1pvhmnww/healthprotectiontraininghandbook-2024.pdf
[44] Climate change fact sheet, WHO, 2023. URL: https://www.who.int/news-room/fact-sheets/detail/climate-change-and-health
[45] Health Effects of Climate Change (HECC) in the UK: State of the evidence, UKHSA, 2023. URL: https://assets.publishing.service.gov.uk/media/659ff6a93308d200131fbe78/HECC-report-2023-overview.pdf
[46] Public Health Specialty Training Curriculum 2022, Faculty of Public Health. URL: https://www.fph.org.uk/media/4ojeo5bk/public-health-curriculum-2022-v13_final.pdf
[47] Talukder et al, 2024. Exploring the nexus: comparing and aligning Planetary Health, One Health, and EcoHealth (5)
[48] UKHSA Strategic Plan 2023 to 2026. URL: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1186751/UKHSA_3_year_strategy.pdf

its building blocks, which includes a commitment to "prioritise policies and interventions that reduce both health inequalities and climate change".[49]

- In Scotland, the health protection function is based within NHS Health Boards. NHS Scotland launched the 2022-2026 Climate Emergency and Sustainability Strategy in August 2022, aiming to become net zero by 2040.[50]

- In Wales, Public Health Wales, which is responsible for health protection, lists "tacking the public health effects of climate change" as one of its strategic priorities (strategic priority six), with a specific focus on "ensuring that efficient and equitable adaptation policies and interventions are in place that help to reduce health inequalities".[51]

2.3 Climate change, sustainability and health protection practice: making the links

The FPH document 'functions and standards of a public health system'[52] includes, from page 2 onwards, information specific to health protection. The definition of health protection is: "Action for clean air, water and food, infectious disease control, protection against environmental health hazards, chemical incidents and emergency response".

All the functions described can be linked to sustainability and climate change. A brief description of the functions is provided in Table 5 (combined where appropriate, for brevity). We have added a further function, response to non-infectious environmental hazards (NIEH), given the major role of health protection in this work and its intrinsic links with environmental public health.

Table 5: Health protection functions

Function(s)	Brief description
Outbreak prevention and control/outbreak management	Development of plans and policies for the prevention and control of communicable disease, analysing risks to health and wellbeing, identifying effective interventions to control major diseases, and providing expert advice to others to prevent and control communicable and environmental hazards; respond to outbreaks when they occur.
Emergency planning	Preparing for emergencies, playing a role in contingency planning and resilience, and monitoring infectious and environmental hazards.
Infection control	Planning measures to prevent or control public risk, local infection work such as monitoring and providing advice on the containment of Health Care Acquired Infections (HCAI), taking a role in hospital infection control and liaising with environmental health.

[49] Build sustainable communities, Public Health Agency. URL: https://www.publichealth.hscni.net/directorate-public-health/health-and-social-wellbeing-improvement/build-sustainable-communities
[50] NHS Scotland climate emergency and sustainability strategy: 2022-2026, Scottish Government, 2022. URL: https://www.gov.scot/publications/nhs-scotland-climate-emergency-sustainability-strategy-2022-2026/
[51] Working for a healthier Wales: Our long-term strategy 2023-35. URL: https://phw.nhs.wales/news/public-health-wales-vision-for-a-healthier-future-for-wales/working-together-for-a-healthier-wales/
[52] Functions and standards of a Public Health System, Faculty of Public Health. URL: https://www.fph.org.uk/media/3031/fph_systems_and_function-final-v2.pdf

Non-infectious environmental hazards (NIEH)	Addressing non-infectious environmental hazards, including those related to climate change, air quality, and chemical/radiological risks. The UKHSA is a Category 1 responder, with HPTs performing a key role as well as teams across the Radiation, Chemical, Climate and Environmental Hazards (RCCE) Directorate including the Centre for Climate and Health Security (CCHS).
Risk management	Communicate advice on threats to health and act to reduce the risks.
Monitoring threats	Providing advice on novel threats to health, interpreting data and using information to monitor disease and trends, and identifying emerging disease risks and the local impact of this.
Immunisation	Implementing and monitoring immunisation policies, providing evidence-based advice on immunisation programmes

The way these functions link directly to climate change and sustainability issues is explored in the subsequent sections, with relevant information provided in each section. This is a pragmatic approach to structuring the information and it is recognised that there is some overlap between sections, with some information being relevant to multiple functions.

2.3.1 Outbreak prevention and control/management

Climate change will have a profound impact on the spread, transmission and potential emergence of new types of infectious diseases. It has been estimated that 58% of infectious diseases have, at some point, been aggravated by the climate.[53] The climate acts as an important driver of spatial and seasonal patterns of infections, year to year variations in incidence, and longer-term shifts in populations at risk.[54] Some of the impacts may be as follows:

- **Increases in zoonotic disease and emergence of new diseases**: Climate change will increase animal-human contact, which is likely to lead to the emergency of new zoonotic diseases.[55]

- **Changes to vector-borne disease distribution**: Changes to vector ecology will have an impact of the distribution of pathogens and the potential for outbreaks of disease. Climate sensitive vector-borne diseases include mosquito borne, rodent borne and tick-borne diseases. Vectorial capacity for mosquito-borne diseases (such as dengue and malaria) has increased, and climate change has contributed to the spread of Lyme disease and tick-borne encephalitis in Europe.[56]

- **Changes to patterns of parasitic and bacterial infections**: A strong association exists between increases in food borne diseases and high air and water temperatures

[53] Mora et al, 2022. Over half of known human pathogenic diseases can be aggravated by climate change (21)
[54] What is the link between climate change and infectious disease? Wellcome, 2023. URL: https://wellcome.org/news/what-link-between-climate-change-and-infectious-disease
[55] Carlson et al, 2022. Climate change increases cross-species viral transmission risk (55)
[56] IPCC Sixth Assessment Report. Climate Change 2022: Impacts, Adaptation and Vulnerability. URL: https://www.ipcc.ch/report/ar6/wg2/

and longer summer seasons. Changes to the climate can also promote parasitic diseases such as schistosomiasis.[57]

- **Changes to disease distribution associated with changes in population distribution/increased population movement.** The social impacts of climate change (conflict, population migration etc) are likely to lead to an increased risk of infectious diseases among some population groups, and changes to patterns of incidence in travel-acquired infections.

As changes to global temperatures could lead to changes in patterns of disease transmission, health protection teams will need to be prepared to respond to unfamiliar disease outbreaks or to change assumptions when following up cases of disease due to the changing nature of what constitutes travel-acquired infection. There will also be a need to adopt a One Health approach and place more focus on zoonoses.

Increased or changed movement of people may result in outbreaks of unfamiliar diseases in the UK, or recirculation of diseases with previously very low incidence. Approaches to outbreak control will need to be sensitive to the changing landscape of infectious diseases associated with changes to the climate.

2.3.2 Emergency planning

Climate change will increase the incidence of emergencies, particularly severe weather events, and health protection teams have a role in ensuring preparedness for these and effective response. For example, it is very likely that climate change has increased the duration, intensity and likelihood of extreme heat in the UK.[58] Deaths could rise from around 1,400 per year due to extreme heat to around 2,500, 3,700, 8,200 and >18,500 at 1.5, 2, 3 and 4 degrees of warming respectively by 2050.[59] Heatwaves cause a short-term increase in mortality, especially among those with CVD and/or other respiratory diseases, and there is a co-effect with air pollution.[60] Hotter weather is likely to increase the risk of wildfires, particularly in the southeast of England.[61]

Climate change is also likely to lead to an increase in flooding, with the number of people at risk of flooding in the UK potentially doubling by the 2050s.[62] It was estimated in 2019 that 1.4 million people in England faced a risk of 1:75 or greater of flooding of any kind; the number at this level of risk could increase to 1.7 million if global warming reaches 2 degrees above the pre-industrial temperatures.[63] Flood and storm disasters can result in cases of infectious and

[57] Editorial: Climate change: fires, floods, and infectious diseases, 2021 (56)
[58] Without human-caused climate change temperatures of 40°C in the UK would have been extremely unlikely, World Weather Attribution, 2022. URL: https://www.worldweatherattribution.org/without-human-caused-climate-change-temperatures-of-40c-in-the-uk-would-have-been-extremely-unlikely/
[59] UKHSA Advisory Board: Preparedness for Environmental Hazards, UKHSA, 2023. URL: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1158216/UKHSA_Advisory_Board_-_Preparedness_for_Environmental_Hazards.pdf
[60] Kurane, 2010. The Effect of Global Warming on Infectious Diseases (57)
[61] Wildfires are becoming more common in the UK – but the threat can be managed, The Conversation, 2022. URL: https://theconversation.com/wildfires-are-becoming-more-common-in-the-uk-but-the-threat-can-be-managed-187217
[62] Flooding and coastal change: Findings from the third UK Climate Change Risk Assessment (CCRA3) Evidence Report 2021, UK Climate Risk. URL: https://www.ukclimaterisk.org/wp-content/uploads/2021/06/CCRA3-Briefing-Flooding-and-Coastal-Change.pdf
[63] How is climate change affecting river and surface water flooding in the UK? London School of Economics and Political Science, 2021. URL: https://www.lse.ac.uk/granthaminstitute/explainers/how-is-climate-change-affecting-river-and-surface-water-flooding-in-the-uk/

parasitic diseases, such as gastrointestinal illness, respiratory infections, and skin or soft tissue infections.[64]

2.3.3 Infection control

Infection prevention and control (IPC) necessarily involves many materials that have an adverse impact on sustainability, particularly single-use items. Health protection teams can, through their involvement with planning infection control measures and providing advice on proportionate responses, help to balance effective infection control with sustainability. Health protection teams can play a role by ensuring that health organisations are adhering to evidence-based guidelines for IPC, for example only using gloves when necessary (it has been shown that gloves worn for the protection of the wearer are associated with fewer hand hygiene measures across multiple care interventions).[65] Health protection teams could also consider reviewing and updating the IPC advice that is given as information about environmental impacts evolves.[66]

There is also a suggested link between climate change and antimicrobial resistance (AMR). It has been shown that there is an association between antimicrobial resistance patterns and higher temperatures.[67][68] A recent literature review exploring antimicrobial resistance and the impact of climate change in Germany and Europe concluded that increases in temperatures and changes in humidity and precipitation may increase the spread of both AMR and healthcare associated infections, but that more research is needed.[69]

2.3.4 Non-infectious environmental hazards

The UKHSA's Radiation, Chemical, Climate and Environmental Hazards Directorate (RCCE) is responsible for protecting public health from non-infectious environmental hazards. This includes assessing and responding to risks from radiation, chemical incidents, air and water pollution, and climate-related hazards such as heatwaves and flooding. The RCCE provides scientific expertise, conducts research, and supports national and local responses to environmental threats. It advises government departments, develops public health guidance, and ensures preparedness for environmental emergencies. By monitoring environmental exposures and evaluating potential health impacts, the RCCE plays a key role in reducing harm and improving resilience to environmental challenges across the UK.

The UKHSA Centre for Climate and Health Security (CCHS), part of the RCCE Directorate, leads work addressing environmental threats. Launched in October 2022, it provides scientific guidance and early warning systems for heatwaves, floods, droughts and air quality events. CCHS teams, which span climate-health evidence synthesis and mobilisation, and assessment and response to vector-borne disease and extreme events, produce the Adverse Weather and Health Plan, health-impact modelling, and surveillance to assess climate-driven risks. Working alongside local authorities, Met Office, academia and international partners, they translate evidence into policy, enhance preparedness, and support resilience to environmental hazards.

[64] Ebi et al, 2022. Extreme Weather and Climate Change: Population Health and Health System Implications (58)
[65] When the gloves come off, BMA, 2022. URL: https://www.bma.org.uk/news-and-opinion/when-the-gloves-come-off
[66] Peters et al, 2023. New frontiers in healthcare environmental hygiene: thoughts from the 2022 healthcare cleaning forum (59)
[67] MacFadden et al, 2018. Antibiotic Resistance Increases with Local Temperature (60)
[68] Kaba et al, 2019. Thinking outside the box: Association of antimicrobial resistance with climate warming in Europe - A 30 country observational study (61)
[69] Meinen et al, 2023. Antimicrobial resistance in Germany and Europe – A systematic review on the increasing threat accelerated by climate change (62)

2.3.5 Risk management and monitoring threats

Risk management involves action to communicate advice on threats to health and act to reduce the risks. This is particularly relevant to communications around extreme weather and air pollution, with a need for early warning systems and effective guidance for heatwaves and extremely cold weather.[70,71]. An example of a climate change/sustainability project in health protection focused on communicating and mitigating risk is provided below:

Case study 5: Charlie Dearman (Extreme Events and Health Protection Team, Centre for Climate Change and Health Security, UKHSA), G*uidance on reducing risk associated with adverse weather*

The challenge: UKHSA published the Adverse Weather and Health Plan (AWHP) in 2023. A key role for registrars in the team was to lead on the production of guidance.

The solution: National guidance was produced for healthcare professionals, for social care/care home managers, and for people with responsibility for those that were sleeping rough.

The impact: The AWHP was launched at a formal webinar and is supported by operational webinars by UKHSA for both summer and winter seasons. There have been many presentations of the work at webinars hosted by other stakeholders, especially those in the voluntary and community sector. The AWHP will be underpinned by an evaluation framework and outcomes will be recorded, with an annual report produced every year.

Lessons learned: Working with the Extreme Events and Health Protection team is a valuable experience for public health registrars. The work poses many interesting challenges including in communication. Working with the behavioural insights team in UKHSA was helpful for developing the effective messages. A broad professional network was important and this project also highlighted the importance of an empowered voluntary sector.

See Appendix for full case study.

Air pollution and climate change are connected because the chemicals that lead to a degradation in air quality are frequently co-emitted with greenhouse gases and air pollution is the leading environmental risk factor for premature death globally.[72]

Monitoring threats includes providing advice on novel threats to health, interpreting data and using information to monitor disease and trends, and identifying emerging disease risks and the local impact of this. This is directly linked to climate change and sustainability; monitoring the impact of climate change on the public's health is vital to improve resilience. Improved surveillance of infectious diseases at the global level is needed to effectively track new diseases, and new variants of diseases, and improve information sharing to enable quick decision making.[73]

[70] Without human-caused climate change temperatures of 40°C in the UK would have been extremely unlikely, World Weather Attribution, 2022. URL: https://www.worldweatherattribution.org/without-human-caused-climate-change-temperatures-of-40c-in-the-uk-would-have-been-extremely-unlikely/

[71] Climate Change and Air Pollution, Institute of development studies, 2024. URL: https://opendocs.ids.ac.uk/articles/report/Climate_Change_and_Air_Pollution/26434036?file=48083650

[72] Pinho-Gomes et al, 2023. Air pollution and climate change (63)

[73] Covid won't be the last pandemic – climate change will make sure of that, Imperial College London, 2022. URL: https://www.imperial.ac.uk/news/241611/covid-wont-last-pandemic-climate-change/

2.3.6 Immunisation

Vaccines are an important part of mitigating the impact of climate change on human health. Vaccine development has been identified as an effective adaptation option for strengthening climate resiliency and adapting to vector-borne diseases.[74] Almost all pandemic-prone infectious diseases and diseases with high burden are being investigated for vaccines.[75]

Changes to the distribution of infectious disease may lead to the need for changes to eligibility for vaccination or require those working in health protection functions to provide evidence for and implement new guidelines around immunisation. Additionally, vaccines are temperature-sensitive products; there is a need to develop climate-resilient vaccine delivery schemes[76], both so that vaccination implementation is resilient against climate change, but also to avoid vaccine wastage which negatively impacts sustainability.

2.4 Health protection, health inequities and environmental justice

This section is relevant to all the functions of health protection practice. Health impacts of climate change, including those directly relevant to health protection (impacts of flooding, heatwaves etc) will be unequal because of differential exposure and the unequal ability of groups in society to adapt to changes.[77] It is likely that those that are least empowered in society will be the ones most impacted by the health impacts of climate change. We need to consider this when thinking about climate change, sustainability and health protection, including considering how best to effectively communicate risks to seldom heard groups. It is important to frame this as a social justice issue and focusing on protecting the vulnerable from these exposures. At a global level, the effect of climate change in infectious diseases disproportionately affects low- and middle-income countries (LMICs).[78] Inclusion of local research in low- and middle-income countries on climate change and infectious diseases has generally been neglected, and research is not socially inclusive or geographically balanced.[79]

2.5 Environment and health work within health protection placements

All registrars on placement within the UKHSA should carry out the UKHSA's Sustainability Development training (accessible via Pulse) to support involvement in environment and health work.

As a category 1 responder, the UKHSA also carries out frequent exercise drills to improve the UK's response to environmental hazards such as floods and wildfires. Registrars should consider attending these with a consultant to strengthen their understanding.

Table 6 provides some specific examples/ideas for projects that could be undertaken during mandatory health protection placements, which are common to all registrars in training.

However, health protection related placements are wide-ranging and the opportunities for projects will differ dependent on setting, organisation priorities, and your stage of training. For

[74] IPCC Sixth Assessment Report. Climate Change 2022: Impacts, Adaptation and Vulnerability. URL: https://www.ipcc.ch/report/ar6/wg2/
[75] Kim et al, 2023. Mitigating the effects of climate change on human health with vaccines and vaccinations (64)
[76] ibid
[77] Paavola, 2017. Health impacts of climate change and health and social inequalities in the UK (33)
[78] Kim, n 73
[79] Vuurst et al, 2023. Climate change and infectious disease: a review of evidence and research trends (65)

example, registrars may consider forming connections early-on in training, and arranging formal placements later, with any of the following other parts of UKHSA:

- Centre for Climate and Health Security (CCHS) within RCCE, for example, see case study 6 below.
- Environmental Hazards and Emergencies (EHE) Department within RCCE
- Health Equity team, focusing on sustainability
- Colindale (UKHSA) may allow opportunities to get involved in strategy and policy work
- Explore joint placements with local authorities on the mitigation of environmental hazards, for example joint pieces of work on air pollution. Taking a strategic approach can be helpful (see HP case study 6 below).

At present, there tends to be a focus on resilience and adaptation when thinking about climate change in a health protection context. It is vital that we also start to think about and encourage prevention in health protection settings and advocate for more sustainable approaches to, for example, infection prevention and control.

Case study 6: Charlie Dearman (Extreme Events and Health Protection Team, Centre for Climate Change and Health Security, UKHSA), *Using Sustainable Development Goals to inform organisational strategy*

The challenge: The Centre for Climate Change and Health Security (CCHS) at UKHSA is a division that has been established to protect health from a changing climate. There was interest in embedding the United Nations Sustainable Development Goals (SDGs) into this strategy and CCHS's wider work.

The solution: This was an exploratory piece involving interviewing team leaders in the new centre, mapping which of the SDGs the centre contributed to and where opportunities were to further embed the SDGs into CCHS' strategy. The report included recommendations for embedding SDGs into the work of the centre.

The impact: This exercise helped to show how the organisation was already aligned with the SDG goals, and to identify several opportunities for embedding them further. The piece of work helped to identify future actions to align evaluation and monitoring activities with the SDGs.

Lessons learned: From a registrar perspective, a key lesson is to seek the opportunities as they arise to embed sustainability into the work and strategy of the organisations we work for. Using formal change models (here we used Kotter's 8 stage model of change to good effect) can be helpful. The SDGs are a useful framework to think through the wide breadth of issues related to sustainable development.

See Appendix for full case study.

Table 6: Potential sustainability/climate change projects during mandatory health protection placement (only relevant Learning Outcomes included):

Learning outcome	Examples in curriculum	Specific ideas for projects/work in a HP setting
6.1: Demonstrate knowledge and awareness of hazards relevant to health protection	Deliver teaching/tutorial to peers/medical students on health protection topics for example…direct and indirect impacts of climate change	• Run a session for practitioners on the health impacts of climate change. • Run a session for the HPT on small steps to improve sustainability in practice
6.2 Gather and analyse information, within an appropriate timescale, to identify and assess the risks of health protection hazards	Identify and assess climate risks on health protection, for example emerging infectious diseases and other hazards related to the environment	• Work in partnership with a local authority to assess air pollution risks in the local population. • Complete an audit of enquiries received by the HPT about air pollution. • Audit of situations which covered a NIEH to share with surveillance and help future planning.
6.3 Identify a health protection hazard; develop a management plan and advise on its implementation, with reference to local, national and international policies and guidance to prevent, control and manage identified health protection hazards	Respond to climate change impacts e.g. flooding, food insecurity, change in distribution of vector-borne disease	• Contribute to a regional Adverse Weather and Health Plan to protect individuals and communities from the health effects of adverse weather. • Play a role in a response to an environmental incident e.g. a flood or fire and write a follow up report exploring resilience and preparedness levels • Draft SOPs for the HPT on resilience and response arrangements for environmental incidents, implementing appropriate mechanism for feedback, learning and improving resilience in the future
6.6 Demonstrate knowledge and understanding of the main stakeholders and agencies at a local, national and international level involved in health protection and their roles and responsibilities, including in emergency preparedness	Understanding of agencies responsible for climate mitigation and adaptation at local, national and international levels	Prepare an organogram/diagram of all the organisations with involvement in climate change/sustainability activities and how they relate to health protection organisations/functions, and share this internally to promote joint working
6.8 Apply the principles of prevention in health protection work and take opportunities to promote health protection actions in specific settings	Reducing exposure to environmental hazards e.g., air pollution, lead, carbon monoxide Identifying the health protection issues affecting vulnerable groups/populations and how best to support these needs, including mental health considerations	Work with a local authority to map exposure to air pollution and mitigate the impact of this, keeping health inequities at the forefront.

Toolkit feedback and case study collection

We would be grateful for your feedback on the toolkit so that we can make it as useful as possible for registrars. Also, if you have done a project that incorporates climate change or environmental sustainability, we would love to include it as a case study.

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Case study form

https://forms.gle/czsQUszY7JZ2rmTM6

Academic placements

Credit: Georgia Department of Natural Resources / Climate Visuals

Mark Dodd, wildlife biologist from Georgia's Department of Natural Resources, surveys oiled sargassum in the Gulf of Mexico, May 2023.

3. Academic placements

3.1 Introduction

Academic public health is one of the six major functions of public health, and is cited within the Faculty of Public Health's Climate and Health Strategy as one of the key areas required to deliver "an effective, evidence-based and just response" to the climate emergency[80].

All eight learning outcomes within the Academic Public Health Key Area can be achieved with work that combines climate/sustainability with public health. This section of the toolkit will focus on achievement of academic public health competencies. Achievement of these is not confined to work carried out in dedicated academic placements.

This chapter is divided into 4 sections, linking environment and public health within academic work:

- Research
- Teaching
- Academic leadership and citizenship
- Learning outcomes

3.2 Research

Research can be used to inform every area of public health practice. To identify opportunities for carrying out research in climate change, sustainability and public health, registrars should initially scope out and contact key individuals working on topics of interest, noting that these academics are often based outside of the public health research department. The MPhil dissertation may provide a key opportunity to carry out a significant piece of environment and health research.

Here we outline areas of major intersection between environment and health which can be used as the basis for research by PH registrars, although registrars can also think creatively about the innumerable other intersections between environment and health that may warrant investigation.

- Changing environmental hazards and infectious diseases: As climate change intensifies, the frequency of extreme weather events is increasing, and infectious disease epidemiology changing. Research to understand the physical and mental health implications of climate change is vital to mitigate, and adapt to, harms.

- The health co-benefits of actions to limit climate change: Actions to reduce environmental impact in many sectors, including housing, transport and energy, can lead to public health benefits. Providing evidence for these health co-benefits strengthens arguments to support climate change mitigation and allows mitigation actions to be considered holistically, bringing together health and environmental gains. Major pathways of dual health and environmental benefit include reducing air pollution, increasing physical activity, sustainable diets, and better mental wellbeing.

[80] Faculty of Public Health Climate and Health Strategy 2021-25. URL: https://www.fph.org.uk/media/3401/fph-climate-health-strategy-final.pdf

- Decarbonisation of healthcare: The NHS is responsible for 40% of all public sector emissions.[81,82] Research to understand and reduce the environmental impacts of healthcare is important to support the transition to a sustainable healthcare system.

Case study 7, Dmitri Nepogodiev: *Decarbonising operating theatres*

The challenge: Our team focusses on how to reduce the carbon footprint of operating theatres and apply these lessons to the wider hospital.

The solution: We will co-develop and test interventions to provide the evidence base for decarbonising operating theatres, in partnership with patients, clinicians, managers, and environmental scientists.

The impact: This research is currently ongoing.

Lessons learned: There is a wide range of activities to get involved in across various methodologies (stakeholder work and PPIE, co-development of interventions, RCTs, QIPs, modelling).

See Appendix for full case study.

- Adaptation to reduce adverse health impacts of inevitable effects of climate change: It is important to strengthen the evidence base around the effectiveness and impacts of adaptation measures to reduce population health risks posed by climate change. Research into adaptation measures that reduce health inequalities will be particularly important, as the impacts of climate change are likely to disproportionately affect those who are least able to respond.

- Climate injustice and health inequalities: Choose a specific setting and/or population to investigate the above through a climate injustice or health inequalities lens.

- Social determinants of health: Take a 'social determinants of health' approach to examine how climate change or sustainability are linked with determinants such as housing, employment, water and sanitation, food production and education. Improving these risk factors for disease also means reducing demand on healthcare, an important aspect of sustainable healthcare[83] and by improving population health, some groups will become more resilient to exposures from climate change.

- Commercial determinants of health: Use a 'commercial determinants of health' lens to consider how commercial interests may shape the planetary health agenda.

- A systems approach:

[81] Net zero care: what will it take? The Health Foundation, 2023. URL: https://www.health.org.uk/reports-and-analysis/briefings/net-zero-care-what-will-it-take
[82] One year on from a world-first ambition – let's stay impatient on the NHS reaching net zero, Greener NHS, 2021. URL: https://www.england.nhs.uk/greenernhs/2021/10/blog-one-year-on-from-a-world-first-ambition-lets-stay-impatient-on-the-nhs-reaching-net-zero/
[83] MacNeill et al, 2021. Planetary health care: a framework for sustainable health systems. (47)

To enable effective upstream planetary health interventions, understanding the complex relationships between human health, economic development and natural systems is necessary. A systems approach to planetary health is required for transformative change.[84,85]

A systems approach to environment and health research enables us to investigate connections within complex systems as well as to look at the bigger picture.

There are multiple aspects involved in understanding a system:

i. Connections between elements of the system
ii. Building in multiple perspectives
iii. Defining the boundaries of the system.

Healthcare systems can be understood in this way, as can other systems with direct health and environmental impacts including transport, energy and food systems.[86]

Applying a systems approach can lead to the development of a more comprehensive understanding of the relationships between actors and institutions within complex systems, including positive and negative feedback loops, and enable identification of potential intervention leverage points. Unintended consequences of interventions, as well as potential synergies and trade-offs can be identified.

Registrars may find the Open University's free introductory course to taking a systems approach a useful starting point.[87]

- Ecological economic theories:

Humans have been using up planetary resources at an unsustainable rate and damaging the environment in the process. The current economic system, driven by neoliberalist philosophy, has supported this, emphasising reliance on free market forces, privatisation, deregulation, and individual responsibility[88]. In the pursuit of better health and living standards for all – and whilst not directly addressing inequalities – the goal continues to be growth in gross domestic product (GDP), equated with increasing consumption.[89]

There are multiple critiques of the GDP growth goal: the contested evidence base for a positive association between GDP growth and better population health; the fact that GDP does not account for important activities for health such as unpaid care and voluntary work; the fact that GDP *does* include consumption of products that negatively impact human and planetary health; and finally, that continual increasing consumption leads to overuse of planetary resources.

As the climate change intensifies, a health-promoting and environmentally sustainable economy is key. Ecological economic models, such as Doughnut Economics, steady-state

[84] Pongsiri et al, 2017. The need for a systems approach to planetary health (66)
[85] Iyer et al, 2021. Sustaining planetary health through systems thinking: Public health's critical role (67)
[86] Systems thinking for noncommunicable disease prevention policy: Guidance to bring systems approaches into practice, WHO, 2022. URL: https://www.who.int/europe/publications/i/item/WHO-EURO-2022-4195-43954-61946
[87] Managing complexity: A systems approach – introduction, The Open University. URL: https://www.open.edu/openlearn/digital-computing/managing-complexity-a-systems-approach-introduction/content-section-0?active-tab=description-tab
[88] Sakellariou et al, 2017. The effects of neoliberal policies on access to healthcare for people with disabilities (68)
[89] Brand-Correa et al, 2022. Economics for people and planet—moving beyond the neoclassical paradigm (6)

economics and degrowth, rely on the assumption that wellbeing is not tied to consumption. Research towards greater alignment of economic and planetary health goals is important, as these may provide useful frameworks for more holistic policymaking that promotes sustainability[90].

Examples of peer-reviewed research articles on some of the above topics are provided in table 7. Although these examples have not been written by PH registrars, similar pieces could be led by registrars during training. The Climate and Health Evidence Bank also provides a useful repository of evidence on the impact of climate actions across sectors.[91]

Table 7: Examples of research linking environment and health

Area of research	**Published article**
Public health effects of environmental hazards and infectious diseases	(19–23)
Climate change mitigation actions with health co-benefits	(24–27)
Environmental impacts of healthcare delivery	(28–30)
Adaptation to the adverse health effects of climate change	(31,32)
Climate injustice	In the UK: (33–35) In other settings: (36–38)
Social determinants of health	(39,40)
Commercial determinants of health	(41,42)
Systems approach	(43)
Ecological economic perspective	(44,45)

Disseminating research

Registrars should write a dissemination strategy when starting a project to maximise research impact. This could involve identifying relevant stakeholder networks and social media channels as well as potential conferences and peer-reviewed journals. Some conference and journal considerations are provided in Table 8. Registrars may also consider presenting their work to other registrars within-region to encourage group learning and peer-to-peer support.

[90] Brand-Correa et al, 2022. Economics for people and planet—moving beyond the neoclassical paradigm (6)
[91] Data explorer, Climate and Health Evidence Bank. URL: https://climatehealthevidence.org/data-explorer

Table 8: Conference and journal considerations

Scope	Conferences	Journals
Environment and health	Presenting at dedicated climate and health conferences, such as the Faculty of Public Health's Climate and Health Conference, provides opportunities to network and learn from with those with specialist expertise in this area.	Dedicated journals include The Lancet Planetary Health, Nature Climate Change, the Journal of Climate Change and Health.
Wider public health	Consider more generalist public health conferences, such as the annual European Public Health or UK Health Security Agency conferences, to communicate to a wider public health audience and advocate for greater focus on the climate and health agenda.	Generalist public health journals include Journal of Public Health, Lancet Public Health, the Annual Review of Public Health, and the European Journal of Public Health.

3.3 Teaching

Public health registrars are often given the opportunity to deliver teaching, for example to health professionals, medical students, fellow public health registrars, and placement colleagues. Registrars may be able to use these opportunities to provide teaching on sustainability and health, simultaneously strengthening their own and others' knowledge in this area.

Material included in a teaching session depends on the aim of the session(s). For example, the purpose might be to generally increase participants' knowledge around climate and health, or to enable participants to identify practical changes they can apply in their work. Try to centre each teaching session around one or two take-home messages and formulate content with this in mind. A generic climate and health session might include the following topics:

- An overview of the health impacts of climate change, in the UK and globally. This might include issues such as heat risks, infectious disease, food insecurity, and mental ill-health.
- Climate injustice and inequalities within the UK and globally
- Health and climate co-benefits
- Healthcare sustainability (if relevant to audience)
- What we can do about it:
    1. Levels of possible action (individual, department/practice/trust/clinic, community/local government, national institutions, international agencies)
    2. Areas of possible action (mitigation, loss and damage, adaptation)
    3. Methods of possible action (research, advocacy, delivery)

Teaching tips:

- Remember to tailor the teaching to your audience. For example, if teaching clinicians, you could include ways that climate change may affect presentation of disease in primary and secondary care, healthcare decarbonisation interventions, and how they may increase the practice of these interventions in their organisation (e.g., through clinical audit).
- Engage your audience through participation. For example, participants would be asked how the issues apply to their work, e.g., "Can you think of ways in which climate change has already impacted people's health in your setting?" and help them consider practical solutions for mitigation or adaptation.
- Include case studies to illustrate your points, e.g., patient or place-based case studies.
- Ask for feedback and incorporate changes into future iterations.
- Consider carefully how to give an honest presentation of the environmental and health crises we face while also being empowering and hopeful. A strong focus on action can help with this.
- Be aware of the potential emotional impact of these subjects, the likelihood of climate anxiety in the students, and signpost to welfare services if needed.

3.4 Academic Leadership and Citizenship

Consider undertaking wider climate and health activities whilst in your academic placement to make a larger impact. For example:

- Participate in setting up more permanent planetary health teaching within your placement university. For example, you could help to convene a planetary health module or degree programme.

Case study 8: Emily Tweed, *Convening a Planetary Health Master's module*

The challenge: To update and co-convene a Public Health Master's module in Planetary Health at the University of Glasgow.

The solution: The registrar co-convened the module with a colleague. This involved updating course content, recruiting new speakers, establishing new intended learning outcomes and formulating and marking assessments.

The impact: Twenty-nine students took this module in the first year following its transformation. Feedback was overwhelmingly positive, particularly regarding topics covered and guest speakers. The group format of an assignment received less positive feedback.

Lessons learned: Convening a module is a substantial commitment, and co-convening enables sharing of workload and combining expertise. This opportunity enabled the registrar to develop their teaching skills and was a useful exercise in determining course content priorities and how to deliver material in the limited available sessions.

See Appendix for full case study.

- Arrange a planetary health conference to raise the profile of the subject and to encourage networking and knowledge-sharing.

Case study 9, Jenny Mack: *Healthy Planet, Healthy People conference*

The challenge: Climate change is not currently a defined policy area within Northern Ireland health policy. This conference was organised to highlight the importance of climate change as a public health issue.

The solution: The Healthy Planet, Healthy People conference was a means of communicating that climate change is a public health threat and providing information about the topic to attendees, with a range of high profile speakers.

The impact: About 1,000 people registered for the conference and between 400 and 500 people attended. The audience was international and very broad. The conference received positive feedback.

Lessons learned: Take time to plan the abstract submission process; engage early with all partners; try and follow up with a meeting of policymakers; ensure actions/commitments are sustained following the conference.

See Appendix for full case study.

- Consider forming a planetary health interest group or network if one does not currently exist within your placement university. Identify gaps that the group or network could fill. The functions of the group might include:
    - Providing a setting within which to present and discuss climate and health; research and brainstorm ideas for new projects;
    - Inviting external speakers to share their knowledge;
    - Arranging conferences, talks and fun events;
    - Identifying ways to increase the university's planetary health teaching or research output or improve its environmental impact

Case study 10, James Smith: *Developing understanding and leadership for cross disciplinary planetary health research*

The challenge: Environmental and health issues were largely addressed separately in research within the University.

The solution: A project was carried out to develop a shared understanding of planetary health and motivate greater cross disciplinary activities across the University.

The impact: Three webinars and a workshop were held, as well as a meeting with senior leaders. There was strong support for more joined up and equitable research in the field of planetary health and leaders have committed to further developing this agenda.

Lessons learned: Levels of engagement could have been improved by greater promotion and more personalised invitations sent further in advance.

See Appendix for full case study.

3.5 Learning outcomes

Through carrying out planetary health research in an academic placement, all learning outcomes within Key Area 8, ‘Academic Public Health’, can be achieved. Additionally, LO 5.7 can be achieved through incorporating consideration of environmental sustainability into a research project, teaching or wider activities within the academic setting. Given the significant overlap between academic public health and public health work in other settings, many other LOs can also be achieved, including but not limited to 1.2, 1.4, 1.5, 1.6, 2.1, 2.2, 2.4, 2.5, 4.1, 4.2, 4.4, 4.5, 4.7, 4.10 and 4.11.

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Healthcare public health placements

Credit: Western Arctic National Parklands / Climate Visuals

Imelyak climate station, 2014. The Noatak basin is internationally recognised as a Biosphere Reserve. Under this United Nations scientific program, the area's ecological and genetic components provide baseline data for measuring changes in ecosystems worldwide.

4. Healthcare public health placements

4.1 Introduction

Registrars may undertake healthcare public health (HCPH) work in a variety of settings, including but not limited to NHS health boards, hospital trusts and screening and immunisations teams. This chapter outlines some of the ways in which climate change and sustainability links with, and should be embedded within, HCPH work. This chapter aims to be applicable to registrars undertaking HCPH work regardless of setting.

4.2 Sustainability and healthcare public health

At time of writing, England, Wales and Scotland have all produced green strategies to move towards a Net Zero NHS.[92,93,94] The Health and Social Care Act 2022 also places a duty on NHS organisations in England to consider environmental impact in their decision-making processes.[95] Delivering on these strategies will require collaboration between public health, health and social care, and the private sector, and public health registrars are well-placed to be involved in this work. Registrars undertaking HCPH work should be aware of relevant strategies and use them for leverage, to increase prioritisation of climate and sustainability work within organisations delivering HCPH.

Moreover, undertaking work linking HCPH with climate and sustainability will build skills crucial for public health registrars in their future careers. The Association of Schools of Public Health in the European Region (ASPHER) has set out Climate and Health Competencies for public health professionals in Europe[96], and states that public health professionals must be able to:

- Identify the health impacts of climate change and effective responses on the part of specific health services.
- Know how to develop strategies for reducing the carbon footprint of health care delivery, from the hospital setting to the outpatient setting, based on “green health care” principles.

Sustainable health systems require sustainable and appropriate supply of healthcare, both covered in this chapter, as well as reduction in demand of healthcare services through disease prevention[97]. To reduce demand on healthcare services it is important that cross-organisational work is carried out between those undertaking healthcare public health and local authority and ICB colleagues, and that the impact of preventative interventions

[92] Delivering a ‘Net Zero’ National Health Service, NHS England. URL: https://www.england.nhs.uk/greenernhs/wp-content/uploads/sites/51/2022/07/B1728-delivering-a-net-zero-nhs-july-2022.pdf
[93] NHS Wales Decarbonisation Strategic Delivery Plan, 2021-30. URL: https://www.gov.wales/sites/default/files/publications/2021-03/nhs-wales-decarbonisation-strategic-delivery-plan-2021-2030-summary.pdf
[94] NHS Scotland Climate Emergency & Sustainability Strategy 2022-2026. URL: https://www.gov.scot/binaries/content/documents/govscot/publications/strategy-plan/2022/08/nhs-scotland-climate-emergency-sustainability-strategy-2022-2026/documents/nhs-scotland-climate-emergency-sustainability-strategy-2022-2026/nhs-scotland-climate-emergency-sustainability-strategy-2022-2026/govscot%3Adocument/nhs-scotland-climate-emergency-sustainability-strategy-2022-2026.pdf
[95] Policy levers for a net zero NHS: four priorities for the future, The Health Foundation, 2024. URL: https://www.health.org.uk/reports-and-analysis/briefings/policy-levers-for-a-net-zero-nhs-four-priorities-for-the-future#:~:text=The%20government%20and%20NHS%20have,%27%20assessment%20(Box%201).
[96] Appendix D of Faculty of Public Health Climate and Health Strategy 2021-25. URL: https://www.fph.org.uk/media/3401/fph-climate-health-strategy-final.pdf
[97] MacNeill et al, 2021. Planetary health care: a framework for sustainable health systems. (47)

(described in detail in the local government placements chapter) on healthcare use is evaluated where possible.

4.3 Climate change, sustainability and HPCH work: making the links

Public health practice includes HCPH as one of the three domains, alongside Health Improvement and Health Protection[98,99].

Major functions of HCPH work are provided in Table 9 and following this the major links between HCPH functions and climate change and sustainability are described.

Table 9: Healthcare Public Health functions

Function(s)	Brief description[100]
Health service commissioning	Provide specialist public health advice to health and social care service commissioners on priorities for spending; develop care pathways, policies and guidelines to improve health outcomes; assess health and social care need, utilisation, demand and outcomes; promote a population health prevention approach within health and social care services.
Health and social care service prioritisation	Objectively balance needs and resources to ensure that the whole population gets the best value for money; evaluate clinical and cost effectiveness of health and social care interventions to inform decisions; critically appraise business cases of proposals for new service developments or configurations.
Healthcare development and planning	Lead the development of population healthcare, influencing local systems to increase uptake of screening and immunisation programmes and integrate prevention into healthcare pathways; review new healthcare developments for effectiveness and affordability; analyse costs, benefits and risks of new services, technology and processes; provide input into the planning of services for vulnerable groups, ensuring fair access and addressing inequalities.
Equity of service provision	Support the commissioning of appropriate, effective and equitable health care from the NHS locally; monitor access and use of health and social care services; undertake health equity audits and equity impact assessments of services; plan services for vulnerable groups using the appropriate evidence base.
Clinical governance and	Set and maintain a culture of continuous evidence-based improvement; agree specifications and standards for services which clearly identify the clinical, quality and productivity outcomes; monitor and audit services to ensure delivery and to improve outcomes; monitor performance, identify

[98] Functions and standards of a Public Health System, Faculty of Public Health. URL: https://www.fph.org.uk/media/3031/fph_systems_and_function-final-v2.pdf
[99] Short headline definition of Healthcare Public Health, Faculty of Public Health, 2017. URL: https://www.fph.org.uk/media/1879/hcph-definition-final.pdf
[100] Functions and standards of a Public Health System, n 96

quality improvement	underperforming providers and make recommendations; communicate and disseminate information that improves practices or services.
Healthcare audit, evaluation and research	Provide independent evaluation of services against NICE and other guidance and recommend changes based on evaluation; promote research where there are gaps in evidence or knowledge; share best practice through publication and dissemination.
Patient safety in health-related services	Participate in risk analysis and interpretation of data in incidents and serious untoward events; identify failures and implement procedures to address them; provide input into the management of incidents to reduce risks to the public; learn from events and improve systems to prevent them from occurring in future.
Leadership for healthcare	Lead through the development of pro-active and collaborative relationships with clinicians, social services, local authority colleagues, the voluntary sector and the private sector; provide a strategic view of future development in health care; lead across organisations, ensuring that they work together to take on the challenge of priorities, applying and sharing good practice.

4.3.1 Health services commissioning

The NHS has considerable purchasing power in its procurement activities which can be used to influence change. The NHS 10 year plan prioritises three key shifts: moving care from hospitals to communities, making better use of technology, and prioritising prevention over treatment. Each of these can be carried out whilst also prioritising environmental sustainability. Healthcare public health is key to helping commission, procure and deliver sustainable models of care.

It is important to improve the sustainability of products procured for health and social care services, including:

- eliminating procurement of single-use plastics and switching to bio-based polymers;
- metal instrument reprocessing;
- device reuse and refurbishment;
- reduced use of paper;
- increasing plant-based diets and reducing food waste;
  encouraging sustainable product innovation;
  decarbonising construction and introducing electric freight transport

Procurement of local services, for example increasing local procurement of infrastructure for equipment reuse and refurbishment, could increase green employment opportunities.

Analysis published in NHS England's Net Zero strategy[101] shows that the highest percentages of NHS carbon emissions are from:

- medicines and pharmaceuticals (20%)

[101] Delivering a 'Net Zero' National Health Service, NHS England. URL: https://www.england.nhs.uk/greenernhs/wp-content/uploads/sites/51/2022/07/B1728-delivering-a-net-zero-nhs-july-2022.pdf

- medical and non-medical equipment (18%)
- other procurement (18%)
- the NHS estate and its supporting facilities (15%)
- travel and transport (14%)
- food and catering (6%)

Emissions from health and social care supply chains can be achieved through more efficient use of supplies, low-carbon substitutions and product innovation, and by ensuring suppliers are decarbonising their own processes. The NHS has established a road map for suppliers to move towards net zero by 2040, building on UK government procurement policy. From April 2022, all NHS procurements were required to include a minimum 10% net zero and social value weighting.[102] The government have also published a roadmap towards greater reuse, remanufacture and recycling of medical technologies.[103]

Prioritisation of spending on health and social care services should involve consideration of the following factors:

i. Medicines

Around 20% of the 25% of medicine-related emissions come from manufacturing and freight within the supply chain. The remaining 5% of emissions is mainly concentrated in two group of medicines, where emissions occur at the point of use: i) anaesthetic gases (2% of emissions) and ii) inhalers (3% of emissions).

- The majority of emissions from inhalers come from the propellant in metered-dose inhalers (MDIs) used to deliver the medicine, rather than the medicine itself. Reducing emissions from inhalers will require significantly increasing the use of lower carbon inhalers such as dry powder inhalers, increasing greener disposal of used inhalers and supporting the innovation in and use of lower carbon propellants and alternatives. NICE has published guidance on inhaler use with a view to reducing emissions[104] as well as a patient decision aid relating to the environmental impact of inhalers.[105]

- Anaesthetic gases used in surgery, such as desflurane, have high 'global warming potential', being 2,500 times more warming than carbon dioxide. Lower impact alternatives, such as sevoflurane, exist and are often clinically appropriate. The capture and destruction of nitrous oxide could cut over one-third of NHS anaesthetic emissions. Lastly, nitrous oxide wastage is currently significant, with over 30% of nitrous oxide left in canisters after use. Reducing, reusing and recycling nitrous oxide is important to reduce emissions. A nitrous oxide decision toolkit is available on NHS Futures in the Greener NHS Knowledge Hub workspace.

ii. Estate and facilities

It is necessary to improve the environmental footprint of existing facilities, and to also ensure new facilities have a low environmental impact. NHS England produced a Net Zero Building

[102] Suppliers, Greener NHS. URL: https://www.england.nhs.uk/greenernhs/get-involved/suppliers/
[103] Design for Life roadmap, Department of Health and Social Care, 2024. URL: https://www.gov.uk/government/publications/design-for-life-roadmap
[104] Asthma: diagnosis, monitoring and chronic asthma management, NICE, 2024. URL: https://www.nice.org.uk/guidance/ng245
[105] Asthma inhalers and climate change decision aid, BTS, NICE and SIGN, 2024. URL: https://www.nice.org.uk/guidance/ng245/resources/patient-decision-aid-on-asthma-inhalers-and-climate-change-bts-nice-sign-pdf-13558151917

Standard[106] to provide clear performance criteria relating to reducing the carbon impact of new buildings. Upgrading of current health and social care facilities is also vital. This may include measures such as upgrading to all-LED lighting, better heating, air conditioning and ventilation systems, and onsite renewable energy generation. For example, Milton Keynes University Hospital has installed over 2500 solar panels, producing 853MWh (megawatt hours per year), around 8% of the Trust's total electricity requirement, with large cost-savings.[107] District Heat Networks also have the potential to support local authorities and the NHS to connect local communities to affordable sustainable heating and energy systems which could be used to tackle fuel poverty and health inequalities.[108]

iii. Travel and transport

The NHS has a dedicated Net Zero travel and transport strategy and aims to have fully decarbonised its fleet by 2035.[109] Key to this is the requirement for Trusts and ICBs to incorporate sustainable travel strategies into their green plans by 2026. Registrars could support work to reduce the NHS fleet's emissions, including green fleet reviews to identify areas of greatest urgency for action within each NHS trust or health board, ensuring all vehicles purchased or leased are low and ultra-low emission, working towards a comprehensive electric charging infrastructure across the NHS, and targeting interventions to encourage patients and staff to reduce vehicle use. Travel miles can be reduced by redesigning commissioned services as well as deliveries from suppliers.

Travel interventions may include promoting walking and cycling, increasing provision of e-bikes, improving active travel infrastructure (e.g. improved cycle paths, and storage and shower facilities), and implementing policies for example to give car parking priority to those car-pooling.

Case study 11: ***Including sustainability in procurement***

The challenge: In one NHS England region when the incumbent provider contracts for the Child Health Information Service were due to end, members of the Screening and Immunisation Teams (SITs) were involved in the joint procurement process for a new provider.

The solution: A set of questions on social value was included in the invitation to tender questions, which included a sub-question on environmental sustainability relating to sustainable travel solutions. Members of the SITs evaluated and scored responses.

The impact: The responses were revealing of sustainability practices in place by bidders. The SIT was able to objectively value bidders' commitment to sustainable practices alongside other public health requirements and signal the importance of sustainable practice to bidders.

Lessons learned: Identifying regional and local sustainability leads and passionate advocates was vital to understanding the local landscape, including identification of local Green Plans and regional priorities that could be incorporated into local work.

See Appendix for full case study.

[106] NHS Net Zero Building Standard, NHS England, 2022. URL: https://www.england.nhs.uk/wp-content/uploads/2023/02/B1697-NHS-Net-Zero-Building-Standards-Feb-2023.pdf
[107] Solar power sparks an electrical future for Milton Keynes University Hospital, Greener NHS. URL: https://www.england.nhs.uk/greenernhs/whats-already-happening/solar-power-sparks-an-electrical-future-for-milton-keynes-university-hospital/
[108] Heat networks, Department for Energy Security and Net Zero and Department for Business, Energy & Industrial Strategy, 2016. URL: https://www.gov.uk/government/collections/heat-networks
[109] Net Zero travel and transport strategy, NHS England, 2023. URL: https://www.england.nhs.uk/long-read/net-zero-travel-and-transport-strategy/

4.3.2 Health and social care service prioritisation and planning

The NHS must consider adaptation to climate change as part of its prioritisation and planning. This could include consideration of:

- Sustainable models of care, for example, low-carbon resilient health systems[110]
- Improving care pathways, policies and guidelines towards climate change adaptation, to increase the ability of health facilities, services and staff to withstand climate change
- Assessing changing health and social care needs, utilisation, demand and outcomes as a result of climate change
- Being aware that services that are climate change-resilient and meet sustainability regulations are more likely to be cost-effective in the long-term as they are less likely to be updated/replaced in the short-term
- Strengthening the role of healthcare public health in supporting local authorities to invest in action that will reduce demand for health services. For example, this may include reducing air pollution, adapting buildings to withstand heatwaves, and increasing access to green spaces.

In England, each trust and Integrated Care System should have a Green Plan which sets out their aims, objectives and delivery plans for carbon reduction. Registrars may seek out the opportunity to be involved in the development, monitoring and evaluation of these plans.[111] Environmental sustainability is also included in Care Quality Commission (CQC) checks on health and social care facilities.[112]

Additionally, registrars can help to stress the importance of planning for climate events within the NHS (such as heatwaves and floods), doing risk assessments, and incorporating green initiatives into other policies and plans within the NHS.

They can also play a role in reviewing new healthcare developments for effectiveness in relation to climate change/sustainability impact and analysing costs, benefits and risks of new services, technology and processes in relation to sustainability and climate change.

[110] Operational framework for building climate resilient and low carbon health systems, WHO, 2023. URL: https://www.who.int/publications/i/item/9789240081888
[111] Organisations, Greener NHS. URL: https://www.england.nhs.uk/greenernhs/get-involved/organisations/
[112] Assessment framework: Well-led: Environmental sustainability – sustainable development, CQC, 2025. URL: https://www.cqc.org.uk/guidance-regulation/providers/assessment/assessment-framework

Case study 12, Emily Loud: *Revising the Climate Strategy of an Integrated Care Partnership*

The challenge: I identified that the Integrated Care System's Green Plan lacked connection between the proposed carbon reduction commitments and local health outcomes and inequalities; did not include a prevention element; and that outcome measurements of impact needed refinement.

The solution: I worked on a Green Plan health impact assessment (HIA), which aimed to identify ways to maximise the positive health and inequality impacts that the proposed carbon reduction activities could have, and to establish a workstream that united carbon reduction and population health.

The impact: The Board of the ICB and ICB executives responded positively to the HIA, encouraged development of an annual action plan to take forward the recommendations, and made some financial resource available to begin these actions.

Lessons learned: The process of consulting with partners drew attention to the connections between health and Green Plans.

See Appendix for full case study.

Case study 13, Shannon Kennedy: *Revising the Climate Strategy of an Integrated Care Partnership*

The challenge: Whilst completing a placement within an NHS England Integrated Care Board (ICB), I supported the climate team in a revision of their climate strategy, which would apply to their Integrated Care Partnership (ICP).

The solution: I ensured there was senior-level strategic commitment to the climate strategy and agreement on extending it to include adaptation. I also incorporated other concepts into the new strategy, including the Doughnut model, justice, community involvement, and a system-wide approach.

The impact: We took the strategy and menu of actions to our Partnership board, who gave their assent to it as a working draft. The menu of actions was also accepted as a means of self-monitoring progress within the system, and thus established a link between the Integrated Care System's risk register and their climate work.

Lessons learned: I had to have courage to challenge the limitations of the current climate strategy and put forward a proposal for a revision. Next time, I would take on the strategy work from the get-go, consult and involve more widely from the start, and include adaptation in this.

See Appendix for full case study.

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4.3.3 Equity of service provision

Climate change has the potential to widen existing health inequalities in the UK due to the impacts of climate change having a greater adverse impact on low-income and marginalised groups.[113] The NHS should plan services for climate-related health problems proportionate to need. This, for example, may involve:

[113] Third Health and Care Adaptation Report, UKHSA, 2021. URL: https://www.england.nhs.uk/wp-content/uploads/2021/12/NHS-third-health-and-care-adaptation-report-2021.pdf

- Targeting services resulting from the impact of high exposure to air pollution. For example, Black, Asian and minority ethnic groups are disproportionately affected by high pollution levels[114]
- Providing appropriate healthcare for households struggling with energy bills as the demand of energy increases as a result of climate change.
- Analysing health impacts of climate related and other hazards on different groups, e.g. air pollution is likely to most affect low-income groups, heat-related morbidity/mortality is more common in the elderly
- Supporting local air pollution, housing and transport policies that impact internal air quality in deprived areas
- Addressing inequity through engaging with affected communities.

Case study 14, Jamie-Rae Tanner: ***Health Impact Assessment of a hospital***

The challenge: Health Impact Assessment (HIA) of a redevelopment of a community hospital. There was a flood risk to the site, older population, lack of transport links, and controversy about inpatient community hospital beds.

The solution: Sustainability was included within the HIA with an extra focus on local vulnerable species.

The impact: A report with recommendations was formulated.

Lessons learned: Engage board members more effectively on the need to act on climate. Building material costs went up and there was a real concern than recommendations wouldn't be acted upon.

See Appendix for full case study.

4.3.4 Clinical governance, quality improvement, audit, evaluation and research

Action in this area could include:

- Embedding sustainability as a dimension of quality within quality improvement (QI) activities, to ensure sustainability is considered in every QI project. SusQI is one way of doing this for which there are many resources available.[115]
- Ensuring sustainability is included in commission and procurement specifications and related contracts
- Monitoring and auditing services against these environmental targets
- Evaluating services against environmental footprint targets, adaptive qualities in the face of climate change and resilience to increasing demand for climate-related health problems.
- Promoting research to fill gaps in evidence or knowledge around climate change adaptation and mitigation of health services.
- Sharing best practice related to climate change adaptation and mitigation of health services through publication and dissemination.

[114] Fecht D et al, 2015. Associations between air pollution and socioeconomic characteristics, ethnicity and age profile of neighbourhoods in England and the Netherlands. (69)
[115] Sustainable Quality Improvement (SusQI). URL: https://www.susqi.org/

4.3.5 Patient safety in health-related services

Building in resilience and adaptation to climate change is part of patient safety, and including climate resilience as part of clinical governance structures could improve accountability for this.[116] Registrars could participate in risk analysis and interpretation of data in incidents and serious untoward events involving climate-related risks, such as hospital deaths during heatwaves, work to reduce risks to the public from incidents resulting from climate change and improve health systems to prevent incidents relating to climate change from occurring in the future. Registrars can also help to:

- Set a culture of continuous evidence-based improved using evidence around adaptation and mitigation in health services
- Communicate and disseminate information that improves the environmental impact, resilience and health mitigation of health services.

4.3.6 Leadership for healthcare

Provide a strategic view of future development to increase mitigation and adaptation in healthcare, develop pro-active and collaborative relationships with clinicians, social services, local authority colleagues, the voluntary sector and the private sector in order to carry out service changes; lead across organisations, ensuring that they work together to take on the challenge of priorities, applying and sharing good practice relating to climate change adaptation and mitigation.[117] Registrars may use the WHO operational framework on low-carbon resilient health systems[118] to structure projects, considering the six building blocks of health systems and using the examples of measurable outputs and indicators as suggestions.

NHS staff have a key role to play in educating others about the climate crisis. The Centre for Sustainable Healthcare provides some helpful resources for this purpose.[119]

[116] Third Health and Care Adaptation Report, UKHSA, 2021. URL: https://www.england.nhs.uk/wp-content/uploads/2021/12/NHS-third-health-and-care-adaptation-report-2021.pdf
[117] Functions and standards of a Public Health System, Faculty of Public Health. URL: https://www.fph.org.uk/media/3031/fph_systems_and_function-final-v2.pdf
[118] Operational framework for building climate resilient and low carbon health systems, WHO, 2023. URL: https://www.who.int/publications/i/item/9789240081888
[119] Centre for Sustainable Healthcare. URL: https://sustainablehealthcare.org.uk/

Case study 15: ***Climate and Health CPD for Screening and Immunisation Team***

The challenge: Registrar wanted to identify the opportunities to incorporate environmental sustainability considerations into workstreams within their Screening and Immunisations placement.

The solution: The registrar developed a CPD session that was delivered to the local Screening and Immunisation Team (SIT) and included breakout sessions that provided the opportunity to consider how their roles might contribute to climate action. The SIT were asked to consider potential operational changes, team actions, individual actions and any quick wins which were then fed back into the session.

The impact: The session raised the profile of environmental sustainability within public health work and several additional pieces of work were developed as a result. Two permanent members of staff volunteered as workstream leads, ensuring the work continued after the registrar's placement finished.

Lessons learned: Identifying regional and local sustainability leads enabled an understanding of relevant plans and regional priorities that could be incorporated into the session.

See Appendix for full case study.

4.4 Advice on incorporation of climate change into specific project types

Table 10 (below) provides examples of work that could be undertaken in healthcare public health placements to fulfil curriculum learning outcomes.

Table 10: Example healthcare public health projects incorporating climate change and sustainability	
Area	**Project ideas from the curriculum and elsewhere**
7.1 Monitor and assess the impact of preventive and treatment services, appraising or applying routine information and bespoke data sources.	• Evaluate the environmental impact of a health improvement programme, e.g. childhood oral health programme • Incorporate environmental impacts into service evaluations
7.2 Describe and apply the ethical and legal principles of resource allocation in health and care services as it applies to both individuals and groups.	• Consider the ethical and legal principles around impacts of climate change on health
7.3 Propose plans and develop supporting products (such as service specifications and commissioning policies) for service configuration to address population health needs. This should include consideration and, if appropriate, an appraisal of examples of different models of healthcare.	• Develop a policy to address waste and environmental impact in the delivery of health care, including PPE, single use plastics and packaging waste. • Build expectations around sustainable delivery of services when developing service specifications or policies • Set specifications and standards for services which relate to resilience of services in the face of climate change • Set specifications and standards for services which relate to lowering environmental footprint of services
7.4 Advocate proposals for improving health or care outcomes working with diverse audiences.	• Propose an active travel plan for a local hospital trust – learning from new modes of (remote) working due to COVID 19 and to reduce patient and staff travel related carbon emissions • Work with a local hospital trust, advocating for proposals to improve health and care outcomes by improving the environmental sustainability of healthcare delivery • Get involved in the development or delivery of Green Plans
7.5 Describe the stages for evaluation of new drugs and technologies in order to select and apply these frameworks to inform policy questions.	Explore methods of minimising anaesthetic gas wastage and technologies to capture expelled medical gases in order to reduce the carbon footprint of healthcare services.
7.6 Critically appraise service developments for their costs and impacts on health and health inequalities, using health economic tools to support decision making.	Carbon footprint modelling as part of a health needs assessment e.g. for specialist podiatric care services
7.7 Lead or contribute to the implementation of change across health and care systems with reference to a model of change.	• Engage with pharmacists and prescribers to encourage responsible disposal of inhalers • Support the implementation of the Greener NHS/Net Zero strategies to support population health co-benefits/inequalities reductions
7.8 Appraise, select and apply tools and techniques for improving safety, safeguarding, reliability and patient orientation of health and care services	• Take a patient-centred approach to optimise inhaler use, disposal and recycling • Build climate resilience into clinical audit tools

Toolkit feedback and case study collection

We would be grateful for your feedback on the toolkit so that we can make it as useful as possible for registrars. Also, if you have done a project that incorporates climate change or environmental sustainability, we would love to include it as a case study.

Please use the QR code or web links below to access each form:

Feedback form

https://forms.gle/KSFXLidXHdaECEKA7

Case study form

https://forms.gle/czsQUszY7JZ2rmTM6

Credit: Logan Abassi / UN Photo / Climate Visuals

A woman carries supplies through a flooded street in Cap Haïtien. After days of continuous rains, parts of Haiti's north, including Cap Haïtien, suffered serious flooding, leaving more than a dozen dead and thousands homeless.

Feedback and contribution

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Case study form

https://forms.gle/czsQUszY7JZ2rmTM6

For further suggestions or involvement, please contact

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or

- FPH Sustainable Development Special Interest Group, sdsig@fph.org.uk

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Appendix: Case Studies

Local Government Placement Case Studies

1: Samuel Hayward, North Somerset Council

The challenge

While the term 'climate change' has been around for a long time, it may not communicate the urgency of the situation, the more appropriate term “climate emergency” has now been widely adopted. North Somerset Council declared a “climate emergency” in 2019 (North Somerset Council: https://www.n-somerset.gov.uk/council-democracy/priorities-strategies/climate-emergency).

Climate change will have both a number of implications for health in the UK, largely negative. Climate change is predicted to lead to greater seasonal variation in weather patterns, meaning: hotter, drier summers, with more heatwaves and droughts. Colder or wetter winters, with more flooding and severe storms[120].

Climate change is the problem of our times, it is already resulting in upheaval and unrest across the globe, with the potential to impact the health and wellbeing of people everywhere. North Somerset, as a low-lying coastal area is particularly at risk from climate impacts. Climate action has the potential to benefit health and wellbeing, through more active lifestyles, improved air quality, healthier diets, as well as warmer homes and other benefits.

Previously, when learning about climate change, adaptation, mitigation and prevention it’s always been presented as a big issue requiring massive change. Just thinking about the scale of the problem can feel overwhelming. It’s makes us think, as individuals, that there is limited action that we can take to change the situation, or that our own actions will have minimal impact.

The solution

Provided Public Health leadership to Council’s climate emergency steering group, leading on development and delivery of actions.

Through engagement with the carbon literacy training I recognised one leverage point is the procurement and commissioning power of the Council. We can set terms for provision and include in these climate and sustainability action. I saw this as a logical and tangible path to follow. I lead our team to do this.

The public health team led by example, through conversation we identified the opportunity to embed sustainability into the procurement of the PH nursing contract. I provided guidance and links to our climate emergency lead and provided opportunity for colleagues to prioritise this.

[120] Time to Think Differently, King’s Fund. URL: https://www.kingsfund.org.uk/insight-and-analysis/projects/time-to-think-differently#:~:text=Climate%20change%20will%20have%20both,more%20flooding%20and%20severe%20storms

We then agreed the approach and delivered within the tender. Fortunately, the team and wider organisation was ready, this might not have been as straight forward to do elsewhere.

Actions:

- Embed decarbonisation into future procurements (digital health, healthy workplaces) and work with procurement team to embed plans for the wider procurement activity of the Council.
- Oversee delivery of climate emergency and decarbonisation training for public health team.
- Support development of SW climate emergency and public health network.

The impact

This provided a practicable and tangible example for others to follow, and for the Council to learn from. Previously, examples of sustainability and climate change projects presented at SPR tutorials were either theoretical, or focussed on built environment projects. I encouraged those arranging a climate emergency tutorial to use the work of NSC as an example to be used elsewhere. The feedback from the session showed this was very well received. The work was also used as case study to be included in training delivered by the Centre for Sustainable Healthcare, and will be further used as a case study to be submitted for the Carbon Literacy programme.

Lessons learned

I purposefully left LO 5.7 toward the end of my training. The reason being that I wanted to build on my previous knowledge from leading the healthy built environment portfolio with the experience from the training programme, to develop the appropriate leadership skills and knowledge. This was in order to have a bigger impact from the actions I took forward.

I recognised that there was opportunity for me to have a bigger impact, not just by changing my own behaviour, but by using my role and position to change the system. To change systems you need to identify leverage points and focus action in those areas to have bigger impact. That leveraged action then cascades change elsewhere.

2: Emily Loud, East of England

The challenge

During a placement with a public health team based in a local authority, I identified a lack of senior leadership and commitment to tackling the climate emergency as a public health priority.

The solution

I identified people in the department who had an interest (not a remit) in the climate emergency and set-up a network between them and members of the local authority green teams. This provided a space to share updates on local authority climate activity, and to identify areas for joint working.

The impact

The network continues to meet and has identified several joint pieces of work. First, there was an opportunity to include climate and health within a joint strategic needs assessment. Second, the local authority was rolling out carbon literacy training among their staff, and the network facilitated this offer being extended to the public health workforce as well. Third, the public health team were able to share a new NHS procurement policy that gave weighting to sustainability when making procurement decisions and there are ongoing discussions as to whether the local authority will adopt a similar approach.

Lessons learned

You need a coalition of people to push the climate emergency agenda and to make the effort itself sustainable i.e. it requires a range of people with a range of knowledge and expertise. Ideally this should include a group of people from different departments to build a system-wide community.

3: Emily Tweed, Scotland

The challenge

This work was undertaken in by a registrar on placement in a health board in Scotland. There was an identified need for greater public health contribution to sustainability, particularly as the health board had recently produced a Climate Change and Sustainability Strategy and the NHS Scotland Climate Emergency and Sustainability strategy was soon to be released. The registrar formulated a workplan outlining how the public health team would contribute to local need and both the local and national strategies. They undertook multiple pieces of work within this workplan.

Specific to this project: There was an opportunity to increase the involvement of the health improvement team in spatial planning and built environment through responding to local and regional development consultations. This would involve building relationships with local authority planning teams, and NHS property and planning colleagues.

The solution

The registrar led a rapid health impact assessment (HIA) of a local development plan for one of the local authority areas, working with both the health board's health improvement team

and with the local authority's planning team. The rapid HIA informed the health board's response to the local development plan consultation.

The impact

Through undertaking the HIA, the health improvement team built a stronger relationship with the local authority. This was a starting point to developing links with all three of the health board's local authority areas. These closer relationships led to the public health team's involvement in the development of planning consultations, increasing opportunity for influence, rather than just responding to them. The health board now has a more established process for dealing with consultation responses, including a method of prioritisation of consultations for engagement.

Lessons learned

Lessons learned included:

1. It is helpful to talk about sustainability in a way that links with partners' areas of work and their priorities/motivators. For example, if they are compliance focused, it may be helpful to highlight national standards and guidance to target compliance.
2. Be willing to learn and adapt. This initial HIA opened doors for the health improvement team to start thinking more broadly about their involvement in developing consultations and prioritising responses. This provided greater opportunity for public health influence than initially expected.
3. Focus on relationship building, not just the immediate piece of work.

4: Simon Harvey, Derby

The challenge

I was already exploring a way of bringing together food, environmental sustainability, community and poverty alleviation together with local authority partners prior to the pandemic as a way of being more joined up around the obesity agenda. However, this was accelerated by the potential impending food chain and food access crisis that appeared at the start of the first pandemic lockdown. This situation exposed the vulnerabilities of poorer sections of the community as well as potential vulnerabilities in the local food supply chain. The challenge was to develop an approach, which would not only address the immediate emergency but start to change the conversation around food for the longer term and the importance of environmental sustainability.

The solution

As part of the initial pandemic response, I worked closely with VCSE partners who were organising the food bank response. Through regular meetings and conversations, I supported the development of a vision for a local food network based on the Soil Association's Sustainable Food Places model. This brought together commercial partners, allotments

associations and other community sector partners to develop a strategy for a sustainable approach to addressing poverty, community cohesion and raising the profile of local businesses and food growers, in addition to health. This meant that the immediate food crisis could be addressed in a healthy and environmentally sustainable way through food banks but with a vision to explore new approaches beyond the pandemic

The impact

The immediate impact was to get Derby City to become a formal member of the Soil Association's Sustainable Food Places network, raising the profile nationally of the work that Derby had done around the food and sustainability agenda. It has maintained a thriving network, which includes food bank, commercial and community partners as well as links into the health and wellbeing board.

Lessons learned

Lessons learned included:

- The importance of developing a wider vision of public health that is owned by wider community
- Seeing beyond immediate crisis to root causes and longer-term ambitions (but still being able to deal with the immediate crisis)
- Recognising that there are (or should be) very few closed doors for public health.
- Having the courage to take public health into new arenas.
- Relationships and reputation. Giving people a reason to be pleased to work with us.
- Leading by being a leader without waiting for the badge

Having to do everything online was a challenge, particularly in developing and maintaining relationships with and between partners. My involvement with this project ended before pandemic restrictions were completely lifted. In future would do much more face to face engagement, especially with VCSE partners and local communities.

Link to further resources/information:
https://www.sustainablefoodplaces.org/members/derby/

Health Protection Placement Case Studies

5: Charlie Dearman, Extreme Events and Health Protection Team, Centre for Climate Change and Health Security, UKHSA

The challenge

UKHSA published the Adverse Weather and Health Plan in 2023. This replaced the heatwave and the cold weather plans for England, and included a new impact-based Weather Health Alerting system. It was produced in collaboration with other stakeholders from across government. A key role for registrars in the team was to lead on the production of guidance.

The solution

This project involved co-leading on public guidance on reducing risk associated with adverse weather. National guidance was produced for healthcare professionals, for social care/care home managers, and for people with responsibility for those that were sleeping rough. The guidance for rough sleepers was carried out in conjunction with the Greater London Authority's (GLA) efforts to produce a Heat-Severe Weather Emergency Protocol (H-SWEP). This collaboration allowed for efficient sharing of resources, a forum to share learnings and to expand the dissemination of our key messages.

The impact

The AWHP was launched at a formal webinar and is supported by operational webinars by UKHSA for both summer and winter seasons. There have also been many presentations of the work at webinars hosted by other stakeholders, especially those in the voluntary and community sector. The AWHP will be underpinned by an evaluation framework and outcomes will be recorded, with an annual report produced every year.

Lessons learned

Working with the Extreme Events and Health Protection team is a valuable experience for public health registrars. The work poses many interesting challenges including in communication, as many people in vulnerable groups do not necessarily see themselves as vulnerable to extremes in temperature or other adverse weather events. Working with the behavioural insights team in UKHSA was helpful for developing the effective messages, (which need to be both comprehensive and evidence based, yet easy to understand). Another important lesson for registrars is the importance of a broad professional network. Here we were able to establish a productive collaboration with the GLA that improved both organisations' work. Finally, this project highlighted the importance of an empowered voluntary sector which we supported by providing them with the expert knowledge to so they could produce their own guidance to aid their crucial work in this area.

Links to any further resources and relevant information:

- https://homeless.org.uk/knowledge-hub/guidance-on-cold-weather-provision-swep-and-heatwaves/
- https://www.gov.uk/government/publications/hot-weather-and-health-supporting-vulnerable-people

- https://www.london.gov.uk/mayor-activates-more-support-rough-sleepers-during-london-heatwave

6: Charlie Dearman, Extreme Events and Health Protection Team, Centre for Climate Change and Health Security, UKHSA

The challenge

The Centre for Climate Change and Health Security (CCHS) at UKHSA is a new division and has been established to protect health from a changing climate. It has developed a strategy to achieve these aims, which includes a theory of change. There was interest in embedding the United Nations Sustainable Development Goals (SDGs) into this strategy and CCHS's wider work.

The solution

This was an exploratory piece involving interviewing team leaders in the new centre, mapping which of the SDGs the centre contributed to and where opportunities were to further embed the SDGs into CCHS' strategy. There were three key questions: first if CCHS's aims aligned with the SDGs; second, if so, how can these be enhanced and what are the potential benefits to the CCHS; and third, what is the route map for CCHS to become an SDG leader. The report included recommendations for embedding SDGs into the work of the centre.

The impact

This exercise helped to show how the organisation was already aligned with the SDG goals, and to identify several opportunities for embedding them further. There were some simple suggested asks for staff for example adding an update to their email signature to express support for the SDGs as well as formal recognition of the SDGs in the centre's theory of change model. The piece of work helped to identify future actions to align evaluation and monitoring activities with the SDGs.

Lessons learned

From a registrar perspective, a key lesson is to seek the opportunities as they arise to embed sustainability into the work and strategy of the organisations we work for. Using formal change models (here we used Kotter's 8 stage model of change to good effect) can be helpful. The SDGs are a useful framework to think through the wide breadth of issues related to sustainable development.

Links to any further resources and relevant information:

UN 17 Sustainable Development Goals: https://sdgs.un.org/goals

Academic Placement Case Studies

7: Dmitri Nepogodiev, University of Birmingham

The challenge

Decarbonisation of healthcare is critical as it contributes 4.6% of global carbon emissions. Operating theatres contribute at least 25% of hospitals' carbon output. World leaders have pledged to achieve Net Zero healthcare by 2045. Our team focusses on how to reduce the carbon footprint of operating theatres and apply these lessons to the wider hospital. Attempting to change a whole hospital at once is complex and likely to fail, so we have focussed on operating theatres, before expanding across other hospital areas.

The solution

At the University of Birmingham our team have been funded to undertake research in to how to reduce the environmental impact of hospitals. We will co-develop and test interventions to provide the evidence base for decarbonising operating theatres, in partnership with patients, clinicians, managers, and environmental scientists. We will (1) fill global knowledge gaps to design quality improvement studies, (2) develop outcome measures that include easy-to-understand cost and carbon models, (3) launch a large, randomised trial to test a specific intervention, (4) undertake two Green Quality Improvement Projects (G-QIPs).

The impact

This research is currently ongoing.

Lessons learned

There would be a wide range of activities to get involved in across various methodologies (stakeholder work and PPIE, co-development of interventions, RCTs, QIPs, modelling).

8: Emily Tweed, Scotland

The challenge

There was an opportunity to update a Public Health Master's module at the University of Glasgow. The module had previously been an Environmental Health module, primarily focused on environmental hazards and taught by environmental health officers. A public health registrar updated and co-convened the module, shaping it into a Planetary Health module to include environmental change more broadly, with a global, rather than local, outlook.

The solution

Updating and co-convening the module involved updating course content, recruiting new speakers, establishing new intended learning outcomes (ILOs) and formulating assessments.

Speakers were interdisciplinary to provide breadth of expertise. To ensure continuity for students was maintained, the module convenors attended all lectures, introducing speakers and facilitating end-of-session discussions to draw links between topics.

Material taught in the module was coordinated with that in other modules from the Public Health Master's to avoid content duplication and create coherence in the course as a whole.

The impact

Twenty-nine students took this module in the first year following its transformation. Feedback was overwhelmingly positive, particularly regarding topics covered and guest speakers. The group work format of an assessment was less well received, feedback that will be considered when planning subsequent years of the course.

Lessons learned

- Convening a module is a big time commitment. There are often hard deadlines, for example, when marking assessments.
- Co-convening is a useful model to share workload. Given the registrar's experience in broad public health practice, convening the module with someone with skills in another area, in this case in sustainable nutrition, was a helpful partnership.
- The interdisciplinary nature of the course and speakers meant it was necessary to provide a shared language to communicate effectively and avoid assumptions about individuals' starting points.
- This opportunity enabled the registrar to develop their teaching skills and was a useful exercise in determining course content priorities and how to deliver material in the limited available sessions.

9: Jenny Mack, Public Health Consultant, Institute of Public Health, Northern Ireland

The challenge

The joint public health conference is an annual, long-standing event organised by the Institute of Public Health and partners across the island of Ireland. Climate change is not currently a defined policy area within Northern Ireland health policy. Therefore, it is also not a strategic objective for the Public Health Agency. The idea of this project (the organisation of a conference) was to highlight the importance of climate change as a public health issue.

The solution

The Healthy Planet, Healthy People conference was a means of communicating that climate change is a public health threat and providing information about the topic to attendees, with a

range of high profile speakers. The event enabled information sharing, knowledge dissemination, and provided an opportunity for local stakeholders to link to others in other jurisdictions. The idea was to provide policymakers with the information they might need when developing climate change and health policy. This was an all-island event with a focus on co-operation and collaboration across the island of Ireland. It was a full day, online conference with the opportunity to submit abstracts in advance. The organisation of the conference included chairing the conference committee and abstract subcommittee, stakeholder management and event planning.

The impact

About 1,000 people registered for the conference and between 400 and 500 people attended. The audience was international and very broad, including health professionals, public health, academics, policy makers, representatives from the media and others. A conference video was produced which contains highlights from keynotes and is available on the conference website. The conference received positive feedback, with speakers found to be passionate and high-energy.

Lessons learned

Take time to plan the abstract submission process and make it a very transparent process; engage early with all partners; try and follow up with a meeting of policymakers. Ensure the conference is not 'just' a conference and a one-off event but is followed up with a commitment to tangible, strategic action and use it as a springboard for further work while people are interested and engaged.

Link to further resources/information: The conference website is available here: https://healthyplanetconference.org/

10: James Smith, University of Cambridge

The challenge

The University of Cambridge has relevant expertise and prior work on sustainability and health, and cross-university initiatives, such as Cambridge Zero, Cambridge Public Health and Global Challenges. However, this work has not yet been brought together using a planetary health lens. Planetary health cannot be well understood without social, political, and cultural perspectives and there is growing local acknowledgement of the legacies of colonialism.

The solution

A project, aimed at introducing the discussion of integrating planetary health into education and research practice in the University of Cambridge over February to July 2023. This work was led by the Assistant Director of Public Health Studies at the School of Clinical Medicine, with the support of a programme coordinator and a public health registrar. The objectives were:

- To bring the voices of global planetary health experts to Cambridge
- To assemble Cambridge researchers to raise consciousness of planetary health and specify potential research
- To communicate this to senior University leaders to inform future research, in anticipation of future UKRI planetary health calls.

The project had four components:

1. A planetary health webinar series, featuring international experts, research funders and the editor of the Lancet Planetary Health;

2. A half-day workshop with the aim of bringing together researchers from across the Cambridge community to consider best practice for engaging equitably in the field of planetary health, opportunities for future work, and next steps to advance the field;

3. A report, "Building the field of planetary health in the University of Cambridge", summarising the key learnings and recommendations from the webinar series and the workshop;

4. A meeting with University of Cambridge senior leaders, with the aim of reviewing the report and deciding the next steps for building the field of planetary health in the University of Cambridge.

The impact

Around 30 people attended each of the three webinars and around 30 researchers and students attended the workshop. The meeting with senior leaders was well-attended. There was strong support for more joined up and equitable research in the field of planetary health and leaders have committed to developing further actions on this agenda.

Lessons learned

Despite the calibre of the speakers, attendance at the webinars was lower than wanted. This may have been due to the timing of the events during the day and insufficient advertising. More time to promote the webinars and a 5pm or 6pm time slot may have resulted in greater attendance. While the workshop had an acceptable number of participants, some relevant research groups were not represented. This may have been improved with invitations being sent further in advance and additional personal invitations and reminders. On the other hand, the meeting with senior leaders was well-attended, which was a result of sending the invitation several months in advance and determining the date and time based on key participants' availability.

More time could have been dedicated to reflecting and debriefing on each of the project components after their completion, as this could have better informed the following steps of the project. Furthermore, as this project was not service work and was not a central project for the academic clinical fellow involved, not enough time was spent thinking about the learning outcomes that could be achieved through this project and how to best use this opportunity to contribute to public health training.

Healthcare Public Health Case Studies

11: Public health registrar, NHS England and Improvement

The challenge

NHS England and Improvement (NHSE&I) Screening and Immunisation Teams (SITs) work closely with their regional commissioning team in managing contracting arrangements of the services they commission. These include services on adult cancer and non-cancer screening, antenatal and newborn screening, immunisation for children and adults, and the Child Health Information Service (CHIS- a service that manages children's health records). In one NHSE region when the incumbent provider contracts for CHIS were due to end, members of the SITs were involved in the joint procurement process for a new provider, with support from the regional procurement team.

There was a national NHSE&I commitment to sustainability as set out in the then Interim Green Plan and a question on sustainability was included in the procurement questions as part of this commitment.

The solution

A set of questions on social value was included in the invitation to tender (ITT) questions, which included a sub-question on environmental sustainability relating to sustainable travel solutions. Members of the SITs, including a public health registrar on placement with the SIT were involved in evaluating and scoring responses to ITT questions by interested bidders.

The public health registrar involved in this procurement exercise was one of the evaluators of the questions on social value. Scoring the responses to questions, and later moderating these scores with other evaluators gave an opportunity to consider and discuss the value of including sustainability in the ITT questions.

The impact

The responses were revealing of sustainability practices in place by some bidders, whilst others did not respond to the sustainability aspect of the question at all. Those who had considered sustainability in depth were able to demonstrate this across financial, environmental, and social facets, drawing on co-benefits, for example, through encouraging active travel and hybrid ways of working.

By including an environmental sustainability question within the ITT, the SIT was able to objectively value bidders' commitment to sustainable practices alongside other public health requirements. In addition, the SIT was able to signal the importance of sustainable practice to bidders, potentially influencing their ongoing practices and future bids.

Further, the exercise enabled the SIT to link in with regional priorities and raised awareness of environmental sustainability and the role that public health can have.

Lessons learned

Identifying regional and local sustainability leads and passionate advocates was vital to understanding the local landscape, including identification of local Green Plans and regional priorities that could be incorporated into local work.

12: Emily Loud, East of England

The challenge

NHS England Integrated Care Systems (ICS) were expected to produce Green Plans by March 2022. During my placement with an ICS, I identified that their Green Plan lacked connection between the proposed carbon reduction commitments and local health outcomes and inequalities; did not include a prevention element; and that outcome measurements of impact needed refinement.

The solution

As a public health registrar, on a 4-month placement, I worked with the ICS's Integrated Care Board (ICB) and local Greener NHS leads on a Green Plan health impact assessment (HIA), which aimed to identify ways to maximise the positive health and inequality impacts that the proposed carbon reduction activities could have, and to establish a workstream that united carbon reduction and population health.

Local stakeholders were consulted, and data assembled to:

(1) assess what impact the current Green Plan commitments could have on carbon reduction and local health outcomes. Health issues related to four key areas were prioritised for review: air pollution, extreme weather, nutrition, and active travel.

(2) make recommendations to improve the chances of health improvement and carbon reduction.

The output produced a report, summary and infographic which covered each Green Plan theme and its associated health outcomes

The impact

The Board of the ICB (including representatives from all partner organisations) and ICB executives responded positively to the HIA, encouraged development of an annual action plan to take forward the recommendations, and made some financial resource available to begin these actions. Local sustainability leads indicated that by connecting carbon reduction to health outcomes, the report would help them to get support and resources within their organisations to proceed with carbon reduction work.

Lessons learned

The process of consulting with partners drew attention to the connections between health and Green Plans. A longer placement could have supported better the process of gathering feedback.

Link to the HIA:

bedfordshirelutonandmiltonkeynes.icb.nhs.uk/our-publications/sustainability/health-impact-assessment-blmk-green-plan/?layout=default

13: Shannon Kennedy, NHS England ICB

The challenge

Whilst completing a placement within an NHS England Integrated Care Board (ICB), I supported the climate team in a revision of their climate strategy, which would apply to their Integrated Care Partnership (ICP). The main challenges of the current strategy were that it lacked content on adaptation, lacked commitments to specific actions, and needed to take a more system-wide approach so that climate activity extended beyond health and social care.

The solution

First, I went upstream (at Partnership level) to ensure there was senior-level strategic commitment to the climate strategy and agreement on extending it to include adaptation. This was my way of making sure there was mutual commitment to, ownership of, and accountability around progressing adaptation action. I also incorporated other concepts into the new strategy, including the Doughnut model, justice, community involvement, and a system-wide approach. The latter system-wide approach ensured that the strategy's applicability extended beyond health and social care activity. For example, it made commitments to things like providing green jobs, and creating inclusive and sustainable economies.

The team and I also engaged with stakeholders from across the partnership with an interest in climate and sustainability e.g., from some local authority and third sector organisations. This engagement work helped to hone the strategy and to identify the points of weakness where better or more convincing communication of the need for action was necessary. A recurrent theme was that partners wanted more guidance and/or a list of specific actions they could take in response to the climate emergency.

In the end, the strategy included a menu of environmental sustainability activity options for the system, with a recognition that organisations would work through the life of the strategy at different paces and from different starting points and priorities. Whilst the list of options may not have been exhaustive, it was felt that those put forward could result in important and substantial progress towards the response to the climate emergency across the partnership.

The impact

We took the strategy and menu of actions to our Partnership board, who gave their assent to it as a working draft. The menu of actions was also accepted as a means of self-monitoring progress within the system, and thus established a link between the Integrated Care System's risk register and their climate work. The board additionally asked that we take the work to our Health and Wellbeing Boards to get Place buy-in.

Additionally, I had the opportunity to act as a critical friend for a Place that was developing a place-based adaptation plan, which is now being shared nationally as an example of good practice. During this time, I was also able to interview the lead author of that plan to identify themes, lessons, etc. I have subsequently been able to capture all of my learning in an adaptation position paper for the ICB and ICP, which outlines the need to address adaption across the system and puts forward recommendations for how to go about this.

Lessons learned

- Upon arrival in my placement, I had to have courage to challenge the limitations of the current climate strategy and put forward a proposal for a revision.

- I learned the value of repetition, both in influencing people and in getting topics on the agenda. There was value in being a bit of what felt like a broken record, but also listening to what others had to say alongside saying my piece over and over in different settings or to different audiences.

- I also learned that even when people are saying good things about climate, they don't often seem to have the actual practicable plans in place. People want to act but don't know how to start, or lack the resource.

- Every organisation needs to make climate a part of every role. At the moment, people without climate specifically on their remits, are unsure of their professional role to progress action.

- There is a gap between climate goals and what actually needs to be done to address the issue. If only the former are worked towards, there is a risk that not enough will be done.

- Many see climate change as just another challenge equivalent to whatever else they're working on. It's tough to get people to agree that climate is the main issue, and that every other challenge is just perched on top of that.

- Next time, I would take on the strategy work from the get-go, consult and involve more widely from the start, and include adaptation in this.

Link to further resources/information:

You can find the strategy here:
https://www.wypartnership.co.uk/application/files/7616/7757/7646/08_Partnerships_Climate_Change_Strategy.pdf

14: Jamie-Rae Tanner, West Midlands

The challenge

Health Impact Assessment of redevelopment of a community hospital. There was a flood risk to the site, older population, lack of transport links, and controversy about inpatient community hospital beds.

The solution

Sustainability was included within the HIA with an extra focus on local vulnerable species.

The impact

A report with recommendations was formulated.

Lessons learned

Engage board members more effectively on the need to act on climate. Building material costs went up and there was a real concern than recommendations wouldn't be acted upon.

Link to further resources/information: https://www.swft.nhs.uk/our-hospitals/ellen-badger-hospital/ellen-badger-hospital-development-plans

15: Public health registrar, Screening and Immunisations

The challenge

A public health registrar interested in environmental sustainability wanted to increase their knowledge, raise awareness within their team, and understand the opportunities to incorporate environmental sustainability considerations into workstreams within their Screening and Immunisations placement.

The solution

The registrar developed a CPD session outlining:

1. Basic information about climate change and its impacts, particularly on health
2. How climate change might impact on screening and immunisation services

This session was delivered to the local Screening and Immunisation Team (SIT) and included breakout sessions that provided the opportunity to consider how their roles might contribute to climate action. They were then asked to consider potential operational changes, team actions, individual actions and any quick wins which were then fed back into the session.

Recommendations were made to:

- integrate environmental sustainability into all areas of work (examples included procurement, contracting and delivery of services),
- include environmental sustainability as a priority within each workstream (similar to reducing health inequalities)
- consider carbon foot-printing and sustainability impact assessments for each service

Buy-in was also sought during the session for sustainability workstream leads, with requests for quick win pledges, additions being made to the local sustainability action plan and commitment to continue to meet to develop ideas further.

The impact

The CPD session was well received, raising the profile of environmental sustainability within public health work and helping to embed it into thought processes. Several additional pieces of work were developed as a result, including a sustainability action plan, an update to the immunisation strategy to include the need for sustainability impact assessments for each programme, and developing additional resources (such as slides on potential quick wins for the SIT). Two permanent members of staff volunteered as workstream leads and this ensured longevity and progress of the work initiated after the registrar's placement ended.

Lessons learned

Identifying regional and local sustainability leads enabled an understanding of relevant plans and regional priorities that could be incorporated into the session. Starting this engagement work and running the CPD session earlier in the placement would have provided more time to develop follow-up actions that were identified.

Additional Case Studies

16: Oliver Williams, Public Health Wales Behavioural Science Unit

The challenge

The climate crisis presents a persistent and growing environmental burden of disease with significant public health consequences. Addressing the crisis via mitigation and adaptation methods requires changing our behaviour. Professionals and practitioners working on policies, services and communications related to the climate crisis could learn from behavioural science to understand how to best frame policies and bring on board stakeholders and the public.

The solution

During a placement in the Public Health Wales Behavioural Science Unit, the registrar led the creation of a visual guide with the aim of supporting professionals and practitioners working on policy, services or communication to tackle the climate crisis. The guide offers useful tips on incorporating behavioural insights and increasing the likelihood of a change in behaviour being adopted.

The guide was created with input from behavioural scientists and environmental health teams, Behavioural Science Unit staff and graphic designers.

The guide follows the structure of six headings using the acronym ACT NOW:

- Assemble the immediate benefits
- Commitments and planning
- Tackle habits
- Never forget COM-B
- Optimistic and relatable actions
- Windows of opportunity

The impact

The guide was launched in November 2022 and is available in English and Welsh online. It is publicly available on the Public Health Wales website as well as the Faculty of Public Health resources page. It was presented to government workers and members of the public at the Welsh Government Climate Week 2022 and has been presented at other conferences and events. Informal feedback has been that the guide is timely and to the point.

Lessons learned

- It is important to identify stakeholders and engage them as early as possible. It is not always clear who the main stakeholders are, so identifying other stakeholders early could help with identifying and engaging others.
- Producing a document often takes more time than anticipated. With the creation of this guide, time needed to be allowed for design, production and translation.

- It is important to have a plan to evaluate the impact of a project before it is launched and have a plan to collect qualitative feedback.
- It was helpful to launch the guide around an existing event (the Welsh Climate Week).
- It is a challenge to persuade people that this guide and action on the climate crisis applies to everyone and not just those working in specific teams.

17: Shannon Kennedy, Sustainable Development Special Interest Group

The challenge

Whilst supporting an NHS England Integrated Care Board (ICB) to develop their climate strategy, I recognised a lack of consensus on what a public health approach to adaption is.

The solution

Throughout my placement I did a lot of reading on climate change adaptation and spoke to people working on adaptation within the ICB, Greener NHS, and in academia to build my own understanding of the topic and consider public health's role. I eventually linked up with public health colleagues who were also working on the area, and together we agreed there was a gap in understanding and agreement on what public health's role in adaptation is and how to communicate this with a coherent narrative.

The impact

Together with other interested public health colleagues, we established an adaptation sub-group of the Faculty of Public Health (FPH) Sustainability Special Interest Group (SIG). To date, we have begun to identify key workstreams for activity and have arranged adaptation workshops and webinars during Summer 2023.

Lessons learned

I think a proof of concept for a system-wide adaptation plan for e.g., a single topic or service might be useful, and this is something I'm trying to get set up with colleagues who are involved in Place-level adaptation. We are also sharing examples of practice from our work and supporting one another to take this work to Board level, where it is gaining more recognition. Finally, we are keen to develop a public health narrative on adaptation.

Link to further resources/information: On 21 June 2023 the FPH co-hosted a Climate and Health Conference on the theme of climate adaptation in the UK. Links to the presentations and recordings are available on the FPH website:

https://www.fph.org.uk/policy-advocacy/special-interest-groups/special-interest-groups-list/sustainable-development-special-interest-group/

18: Paul McGurnaghan, Public Health Agency, Northern Ireland

The challenge

Northern Ireland is early to the journey on responding to climate and health issues and there is no defined path for trainees to follow if wanting to work on this. There is one consultant working on climate and health but it's not a formal part of strategy. This project, which involved mapping actions on climate and health to the Essential Public Health Operations ten functions for effective public health organisations, was aimed at putting a framework in place to guide the work. The aim was to develop a resource to support public health organisations in identifying how they can begin to address issues related to climate and health.

The solution

The project involved the development of a visual aid to support the operationalisation of guidance on climate change, using a systems approach. It was decided to use an international framework, and The World Health Organisation's (WHO) 10 Essential Public Health Operations (EPHO) was selected as this is internationally recognised so the document could be used at an international level.

The process involved looking at recognised resources/recommendations published for climate and health including:

- The Lancet Countdown UK Policy Brief 2017-2022
- Royal College of Paediatrics and Child Health (RCPCH) position paper on air quality in the UK, 2020
- European Academies Science Advisory Council (EASAC) policy report 2019
- Joint editorial, BMJ 2021
- COP26 special report on climate change and health, WHO, 2021

The essential public health operations were then cross-referenced against recommendations from each of the reports, to create a visual tool showing where public health could have a role in tackling climate and health problems. This project was supervised by a consultant with a joint appointment in academia and health protection.

The impact

The visual tool has been accepted as a poster at the European Public Health Conference and presented at a regional public health event for public health trainees. There is a plan to evaluate the impact of the tool. Next steps might involve mapping to the FPH public health functions, to make the tool more UK relevant, and/or refining the tool using a Delphi method.

Lessons learned

This was a naturally evolving rather than a planned piece of work designed initially to support internal conversations and then moving on to become a more general tool. It would have been helpful to have had more academic rigour and to have more stakeholders involved in the mapping.

Link to further resources/information:

- EPHOs: https://www.fph.org.uk/media/4ojeo5bk/public-health-curriculum-2022-v13_final.pdf
- The Lancet Countdown UK Policy Brief 2017-2022: https://www.bma.org.uk/media/6332/2022-lancet-countdown-uk-policy-brief.pdf
- Royal College of Paediatrics and Child Health (RCPCH) position paper on air quality in the UK, 2020: https://www.rcpch.ac.uk/resources/air-pollution-uk-position-statement#:~:text=RCPCH%20recommendations,-1.&text=The%20NHS%20should%20reduce%20its,to%20hospitals%2C%20clinics%20and%20appointments.
- European Academies Science Advisory Council (EASAC) policy report 2019: https://easac.eu/publications/details/the-imperative-of-climate-action-to-protect-human-health-in-europe
- Joint editorial, BMJ 2021: https://www.bmj.com/content/374/bmj.n1734
- COP26 special report on climate change and health, WHO, 2021: https://www.who.int/publications/i/item/9789240036727