

Fellowship call for applications

Green and sustainable healthcare: improvement research

1 Background

1.1 Facing the challenge

The risks of climate change continue to grow in prominence. Current projections suggest we could see increases of 3 to 4°C in global temperatures by 2100, with catastrophic effects. Recent extreme weather events, from heatwaves in north America and flooding in western Europe to devastation in low income countries during summer 2021, confirm the urgency of the challenge. Many of the effects are likely to be felt in people's health, given the intimate relationship between health and the environment. Climate change is now generating both direct consequences for health (e.g. heat-related deaths and rises in vector-borne infections⁽¹⁾) and indirect consequences (e.g. disrupted food systems and economic and political instability). The distribution of these consequences reflects established patterns of inequality. For instance, ethnic minority groups and those in deprived areas experience greater harms from air pollution, which account for around 28,000-36,000 excess deaths a year.⁽²⁾

Given the role of climate change in health and inequalities in health, it is perhaps ironic that healthcare systems themselves are major contributors to climate change. If the global health sector were a country, some estimates put it as the fifth largest source of greenhouse gas emissions on the planet.⁽³⁾ In the UK, the NHS is responsible for around 4% of all carbon emissions and about a fifth of public sector emissions. Just one area – such as pharmaceuticals – drives high levels of emissions through manufacturing and refining processes with high-risk chemicals, long supply chains and high rates of waste. Particular clinical specialties may also pose specific environmental challenges. In anaesthetics, for example, environmentally consequential routine use of high quantities of drugs (fresh gas flow rates and concentrations) may be driven by regulation and historic practice more than need.⁽⁴⁾ In another example, areas such as renal services may have avoidably high rates of water and energy use and generate large volumes of waste.⁽⁵⁾

Given the disease burden of direct emissions from healthcare, calls are increasingly made for leaders to give environmental sustainability top priority. Action to achieve low carbon health systems includes changing energy use patterns, building design, disposal of waste, procurement and supply chains, and care processes. But developing sustainable services requires efforts not just to reduce greenhouse gases – ‘inside out’ impacts of healthcare – but also to strengthen the resilience of organisations to future climate change or ‘outside in’ effects on healthcare.(6) Organisations need to prepare for operational challenges and changes in demand for services prompted by climate events, including heat-related illnesses and disruption to supply chains or scarcity of essential materials. And they need high quality evidence to support them in addressing those challenges.

1.2 NHS actions

Good progress has been made already. Over the last thirty years, emissions under NHS direct control have fallen by 62%.(7) Counting the wider impact across the whole supply chain, including transport of goods or patient journeys, carbon footprint has reduced by over a quarter since 1990. Local services have contributed to these achievements through initiatives ranging from redesigning nephrology services to minimising use of plastic gloves in hospitals. In addition, NHS organisations can, as anchor institutions,(8) influence local policy and practice in their communities through actions such as better transport links, promoting recycling and reducing food waste.

But more must be done. In the last year, targets have been set in all countries of the UK to achieve net zero health services by 2045 (or earlier), with ambitious strategic roadmaps and actions for local organisations.

The COVID-19 pandemic has provided opportunities and challenges for environmental advances. On the one hand, infection control measures saw greater use of disposable personal protective equipment and supplies, with adverse environment effects. But at the same time, the shock of the pandemic also showed that rapid and large-scale changes to the way services are delivered are possible. If sustained, changes like the remote provision of many forms of care could generate positive impact on NHS-related carbon emissions. The net effect of such changes has not yet been established, but there is important learning to be gained on design of work practices and the role of digital healthcare in meeting environmental goals.

1.3 Gaps in knowledge

As the NHS reduces its carbon footprint, many knowledge gaps can be identified. Not enough is known, for example, about how to improve the energy efficiency of older buildings, how to manage the switch from disposable to reusable equipment and how to optimise more sustainable ways of organising services and reducing waste. One scoping review helpfully used conceptual framing from industrial ecology to characterise 1748 papers up to 2017 on

sustainable healthcare.⁷ The authors noted that little work had been done to date on 'background effects' – impact of purchased energy, goods and services and supply chains – although these contributed more to carbon footprint than direct emissions from healthcare organisations. In addition, more research effort has been focused on 'inside out' activity to reduce environmental harms of healthcare activity than on 'outside in' impact of climate change and future environmental shocks to the capacity and running of health services. Future research in this area could draw on other relevant bodies of evidence, such as emergency planning and management in healthcare.⁽⁹⁾ Another literature review of pharmaceutical environmental harms pointed to the need for 'life cycle assessments' of medicines, that is considering the end-to-end environmental harms of medicines across the supply chain and not just in manufacture.⁽¹⁰⁾ And other research has pointed to the potential for 'reverse learning' from lower and middle income countries on more sustainable practices and use of resources.⁽¹¹⁾

In particular areas, some helpful initiatives to identify the most pressing research questions have been undertaken. Examples include a current exercise to set priorities for research on environmentally sustainable perioperative practices or greener operations, with engagement from patients, public, clinicians and managers.⁽¹²⁾

In all cases, the shift to more environmentally sustainable systems and practices will require building of a sound evidence base. But industry or traditional funding support may be hard to attract for some important questions – including those relating to technology. One example concerns the evidence base on infection risk with different types of instrument – single use, re-usable or hybrid – and design principles to improve the ease and effectiveness of sterilisation and understanding barriers to re-use of equipment.

While technology is an important focus for sustainability research in healthcare, it is not the only one. A systematic review of hospital sustainability concluded that more is known about the technology to reduce carbon footprint than behaviours which govern activity.⁴ Research is needed to identify wasteful or environmentally harmful processes of many kinds and to co-create and evaluate potential solutions with those working in and using healthcare. At an organisation or system level, work is needed to understand the tensions and balance between environmental sustainability and other important drivers such as health and safety concerns. In terms of improvement activities, we need to understand how to embed environmental sustainability as a core dimension of quality (similar to patient safety) in organisational cultures and practice.

Linked to this is the need to examine how teams and organisations can adapt and respond to shape services which are sustainable and contribute to a net zero carbon future, and how they can include the patient perspective at every stage. This includes activity at individual level, from decisions to walk or cycle to work to use of medical devices by clinicians, as well as what works to influence and incentivise organisational change for greener pathways and processes. There are also wider links with activity to reduce low value or ineffective healthcare practices or procedures and the broader 'choose wisely' policy platform to reduce overuse of healthcare.⁽¹³⁾

What is clear, therefore, is that achieving lower carbon systems means addressing many of the well-known challenges in the study of healthcare improvement: how to design and

evaluate care pathways, how to specify process improvements, how to implement evidence, how to support cultural change, how to design work systems and practices, and how to make sure that quality and safety are delivered and that patient experience and outcomes are priorities throughout. Different disciplines, from material and environmental sciences, clinical specialties, industrial ecology, human factors, operational research, pharmacy, design and social sciences – and many, many others – need to be brought together in new ways to deliver robust solutions that are attentive to the multiple considerations in play. This will involve careful stakeholder engagement, bringing together clinicians, patients, managers, and many wider stakeholders to develop sustainable clinical pathways.

THIS Institute is keen to encourage innovative research activity to advance NHS capacity to improve environmental sustainability. Investment to date includes a postdoctoral fellowship to explore greener operating theatre design, including ventilation of anaesthetic gases bringing together researchers, architects, patients and perioperative teams to develop better solutions. More research is needed to strengthen the evidence base for the NHS in driving sustainable change.

2 Fellowship award

THIS Institute wishes to award fellowships to individuals based in universities or other research-intensive settings. Given the broad scope of improvement efforts to drive sustainable change in the NHS, we are open to a range of projects testing new thinking and approaches as well as building on what we already know. Proposals might, for example, focus on energy use, waste disposal, procurement and supply chains, operational processes, transport, hygiene practices, equipment and technology, care processes, device or building design – but they might also tackle many other research questions relevant to improving sustainability.

We welcome fellowship applications in any the following broad areas, including those that demonstrate cross-over or synergies between these areas:

- Development, co-design and formative evaluation of new approaches to carbon or waste reduction in healthcare. In this context, “new approaches” are very broadly defined to include everything from operational and clinical processes and pathways, transport policies, use of remote technologies, and new devices and designs through to behaviour change – and everything in between. Fresh thinking is very welcome.
- Developing high level guidance for improving sustainability and carbon reduction, for example through development of principles, frameworks or approaches to support decision-making and action under conditions of uncertainty and when many interests and considerations have to be balanced
- Testing, scaleup and formal evaluation of existing interventions showing promise in reducing carbon footprint

- Identification and formative evaluation of initiatives to develop resilience in healthcare organisations to mitigate the effects of external climate shocks
- Adaptation and evaluation of existing improvement approaches – such as use of networks, champions, quality improvement techniques, performance management, audit and feedback – to strengthen environmental sustainability,
- Methodological research to support measurement and monitoring of environmental effects of changes and their use by local decision-makers and their relation to other quality and safety performance metrics and wider quality improvement approaches in healthcare(14)

Whatever the focus, projects should:

- Make the case for the proposed work to address sustainable change. Projects might cover a range of improvement approaches and interventions. As illustrative examples (not intended to be an exhaustive list), they might include:
 - Identifying strategies for more efficient water use in hospitals
 - Designing sustainable new-build general practices
 - Minimising single-use equipment for community nurses and care homes
 - Co-designing strategies to reduce avoidable waste for areas such as chemotherapy and dialysis
 - Evaluating the ways in which clinical networks supported sustainable practice in ophthalmology services
 - Influencing prescribing behaviour to support 'greener' alternatives (eg reduced use of metered dose inhalers for people with asthma)
 - Modelling exercises with stakeholders to identify strategies for hospitals to cope with extreme flooding
- Seek to produce generalizable or transferable findings, even if conducted on one site only.
- Projects should contribute to scholarly work as well as generating actionable learning for the service. This might include appropriate theoretical framing for the study and awareness of relevant evidence bases.
- Make a strong case for the importance and feasibility of the intervention and research – for example, by showing it is a priority that has been identified by policy-makers or research, and that it will be possible to gain engagement by key stakeholder groups.¹⁰
- Use sound research principles to design and evaluate complex socio-technical interventions. For example, mixed methods may be used to address aspects of

measuring and modelling impact, sustaining change and experience of staff and patients.

- Consider pathways, people and culture to achieve change as well as the technology or policies for reducing carbon footprint. To assess the potential of interventions to be scaled up or influence practice, attention should be paid to context and delivery mechanisms. Where appropriate, projects should look at ways of assessing organisational culture, staff engagement and buy-in and use available theory and tools from disciplines such as implementation science.
- Ensure appropriate engagement of clinical and other staff in designing and testing new pathways and approaches to carbon reduction in the health system.
- Pay attention to inclusion, diversity and equality. There are tensions and trade-offs between environmental sustainability and other desired outcomes and these balances are different according to who you are and where you live. It will be particularly important to take account of the needs and behaviours of diverse communities and vulnerable or disadvantaged populations and impact of new activity.
- Consider a range of settings. Much research to date on sustainability has focused on hospitals, given high rates of carbon emission and more bounded activities. This fellowship scheme wants to fund high quality improvement research in a range of healthcare settings, recognising the particular difficulties in delivering and measuring environmental change outside hospitals and impact of one part of the system on others.

The fellows will work collaboratively with Tara Lamont, Senior Fellowship Adviser and Graham Martin, Director of Research at THIS to deliver projects as well as with other partners and stakeholder groups identified by applicants in their proposals.

3 Fellow requirements

Applicants for fellowships should be experienced researchers who can lead the project independently while sustaining excellent relationships with collaborators, clinicians, and wider health service stakeholders. Given the wide scope of research into environmentally sustainable healthcare, THIS is looking to support a number of fellowships with researchers from a wide range of relevant backgrounds and disciplines. These might include applied health research, ecology, behaviour change, engineering systems, device or building design and many, many others. Applicants should have a PhD in a relevant discipline or, exceptionally, equivalent postgraduate research experience. Applicants should demonstrate a good publication record for their stage of career, including peer-reviewed outputs.

The fellowship is suitable for applicants who are currently in post at UK universities or other research-intensive environments. Applicants should have a PhD in a relevant discipline or, exceptionally, equivalent postgraduate research experience, and should be available to work as soon as possible on this award. Applicants should be sufficiently post-doctoral (or equivalent) to be able to lead a project independently while sustaining excellent relationships with diverse stakeholders. Applications from those at senior level (e.g. associate professor/professor or equivalent) are welcomed, as the fellowship opportunity may be suitable for a sabbatical.

The appointed fellows will be offered a professional development programme which will be discussed on award and customised to the specifics of each fellow's needs, commitments, and fellowship duration. The programme may include, for example, membership of a learning set, coaching, and/or mentoring. Full engagement with the agreed programme will be expected.

4 Budget

Each award will include salary costs (at the agreed proportion of FTE) and research expenses directly relevant to the project up to a maximum of £270K. This fellowship should be completed in 36 months, or up to a maximum of 45 months if part-time, but applications for shorter awards are also welcome. It is expected that the fellowship(s) will begin in early 2022. Only direct costs can be paid; no overheads or indirect costs are payable. Direct costs are those items which are chargeable on the basis of cash amount spent and are that verifiable and auditable from the accounting records (e.g. invoices for non-pay expenditure and payroll for staffing). Examples of direct costs include staff costs specifically for the project, consumables, travel and small items of equipment.

The appointed fellow should be in post at their own university at time of application, with the intention that they remain employed by that university for the duration of the fellowship. They may also be in clinical practice affiliated to a university who has agreed to host and provide academic support to the fellow if successful.

5 References

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