Sustainable health and social care

Connecting environmental and financial performance

Key messages

- Spending on health and social care accounts for £1 in every £10 of the United Kingdom's gross domestic product (GDP) – more than £150 billion a year. Any activity on this scale inevitably has consequences for the natural environment. For example, carbon dioxide emissions attributable to the NHS in England alone are greater than the total emissions from all aircraft departing from Heathrow airport.

- Increasingly, health and social care will need to be delivered in ways that are not only financially sustainable, but environmentally sustainable too. This means minimising avoidable environmental damage while also ensuring that services are capable of responding to the health impacts and operational consequences of anticipated environmental changes.

- Improving environmental sustainability could contribute to other system objectives. There is a particularly close connection with the drive to improve productivity in the NHS; both agendas call for a renewed focus on cost-effectiveness, value and prevention of avoidable activity. Evidence suggests that adopting various measures could generate considerable cost savings for the health and social care sector, as well as reducing its environmental impacts.

- In some cases, improving environmental sustainability could also produce direct health benefits, as well as helping to improve the quality of services. For example, measures such as making better use of new technologies, developing more integrated forms of care, and removing duplication and redundancy from care pathways all have the potential to reduce environmental impacts while improving patient experience and outcomes.

- The scale of the environmental challenge suggests that improving efficiency at the day-to-day operational level will not be sufficient. A more fundamental transformation in service models is needed.

- To a large extent, the changes needed to improve environmental sustainability are the same as those needed to deliver quality improvements and financial sustainability. Services need to be re-designed to shift care upstream and place greater emphasis on primary care, prevention and self-management. If health and social care services were provided in such a way that service users experience an efficient journey through the system,

obtain maximum value from every contact with professionals, and receive well-co-ordinated support for their multiple needs, this should be more sustainable from both an environmental *and* a financial perspective.

■ At the same time, some changes are needed which are specifically related to environmental sustainability. For example, there are considerable opportunities to improve energy efficiency in hospitals and other care facilities, including through making some relatively simple changes in terms of heating and other forms of direct energy use. Organisations also need to assess the risks posed to their operations by the health impacts of climate change, increased incidence of extreme weather events, and raised prices for energy, water and other natural resources.

■ The current policy framework creates a number of barriers that discourage organisations from developing more sustainable approaches at the local level. Policy-makers need to explore what changes are needed to create a more enabling environment, as well as how existing policies can be delivered in the most sustainable way. Sustainability should increasingly be seen as an essential dimension of quality akin to equity or accessibility, with mechanisms to monitor and hold the system to account for its environmental performance.

Introduction

What is sustainable health and social care?

The idea that health and social care services should be planned, financed and delivered in ways that allow them to meet the needs of future generations as well as today's population is not new. We are well accustomed to the notion that services must be financially sustainable. Consider, for example, the long-running debates on what would constitute a sustainable funding model for social care.

What we are less familiar with in the health and social care sector is the notion that sustainability extends beyond having a sound *financial* basis for the future. The most widely used framework from the field of sustainable development recognises three interdependent elements – economic development, social development and environmental protection – sometimes referred to as the 'triple bottom line'. Applying this framework to health and social care implies that we should seek to have a system that is not only financially sustainable, but also minimises adverse impacts on society and on the natural environment, which could jeopardise the ability of future generations to meet their health and social care needs.

> *Sustainability means more than merely lasting or surviving; it means designing and delivering health care that uses resources in ways that don't prejudice future health and wellbeing.*
>
> David Pencheon, Director, NHS Sustainable Development Unit (Pencheon 2011)

The Department of Health has made a commitment to sustainable practices in the delivery of services (Department of Health 2008b), and established the NHS Sustainable Development Unit (SDU) to drive this agenda forward within the NHS. There have also been parallel developments within social care, such as the Sustainable Social Care programme delivered by the Social Care Institute for Excellence (SCIE).

This report is primarily concerned with *environmental* sustainability in health and social care. The scale of the sector means that it has a significant environmental impact. The NHS in particular is under increasing pressure to reduce its environmental impact as local, national and global efforts to mitigate climate change gather pace. Under the terms of the 2008 Climate Change Act, the United Kingdom is committed to reducing greenhouse gas emissions by 34 per cent by 2020, and by 80 per cent by 2050. As a significant contributor to emissions, the health and social care sector must play its part in

meeting these targets, and a number of policy levers, such as the CRC (Carbon Reduction Commitment) Energy Efficiency Scheme, create a financial incentive to do so.

In addition to reducing its impact on the environment (commonly referred to as 'mitigation'), the health and social care sector needs to ensure that it can function in a changing natural environment ('adaptation'). Anticipated environmental changes include changes to the climate, but also increasing scarcity of natural resources such as fossil fuels and water (Intergovernmental Panel on Climate Change 2007; Hanlon and McCartney 2008). These changes will have direct consequences for service provision, and will also affect the population's health and social care needs (Department of Health/Health Protection Agency 2008). Sustainability means being prepared for these changing needs. This two-way relationship is illustrated in Figure 1 below.

Figure 1 The two-way relationship between environmental change and health and social care
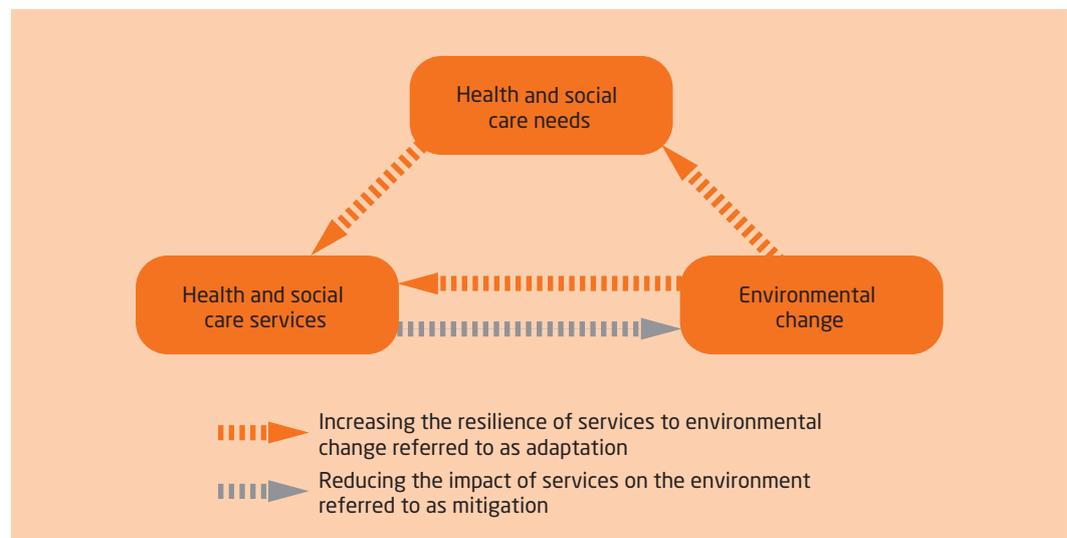
There are also more immediate incentives to engage with the issue of environmental sustainability. As described later in this report (*see* 'The business case for environmental sustainability', pages 9–10), there is an emerging literature on the potential synergies and co-benefits between the core objectives of health and social care and efforts to minimise environmental impacts. These are as follows.

■ *Financial* co-benefits: where developing environmentally sustainable approaches to the delivery of health and social care also reduces direct costs – for example, by promoting greater efficiency of resource use.

■ *Health* co-benefits: where approaches that reduce adverse impacts on the environment also improve public health – for example, promoting walking or cycling instead of driving.

■ *Quality* co-benefits: where changes to health or social care services simultaneously improve quality and reduce environmental impacts – for example, by minimising duplication and redundancy in care pathways.

It is important to be clear about what constitutes environmentally sustainable health and social care. In part, it means taking measures that explicitly promote sustainability – such as adopting new technologies in hospitals and other facilities, which reduce the environmental impact of health and social care buildings. But more fundamentally, it means delivering health and social services in a way that is as effective and efficient as possible. Ultimately, the most sustainable system is one that minimises unnecessary or ineffective use of resources (financial or natural) by delivering the right care, in the right place, at the right time – and by preventing care needs from arising at all, where possible.

There is, therefore, a close connection between environmental sustainability and efforts to improve productivity (for example, through the Quality, Innovation, Productivity and Prevention (QIPP) programme).

Report structure and research methodology

This report provides an overview of what is currently known about the environmental impacts of health and social care, before examining the evidence for a connection between sustainability, productivity and other system objectives. It goes on to describe how health and social care needs to change in order to become more environmentally sustainable. Finally, it discusses the kind of behaviours and policies needed to implement these changes, drawing out key recommendations for health and social care organisations, as well as policy implications.

The report is based on a literature review and stakeholder consultation process, including semi-structured interviews with 28 representatives of key stakeholder groups. These were conducted as part of a scoping review commissioned by the Service Delivery and Organisation (SDO) programme of the National Institute for Health Research and the Social Care Institute for Excellence (SCIE), through its Sustainable Social Care programme. The full report of the scoping review, which explores how the research community can respond to the issues raised, is available on the SDO website (www.sdo.nihr.ac.uk). Complete methodological details are provided in the full report (Naylor and Appleby 2012).
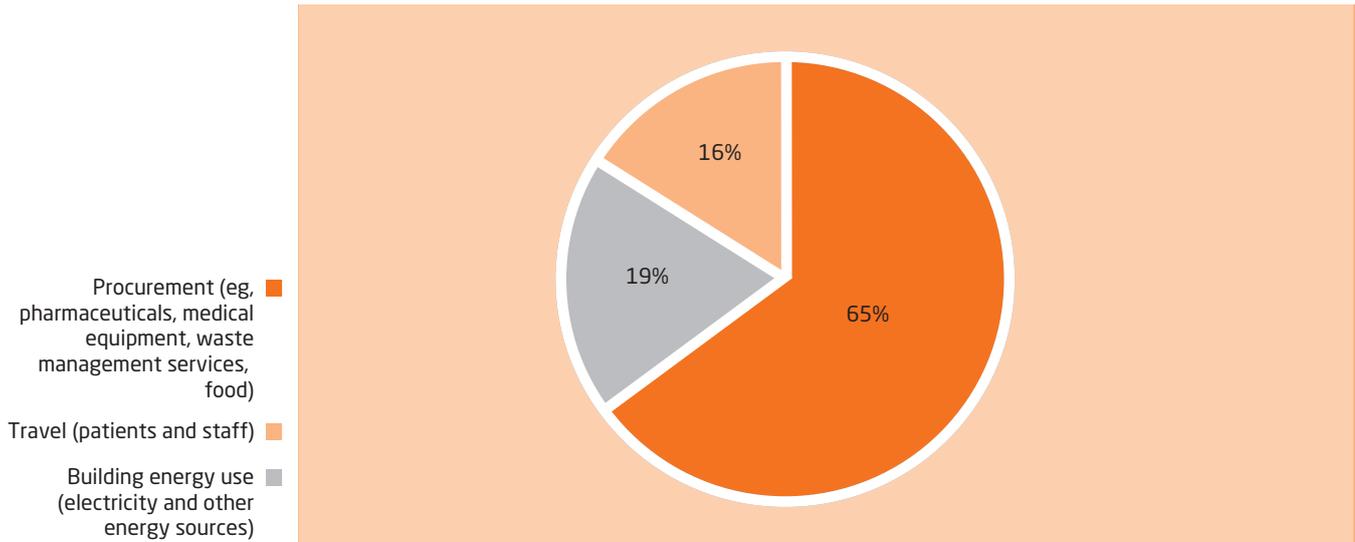
The environmental impacts of health and social care

The sustainable development agenda has attracted increasing attention in the health and social care sector over the past decade. We now understand much more about the environmental impacts associated with delivering care than we did even five years ago. The NHS Sustainable Development Unit (SDU), established in 2008, has commissioned a number of studies measuring these impacts, and has published reports and guidance designed to support improvement. These have mostly focused on carbon dioxide emissions and climate change.

It is perhaps not surprising that an industry that consumes close to £1 in every £10 of the United Kingdom's gross domestic product (GDP), that has the largest property portfolio in Europe, and directly employs more than 1.7 million people across the United Kingdom, should also have a significant impact on the environment. The overall carbon footprint of the NHS in England in 2010 was around 19.7 million tonnes of CO_2e (NHS Sustainable Development Unit 2012). This accounts for 25 per cent of all public sector carbon emissions, or around 4 per cent of total emissions in England. It is greater than the annual emissions from all passenger aircraft departing from Heathrow airport (Department for Transport 2011).
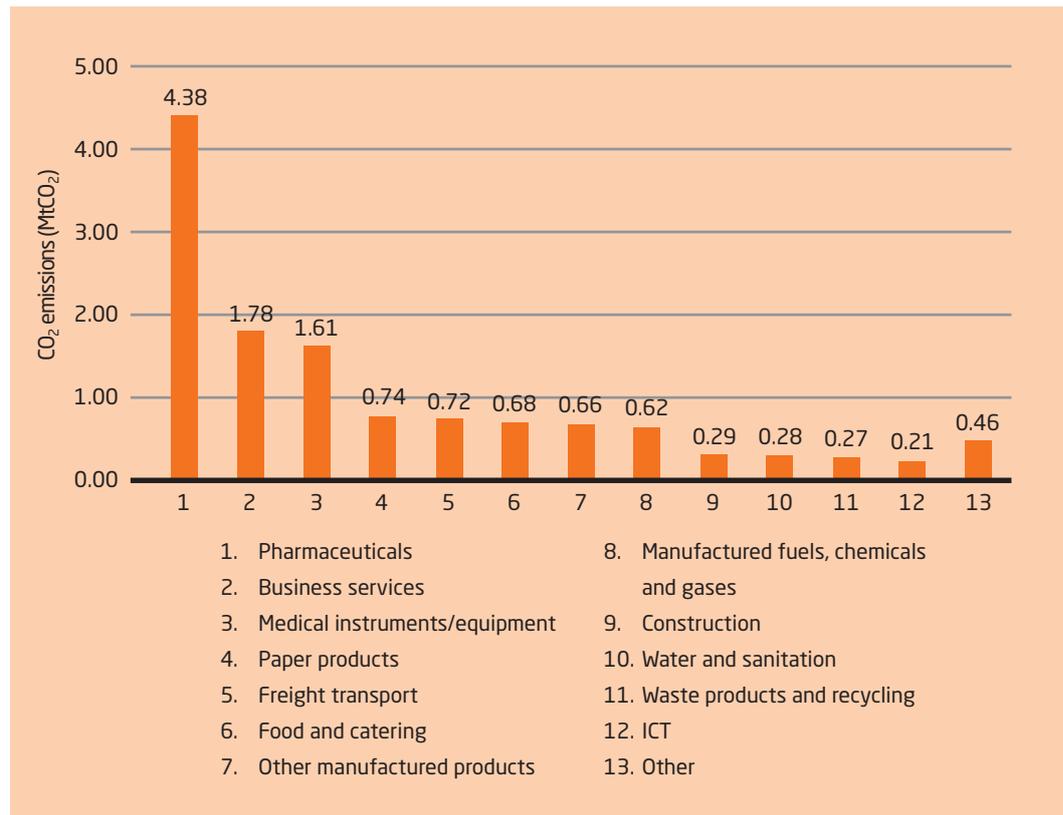
The carbon footprint has grown over the past decade as the NHS has expanded its activities and workload – although it is important to note that the carbon *intensity* of health care (that is, emissions per unit of expenditure) has fallen and recent evidence suggests this upwards trend is starting to reverse (NHS Sustainable Development Unit 2012). Two-thirds of these emissions are related to goods and services that the NHS procures – notably pharmaceuticals and medical equipment. The remainder are attributable to direct energy use in NHS buildings (19 per cent) and patient/staff travel (16 per cent) (*see* Figure 2 opposite). Emissions related to procurement can be further broken down into contributing sources (*see* Figure 3 opposite).

Figure 2 NHS England carbon dioxide emissions profile for 2010

Procurement (eg, pharmaceuticals, medical equipment, waste management services, food) ■

Travel (patients and staff) ■

Building energy use (electricity and other energy sources) ■

- 65%
- 19%
- 16%

Source: NHS Sustainable Development Unit 2012

Figure 3 NHS England procurement-related carbon dioxide emissions in 2010

CO_2 emissions ($MtCO_2$)

#	Value
1	4.38
2	1.78
3	1.61
4	0.74
5	0.72
6	0.68
7	0.66
8	0.62
9	0.29
10	0.28
11	0.27
12	0.21
13	0.46

1. Pharmaceuticals
2. Business services
3. Medical instruments/equipment
4. Paper products
5. Freight transport
6. Food and catering
7. Other manufactured products
8. Manufactured fuels, chemicals and gases
9. Construction
10. Water and sanitation
11. Waste products and recycling
12. ICT
13. Other

Source: NHS Sustainable Development Unit 2012

Research evidence further demonstrates the scale of the environmental impacts related to health care in the United Kingdom. These include the following.

■ The NHS in England consumes 39 billion litres of water and produces 26 billion litres of sewage each year (Department of Health 2008a) – enough to fill Wembley stadium every 16 days.

- Five per cent of transport emissions in the United Kingdom are estimated to be accounted for by health care-related journeys (Bond *et al* 2009).

- There are considerable 'food miles' associated with meals served in health care facilities (Jochelson *et al* 2005).

- The NHS produces 5.5kg of waste per patient per day – substantially more than health systems in France and Germany (Tudor *et al* 2008a).

- Non-metabolised pharmaceutical products have been found in measurable concentrations in soil samples and drinking water (Depledge 2011).

Beneath these high-level findings, limited evidence has been published on the environmental impacts associated with specific organisations, service types or patient groups, although a small number of NHS trusts have calculated their individual carbon footprint (Brockway 2009; Brockway 2010), and some attempts have been made to estimate typical impacts associated with standard units of care. For example, CO_2e emissions associated with an average inpatient admission have been estimated at 380kg, with an extra 80kg for each additional bed day, and 50kg for an outpatient appointment (Tennison 2010). Clearly, these figures do not reveal what are likely to be large variations between different types of care. Emissions attributable to each bed day for renal patients, for example, are estimated to be double the average (Connor *et al* 2010).

Less is known about the environmental impact of social care. The main sources of CO_2 emissions in this sector are likely to differ from those in the NHS. For example, the proportion of emissions attributable to procurement may be lower, given that NHS procurement-related CO_2 emissions are largely driven by pharmaceuticals. Despite the trend away from institutional care, it is likely that care homes and other facilities still account for a significant proportion of the environmental impact of social care.

What action is being taken?

The approach taken towards sustainability by the NHS is unique internationally in terms of the breadth of its scope. While several countries have examined issues such as electricity consumption and waste generation in hospitals, few have developed comprehensive strategies that treat environmental sustainability as an organisational development challenge rather than just a technical one. This approach is exemplified by the NHS Carbon Reduction Strategy for England (*see* box below).

The NHS Carbon Reduction Strategy for England

The NHS Carbon Reduction Strategy for England was developed to help organisations measure and reduce their carbon footprint (NHS Sustainable Development Unit 2009). It describes key actions required across 10 areas, including technical changes but also actions in terms of governance, workforce development and finance.
A number of other resources have also been published to support implementation, including guidance aimed at procurement teams and clinical commissioning groups (*see* www.sdu.nhs.uk).

There is evidence to suggest that, at the strategic and corporate levels, health and social care organisations are increasingly aware of the need to operate in a sustainable way. For example, most NHS organisations now have a sustainable development management plan that has been approved by the board. However, the profile of sustainability varies markedly between organisations. For example, there is wide variation in terms of what gets reported at board level, and how frequently (Cannaby 2010; Royal College of Nursing 2011).

While most NHS organisations now have strategies on sustainability, their progress in translating these strategic commitments into tangible action appears to be less consistent (Richardson *et al* 2009; Nichols and Richardson 2010). A literature review found several examples where sustainability policies had been implemented successfully, but these were outnumbered by examples of well-intended policies and strategies that appeared not to have been implemented (Nichols *et al* 2009).

Nonetheless, there are numerous local projects within both health and social care where structural, operational or clinical changes have been made that have reduced environmental impacts – in some cases achieving wider benefits as well. Examples include University College London Hospitals (UCLH) NHS Foundation Trust and Bristol City Council (*see* boxes below).

Taking a lead on sustainability: University College London Hospitals NHS Foundation Trust

Within the NHS, UCLH has been a leading organisation on sustainability. The trust employs a dedicated sustainability development manager – a post funded entirely through savings made as a result of its sustainability strategy. It has established sustainability implementation groups, as well as working groups for specific sustainability themes. It has also nominated trust-wide carbon 'champions' to promote best practice across its various sites and activities.

Activities so far have focused on seizing 'quick wins' that deliver cost savings within a short period of time, largely in relation to energy management. For example, installing software to automatically shut down office computers over weekends is predicted to save £100,000 a year by reducing electricity consumption.

The trust has developed low carbon menus by sourcing food locally, and has also developed 'NHS Re-use', a web-based tool to allow NHS trusts to re-use surplus and redundant office furniture and equipment (www.nhsreuse.co.uk). By March 2011, UCLH had saved £84,000 using this tool, while reducing carbon emissions and waste generation.

UCLH was also among the first organisations to sign up to the high-profile 10:10 campaign pledge to cut carbon emissions by 10 per cent in a year. They surpassed this target, achieving a 14 per cent reduction by the end of 2010/11.

For more information, *see*: www.sustainabilityforhealth.org/energycarbon/reports/uclh-draft-energy-reduction-action-plan-10-by-2010.

Making health and social care more sustainable: Bristol City Council

Bristol has been a centre of innovation in developing sustainable approaches to the delivery of public services. There has been a longstanding local commitment to sustainability across the public sector and high-level political support, including a council-wide target of 40 per cent emissions reductions by 2020.

Within the council's Health and Social Care directorate, a number of developments have contributed to improving environmental sustainability.

- Inclusion of the directorate in the scope of Bristol City Council's international standard environmental management and audit scheme (EMAS) since 2008. EMAS is used to monitor environmental impacts and help identify priority actions to reduce these.

- Development of a climate change risk register, identifying which individuals and communities may be particularly vulnerable. The plan is to train social care

professionals to discuss relevant issues with clients – for example, asking if they have insulation, how they would cope during a flood, whether they have a back-up food supply, etc.

- Joint working with local NHS commissioners to explore how climate change will affect service delivery.

- Recruitment of a half-time environmental adviser post within the directorate.

The outcomes achieved so far include the following.

- A saving of £30,000 a year on electricity and approximately £100,000 a year on gas and oil (from a total annual energy spend of £650,000), through implementing energy-saving measures such as improved lighting systems and insulation in care homes, day centres and other facilities.

- A 20 per cent reduction in business mileage claims, estimated to save £100,000 a year across the directorate.

Sources: Evans *et al* 2010; Evans *et al* 2011

There is some concern that progress in implementing measures to increase environmental sustainability within social care has been less systematic than in the health service. Many local authorities have engaged with the issue of sustainability and have promoted it across their local communities. However, there is limited evidence that this agenda has filtered down from the corporate level into social care departments. There has been less guidance and co-ordinated action – for example, there is no equivalent of the NHS Carbon Reduction Strategy for social care. To some extent, this reflects the structure of the social care sector, which is characterised by highly diverse provision, many small providers, and a mix of public and private ownership.

One common critique within both health and social care is that sustainability has not yet been 'mainstreamed' into standard business processes, and is currently being driven by individual champions rather than a broad, organisation-wide commitment (Evans *et al* 2010). Sustainability has sometimes been seen as an issue primarily for Estates Departments rather than an overarching focus for the organisation as a whole (Cannaby 2010). While Estates Departments can make a crucial contribution, the carbon emissions profile illustrated in Figure 2 (*see* page 5) indicates that environmental sustainability goes well beyond buildings and associated technologies.

Health and social care organisations that have included environmental sustainability among their corporate objectives have often done so by coupling these to other goals such as reducing costs or improving quality of care. This wider business case for environmental sustainability is explored in the next section, which highlights the opportunities to achieve co-benefits at a number of levels.

The business case for environmental sustainability

There is growing evidence to suggest that in addition to reducing environmental damage, sustainable approaches to health and social care can have other, more immediate benefits. This section examines the argument that sustainable approaches can promote efficiency and lead to financial benefits, drawing on evidence from within health and social care, as well as from other sectors. It then discusses potential co-benefits in terms of public health and quality of care.

Sustainability and the productivity challenge

There is a clear connection between environmental sustainability and the drive to achieve better value for money in health and social care. Environmental impacts can be minimised by reducing avoidable or low-value activity and delivering efficient, effective care. This in turn implies a focus on evidence-based treatment and support, preventive and upstream approaches, and individualised care that generates maximum value for patients and clients (*see* 'Providing evidence-based, personalised care', page 13). To this extent, sustainability provides an additional rationale for implementing many of the changes that are needed in health and social care for financial and quality reasons.

> *Anything we can do to achieve the QIPP [Quality, Innovation, Productivity and Prevention] agenda, which is all about reducing waste and inefficiency, is likely to improve sustainability at the same time.*
>
> (Consultant renal physician)

> *Whenever there is wasted expenditure, there is avoidable environmental damage as well.*
>
> (Sustainability consultant)

While the conceptual connection between sustainability and productivity is clear, in practice, sustainable approaches will differ in terms of their return on investment, and the period over which this will occur. The NHS Sustainable Development Unit (SDU) has published a series of 'Marginal Abatement Cost Curves', which plot financial investment against carbon savings for a number of carbon reduction measures. Measures were selected which would offer a rapid return on investment – often within two or three years. If implemented across the NHS in England, the 29 measures assessed could save an estimated £180 million and over 800,000 tonnes of CO_2 a year. The changes that offer the greatest financial return on investment include reducing drug wastage, installing combined heat and power generators in acute trusts, and reducing business travel through teleconferencing (Hazeldine *et al* 2010; NHS Sustainable Development Unit 2010). These predicted savings do not indicate the limit of what is achievable through adopting more sustainable approaches. There may be opportunities to achieve much greater cost and carbon savings through more fundamental changes to what care is provided, how, and where (*see* 'Opportunities to improve the environmental sustainability of health and social care', pages 11–14).

There are a number of case studies which indicate that some of these theoretical cost savings can be successfully achieved in practice. Changes implemented by leading organisations such as University College London Hospitals (UCLH) and Bristol City Council, for example, have delivered relatively quick financial returns (*see* boxes on pages 7 and 8). Indeed, several local authorities cite cost savings as a primary driver for adopting more sustainable approaches in social care (Evans *et al* 2010).

Health and social care organisations are also now incurring direct financial costs as a result of environmental policy tools. For example, most NHS trusts and local authorities are obliged to participate in the government's CRC (Carbon Reduction Commitment) Energy Efficiency Scheme. At current prices, purchasing mandatory carbon credits for

this scheme costs the NHS in England around £50 million a year. This is anticipated to increase over time as carbon prices rise and other policy tools are developed. Reducing the carbon footprint of the health and social care sector would decrease the costs incurred.

Sustainability and profitability in other sectors

Outside of the health and social care sector, a number of business leaders have sought to align sustainability with productivity and profitability. In one survey, 87 per cent of Fortune 1000 Chief Executives reported that they believed environmental performance was important for profits, with 73 per cent saying that a focus on sustainability was delivering cost savings in their businesses (Accenture 2009). There are some quantitative studies that test this relationship (Dangelico and Pujari 2010). One study found that firms adopting sustainability as a core part of their business strategy outperformed rivals in financial markets by 15 per cent (Mahler *et al* 2009). However, the evidence for this is not definitive, and the effect is certainly not universal or systematic, and is highly contested within the business community (Fenwick 2007; Mittal *et al* 2008).

It has been suggested that the critical link between sustainability and profitability is commercial sophistication and far-sighted management – which may be vital for both economic and environmental success (Pflueger 2010). Others argue that the challenge of improving environmental performance acts as a spur to promote creativity and innovation, describing sustainability as being 'innovation's new frontier' (Nidumolu *et al* 2009). Business leaders pursuing sustainable practices perceive a number of benefits from doing so, including: lower production costs due to improved efficiency; improved recruitment and retention and employee engagement; and reputational improvement (Heslin and Ochoa 2008; Lindgreen *et al* 2009; Dangelico and Pujari 2010; Sprinkle and Maines 2010).

Sustainability, public health and quality of care

In addition to the connection between sustainability and productivity, there are a number of measures that could improve public health and reduce environmental impacts (Haines *et al* 2009). Examples include:

■ promoting active travel (walking and cycling) instead of driving

■ reducing meat consumption

■ improving insulation in housing

■ improving access to green spaces.

Through influencing these behaviours and social determinants, there may be opportunities to develop more sustainable practices while at the same time improving public health. Local authorities could play a particularly crucial role as they take on new responsibilities for improving the health of the populations they serve, including through the transfer of public health budgets from primary care trusts, and the creation of health and wellbeing boards.

There are also potential co-benefits in terms of quality of care. Many of the changes discussed in the following section have the potential to reduce the environmental impacts of care while improving patient experience and outcomes. These include:

■ providing evidence-based care that achieves the best possible outcomes with the resources available

■ developing more integrated approaches that co-ordinate different elements of care more effectively and remove duplication and redundancy from care pathways

■ making better use of new technologies such as telecare and telehealth

■ delivering care in settings closer to people's homes.

Opportunities to improve the environmental sustainability of health and social care

A more environmentally sustainable approach to health and social care would require changes at a number of levels. This section describes some of the main opportunities that could be exploited through:

- changing *where* care is delivered
- changing *what* care is delivered
- changing *how* care is delivered.

Changing where care is delivered

Making facilities sustainable

Environmental impacts associated with health and social care facilities could be reduced considerably. As stated earlier, direct energy use in NHS hospitals and other buildings accounts for 19 per cent of the total NHS carbon footprint (NHS Sustainable Development Unit 2012). This is one of the elements of the footprint over which organisations have most control.

A number of innovations can help to reduce the environmental impacts associated with buildings, such as exploiting opportunities for natural heating, lighting and ventilation, and installing combined heating and power systems. Some improvements could be made without significant upfront investment – for example, exploring the feasibility of heating facilities to a lower temperature. There is also considerable scope to reduce the environmental impacts associated with disposal of hospital waste materials through more effective segregation of waste streams, and increased recycling and re-use where appropriate (Duputie and Farrington 2002; Tudor *et al* 2008b; Cannaby 2010).

Buildings must also be made more resilient to environmental change. There is some risk that measures aimed at mitigating climate change could compromise climate change adaptation. For example, designing facilities to maximise natural heating or 'solar gain' may reduce heating costs in winter but at the expense of creating rooms that are difficult to keep cool in summer. Given that most of the excess deaths recorded during the 2003 European heatwave were among older people, it is important that factors such as this are taken into account when designing improvements to make hospitals and care homes more environmentally sustainable.

More fundamentally, there are opportunities to reduce reliance on buildings-based services over time and, where appropriate, to shift care out of hospitals and other energy-intensive environments. One service review predicted that shifting to a system of satellite clinics for breast care appointments would reduce total emissions by 14 per cent, despite marginally higher emissions from staff travel (Best Foot Forward 2009). However, this logic only holds if capacity can be taken out of the hospital sector.

Minimising 'care miles'

Patient and staff travel accounts for 16 per cent of the NHS carbon footprint and is likely to account for a significant proportion of the environmental impact of social care. Delivering care in community-based settings may reduce this impact. For example, mobile breast screening in Norfolk saved 75 tonnes of CO_2 a year – a two-thirds reduction (Bond *et al* 2009). However, impacts must be assessed in the round to ensure that reductions in patient travel are not outweighed by increases in staff travel or by other environmental impacts. For example, home-based kidney dialysis using currently available technology can have a larger environmental impact (despite reductions in travel) when this means patients need to dialyse more frequently and for longer (Connor *et al* 2011).

It may be possible to use telehealth and telecare interventions to reduce emissions (Masino *et al* 2010; Wootton *et al* 2010). For example, North Yorkshire County Council is reported to have reduced emissions and saved around £1 million a year through using a telecare support package (Evans *et al* 2010; Evans *et al* 2011). Some services have used videoconferencing to reduce business travel. For example, a cancer network reported that this led to savings in terms of both emissions and costs (Lewis *et al* 2009).

Travel associated with home visits can be minimised through careful planning of rosters. Where travel is necessary, some services have explored lower impact options. For example, the 'Go Low' sustainable travel project in Avon and Wiltshire Mental Health Partnership NHS Trust has reduced business mileage claims and CO_2 emissions by using car pools, smart cars and electric bikes.

Hospital reconfiguration decisions can also have a major impact on travel-related emissions. In one study, concentrating care for heart attack in tertiary centres was estimated to have tripled travel-related emissions (Zander *et al* 2011). However, this needs to be set against the potential environmental benefits of removing over-capacity and matching supply of hospital care more closely to demand.

Changing what care is delivered

While the facilities and settings in which care is delivered have an important influence on environmental impacts, sustainability also raises more fundamental questions about the kind of care that is provided. More evidence is needed to establish which care pathways have the greatest environmental impacts, and the clinically appropriate alternatives. However, in some service areas, health and social care professionals are already leading the way. For example, considerable research and development work has been conducted as part of the Centre for Sustainable Healthcare's Green Nephrology programme, which includes a network bringing together clinicians, patients, renal technicians and industry partners (Connor *et al* 2010; Connor *et al* 2011). Similar work will be needed in other service areas to build the evidence base. What is already clear is that sustainable care pathways are likely to place considerable emphasis on preventing the need for formal care where possible, and on delivering evidence-based interventions.

Promoting prevention and self-management

A strong message from our research was that prevention must be at the core of sustainable health and social care. Interviewees stressed that the most environmentally sustainable approach to health and social care is one that minimises care needs by preventing ill health, encouraging health-promoting behaviours in the population, and supporting those who do develop health problems to manage their own condition as effectively as they can.

> *The best thing that could be done for the environment, for quality of life and for the long-term viability of the NHS is to keep people healthy, stop people becoming patients in need of treatment. And you can do that in ways that are very environmentally friendly, by encouraging healthier lifestyles.*
>
> (Social policy expert and analyst)

Prevention is relevant to sustainability to the extent that preventive approaches can reduce subsequent resource demands and lifetime service use. From a sustainability perspective, the focus of preventive activity should be on preventing avoidable consumption of health and social care resources. In part, this will involve preventing the initial onset of illness, for example, by promoting healthy behaviours in the population. But it will also need to include tertiary prevention – preventing those who develop illnesses (particularly long-term conditions) from requiring highly resource-intensive care.

There is growing evidence that a range of preventive approaches can successfully reduce subsequent demand and in doing so can deliver a financial return on investment (Windle *et al* 2009; Knapp *et al* 2011; van Gils *et al* 2011). For example, there is some evidence that support for self-management can reduce unplanned hospital admissions among people with long-term conditions (Challis *et al* 2010; Purdy 2010; De Silva 2011). The relevance of these findings to sustainability is that reduced demand can be taken as a proxy for avoided environmental damage – provided, of course, that reduced resource use in one part of the system is not accompanied by increased demand for other forms of care.

Providing evidence-based, personalised care

A crucial component of environmentally sustainable health and social care is the continued drive for evidence-based care at all levels. Those forms of treatment or support which offer maximum value to service users for a given investment of resources (financial or natural) can be seen as being intrinsically more sustainable because they reduce wasteful use of these limited resources.

> *Evidence-based interventions by their nature should be greener – because they actually work.*
>
> (Director of health care charity)

The challenge here is twofold. First, there is a need for further development of the evidence base. Second, and equally important, the evidence that already exists needs to be applied much more systematically. This will involve identifying unwarranted variations in practice, reducing low-value interventions, and exploring the issue of supply-induced demand.

In assessing what constitutes 'maximum value', it is important that this is understood from the perspective of individual patients or service users – hence care should be personalised as well as evidence-based. Shared decision-making tools can be used to identify the outcomes that individuals value most highly, and in doing so can contribute towards creating a system focused on value and efficiency (Elwyn *et al* 2010; Coulter and Collins 2011).

While it is likely that many of the interventions that are cost-effective from a financial perspective will also create less environmental damage per unit health gain, this may not always be the case. In the longer term, the National Institute for Health and Clinical Excellence (NICE) and other organisations need to adopt a broader concept of cost-effectiveness that includes environmental costs and benefits, to ensure that these are assessed directly.

Changing how care is delivered

Delivering well-co-ordinated, integrated care

Just as the effectiveness and efficiency of individual interventions has a bearing on the environmental impacts of care, so too does the efficiency of the overarching framework within which these interventions are delivered. Resources can be wasted through poor communication and information sharing between organisations and different parts of the system. This could be improved through more shared or collaborative care arrangements, and better integration between health and social care. More integrated models, providing better co-ordinated care, could be more sustainable environmentally as well as financially.

> *A lot of the policy aspirations that we have about reducing duplication, joining up services, offering more integrated services, would also produce sustainability benefits.*
>
> (Social care policy expert)

More integrated care is surely the Holy Grail of a sustainable health care system.

(Sustainability adviser)

Alongside closer integration at the clinical and service levels, close relationships between organisations across a locality can support strategic planning for sustainability. Evaluations of the corporate citizenship approach in health and social care have identified effective joint working between health organisations, local authorities and other local partners as a key enabler supporting the development of environmentally sustainable approaches (Dooris 2006; The Environment Council 2008).

Obtaining maximum value from pharmaceuticals and technologies

Pharmaceuticals account for around 22 per cent of the overall NHS carbon footprint and 13 per cent of its costs (NHS Information Centre 2011). On both financial and environmental grounds, there is a need to gain control over inflationary pressures in the drugs budget.

There is some scope for the NHS to use its purchasing power to lever changes in manufacturing processes (*see* 'Adopting sustainable procurement and commissioning practices', pages 16–17). However, services also need to reduce the large volumes of medicines wasted due to inadequate stock management or inappropriate prescribing, as well as the high proportion of drugs not taken as intended. Marginal improvements in medicines management could have a major impact on aggregate because of the high volumes involved. Shared decision-making tools may help by supporting patients to make informed choices about medication (Elwyn *et al* 2010; Coulter and Collins 2011).

The number of older people taking multiple medications and the large volumes of drugs wasted as a result of over-medication or inappropriate prescribing in care homes (Windle *et al* 2009) indicates that there may also be a role for social care professionals in improving the efficient use of pharmaceuticals. Intensive pharmaceutical use in the final months of life highlights the impact of attitudes towards end-of-life care on the sustainability of the health and social care system (*see* 'Engaging patients and the public', pages 17–18).

Innovations in medical equipment and care technologies could also have a significant impact. For example, research on water conservation in renal dialysis indicates that new designs could generate carbon and cost savings (Tarrass *et al* 2010). A sustainable approach to health and social care will involve making the most of new technologies as they are developed, and rapidly diffusing innovation throughout the system. Research on the uptake of new technologies within the NHS has shown that this is not being done consistently well at present (Liddell *et al* 2008).

Being prepared for environmental change

While climate change mitigation has received increasing attention within the health and social care sector, limited attention has been given to the issue of adaptation and preparedness for environmental change – including both climate change and also the increased scarcity of natural resources such as fossil fuels and water. A report published by the Faculty of Public Health suggests that organisations need to take a number of steps, including identifying vulnerable groups in the local population, reviewing plans for responding to floods, heatwaves and other extreme weather events, and establishing contingency plans to deal with disruption to supplies of energy, food and water (Griffiths and Stewart 2008). As discussed above, facilities need to be suitable for changing weather conditions. But beyond this, organisations need to ensure that the supply chains, workforce and public infrastructure on which services depend are all sufficiently resilient.

Implementing sustainable approaches

The approaches described in the previous section are unlikely to be implemented consistently unless supportive behaviours, attitudes and cultures become more widespread within health and social care organisations. One of our interviewees argued that sustainability requires a cultural change in attitudes to wastefulness and inefficiency equivalent to that seen in relation to hygiene and hand washing in NHS hospitals over the past decade.

A more enabling policy framework is also needed, with greater alignment of financial, regulatory and other levers. This section describes the behaviours that need to be adopted by health and social care organisations to drive sustainable practices, and the changes required at the policy level.

Driving sustainability within organisations

Engaging staff with the sustainability agenda

There is significant evidence – albeit largely from outside the health and social care sector – about how organisations can successfully adopt environmentally sustainable approaches. One of the most consistent findings is that staff engagement at all levels is critical for success (Fenwick 2007; The Environment Council 2008; McConnell 2009; Evans *et al* 2010; Smith and Sharicz 2011). Our interviewees suggested that many of those working in health and social care have strong concerns about environmental protection, and would engage with the notion of sustainable health and social care if they felt empowered to do so. Reasons for poor staff engagement in health and social care organisations may include the following.

- A sense of not having sufficient power or the right knowledge or skills to be able to change existing practices.

- Ingrained habits and/or resistance to change among frontline staff (McConnell 2009; Evans *et al* 2010).

- Diffusion of responsibility for resource use (Topf 2005).

- Staff being unable to see the environmental costs attached to their work practices (McConnell 2009).

- Peripatetic staff or those working across a number of facilities and institutions may feel less responsibility towards the environmental impacts associated with any particular workplace (Royal College of Nursing 2011).

Senior leadership can play a critical role in encouraging staff to engage with environmental sustainability (The Environment Council 2008; Heslin and Ochoa 2008; McConnell 2009; Dangelico and Pujari 2010). For example, in Bristol, high-level commitment to promoting environmental sustainability across the public sector and among local politicians was identified as a crucial condition for the progress made within adult social care (Evans *et al* 2010). Research findings from other sectors recommend embedding sustainability in senior leadership and creating rewards for success (Heslin and Ochoa 2008).

Giving departments and teams more detailed information on their use of resources, and the environmental impacts associated with this, could empower staff and encourage them to accept greater responsibility for sustainability (McConnell 2009). Disaggregated data collection processes (eg, through electricity sub-metering) combined with changes to managerial practices (through service line management arrangements, for instance) may help to promote staff engagement by putting power and responsibility for sustainability in their hands.

The experience of achieving widespread change in hand washing and hygiene practices in hospital settings suggests that behavioural techniques could play a role in promoting staff engagement. For example, there may be opportunities to re-design care settings to make sustainable behaviours 'easier' than unsustainable behaviours.

Adopting sustainable procurement and commissioning practices

Almost two-thirds of the NHS carbon footprint is associated with the goods and services procured by the service. Health and social care organisations have some power to influence organisations in their supply chain to operate in a more environmentally sustainable way. Indeed, third sector organisations report that public clients are increasingly doing so – for example, by including environmental requirements in procurement processes (King *et al* 2009). However, this sometimes appears to be a tokenistic exercise, with little active management of these requirements once the procurement process is completed. The National Audit Office found that public sector procurement teams often fail to follow through on a strategic commitment to sustainability due to a number of barriers, including cost and a lack of training or guidance (National Audit Office 2005).

Sustainability consultants interviewed for our research suggested that suppliers to the health and social care sector are often supportive, in principle, of developing more sustainable goods and services. However, progress can be slowed by a number of factors (Jochelson *et al* 2005), including the following.

- Suppliers are not always clear about what clients in the health and social care sector want in terms of sustainable products.

- Health and social care organisations do not always have detailed, disaggregated data on exactly what products they procure, or sufficient understanding of the supply chain (eg, what different suppliers can offer).

- Suppliers do not always know the environmental impacts of their products.

Given these barriers, there is a clear need for health and social care organisations to engage with suppliers to develop a better mutual understanding of what is needed and what can realistically be provided.

A related issue is the commissioning of health and social care services. By influencing the design and development of care pathways and by including sustainability requirements within service contracts, commissioners can play an important role in driving many of the sustainable approaches described in this report. For example, the London Borough of Camden has developed an outcomes-oriented approach to commissioning, which includes outcome measures for environmental, financial and social sustainability (*see* box opposite).

The new clinical commissioning groups – along with the NHS Commissioning Board – can help to develop a more sustainable system by holding providers to account for their environmental performance. In recognition of this responsibility, the Commissioning Competency Framework developed by the Royal College of General Practitioners includes '*a commitment to the sustainable use of resources, including the natural environment*' as one of its five foundations for effective commissioning (Royal College of General Practitioners 2010).

> ### Commissioning for sustainable outcomes in Camden
>
> As part of its Sustainable Community Strategy, the London Borough of Camden has worked with the New Economics Foundation to develop an outcomes-oriented commissioning model. This supports commissioning on the basis of wider community outcomes alongside service-level outcomes, and allows for 'hidden' costs and benefits to be considered in the commissioning process in addition to upfront costs. For example, tender specifications have included questions about how potential service providers will achieve environmental outcomes such as improved energy efficiency, a reduction in the amount of waste produced, or using locally sourced food. The model has been used to commission a number of services, including mental health day services, substance use services, and family and parenting support.
>
> *Source*: Evans *et al* 2010

Developing a learning culture

Research studies have examined the organisational characteristics associated with the adoption of various approaches to environmental sustainability (Fenwick 2007; Smith and Sharicz 2011). The most successful organisations are often those that devolve responsibility for sustainability to individual employees and teams, allow improvisation and experimentation, and create conditions that foster learning in everyday practice, specifically:

- decentralisation of responsibility
- connectedness between staff in different parts of the organisation
- opportunities for feedback and communication between stakeholders.

Part of the rationale for this devolved, adaptive approach is that our collective knowledge base on environmental sustainability is still limited. Organisations have not, therefore, been able to develop highly specified, top-down blueprints for strategic change. On this logic, experimentation – and, by extension, failure – needs to be permitted and used to create opportunities for learning. The concept of the 'learning organisation' has been developed to describe organisations that do this successfully. But our interviewees consistently reported that these enabling conditions are not present in many health and social care organisations, where the prevailing ethos is one of caution and conformity. This organisational culture could pose a significant barrier to innovation.

Engaging patients and the public

Health and social care organisations need to engage with patients and the public to build support for more sustainable approaches to care. Public expectations can play a significant role in driving highly resource-intensive and potentially unsustainable practices. Attitudes towards end-of-life care also play a part in this, given that the final months of life are typically when health and social care resources are used most intensively.

It is vital, though, that sustainable care is not equated with sub-standard care in the public mind. Public support for efforts to improve the environmental sustainability of health and social care will be particularly important in the context of increased patient choice, the growth of any qualified provider markets, and movement towards personalisation in social care (Evans *et al* 2010). In a system where resource flows are increasingly dependent on individuals' decisions, service users will need to see the value in making choices that minimise avoidable environmental harm.

Health and social care organisations may also need to consider their role with respect to the sustainability of the communities they serve. There may, for example, be a role for professionals in building individual and community-level resilience to the health effects of environmental change, and in ensuring that vulnerable groups are protected from the

combined effects of climate change and rising prices for fuel, food and water. There is some evidence that communities with higher levels of social cohesion and stronger social capital may be more able to withstand the effects of natural disasters and extreme weather events, for instance (Mathbor 2007). The work of the Local Government Information Unit's Sustainable Social Care Learning Network suggests there could be a particular role here for social care professionals, and for local authorities more generally, in their community leadership and place-shaping role (Bradshaw *et al* 2010).

Developing a supportive policy framework

A range of policy levers could be used to encourage sustainable approaches in health and social care, including financial incentives, regulatory approaches, targets, and public reporting of environmental performance. A strong message from our expert interviews was that the existing financial reimbursement systems for health and social care providers often act as a significant barrier to developing more environmentally sustainable approaches. There was widespread concern that the hospital reimbursement tariff system – Payment by Results (PbR) – creates an incentive for increased activity and for (at times unnecessary) face-to-face contact. Providers are, in effect, financially penalised for adopting innovative methods such as telephone-based consultation or preventive approaches that may be more sustainable. While one of the original aims of PbR was precisely to introduce incentives to increase activity (in part to bring down long waiting times), the continuation of this incentive is increasingly seen as counter-productive for environmental sustainability.

Payment systems need to reward providers for delivering lean, efficient care. To some extent, this may be achieved through the efficiency factor in the PbR tariff or through the move towards best practice tariffs. However, it is likely that more sophisticated ways of paying for care will be needed in future – for example, based on payment for outcomes rather than activity, or through capitated budgets and more sophisticated contracting on the part of commissioners. Without this, there is a risk that the benefits of increased efficiency will be negated by increased activity levels.

Another consistent message from our interviewees was that certain fundamental characteristics of the health and social care system encourage a myopic focus and make it difficult for managers and other professionals to prioritise longer-term sustainability. Several factors may contribute to this. The need to balance budgets on an annual basis may play a part, as may the fact that foundation trusts are not always permitted to hold on to budgetary surpluses for future investment. The highly politicised environment in which health and social care organisations operate may also frustrate efforts to promote longer-term sustainability. As one of our interviewees said, this '*is usually a recipe for dancing to a political tune rather than a sustainable agenda*'.

> *Some of our European counterparts set 15- to 20-year plans for population health which are not subject to change every four or five years depending on who thinks they're going to get the vote. And until we move to that sort of agenda, we're going to still have problems with the sustainability of health care provision.*

<div align="right">(NHS foundation trust medical director)</div>

It will be important to identify levers for sustainability in the new system introduced by the Health and Social Care Bill. Whether the reforms will support environmental sustainability remains to be seen, but alongside the risks there are a number of possible opportunities. Health and wellbeing boards could play an important role by including a sustainability perspective within health and wellbeing strategies for local communities, as could local authorities more generally as they take on new responsibilities for improving public health (Local Government Association/Social Care Institute for Excellence 2011).

The outcomes frameworks for the NHS, social care and public health could also help if they succeed in creating a more outcomes-oriented system with greater incentives for upstream approaches to care – particularly if these include metrics on environmental sustainability.

Using appropriate metrics and methods

Developing measures and metrics that can be used by health and social care organisations, regulators, policy-makers and members of the public to evaluate the environmental impact of different interventions, pathways, technologies and approaches will be critically important. Without being able to readily quantify environmental impacts, it will not be possible to embed sustainability within routine management targets, objectives and indicators:

> *We have to understand the metrics. Until we can measure these things, it's just going to be hot air. Until we can face decision-makers with true costs, or costs that are being deferred to a subsequent generation, then it's all just nonsense.*
>
> (Oncologist)

There are currently a range of metrics available for assessing environmental impact, with significant discrepancies between calculations based on different methods. A greater consensus is needed on which metrics and methods are most suitable for the health and social care sector. Tools developed in other sectors need to be adapted and refined so that they can be applied easily within health and social care without compromising on accuracy. New methodologies will also need to be developed within health economics to value future costs and benefits appropriately.

Conclusions and recommendations

The health and social care system has a considerable impact on the natural environment. Reducing this impact and developing a more sustainable approach to the delivery of health and social care will require substantial changes at three levels:

- *innovation*, in terms of where, what and how care is provided
- supportive *behaviours, attitudes and cultures* in health and social care organisations and wider society
- an enabling *system governance and policy* framework.

Some progress can be made by improving the efficiency of existing processes, technologies and facilities, and minimising unnecessary resource use at the day-to-day operational level. However, these actions alone are unlikely to be sufficient. The scale of the environmental challenge demands a more fundamental transformation in the service models used to deliver health and social care.

To a large extent, the transformation needed is the same as that called for on financial and quality grounds. Services need to be re-designed to shift care upstream and place greater emphasis on primary care, prevention and self-management. If health and social care services were provided in such a way that service users experience an efficient journey through the system, obtain maximum value from every contact with professionals, and receive well-co-ordinated support for their multiple needs, this should be more sustainable from both an environmental *and* financial perspective. In this sense, environmental sustainability provides a new lens through which to view existing problems in the system, and a new way of assessing policy solutions:

> *The carbon challenge is so demanding that it begs questions of the health service that make you go into a more open, questioning frame of mind, where the innovation*

has to be transformational. And in trying to solve the carbon problem, you are then tantalisingly offered the potential to clear up ill health while you're at it.

(Sustainability consultant)

Table 1, below, summarises the three key areas where changes need to be made. It distinguishes between actions explicitly intended to improve the environmental sustainability of services ('direct') and broader changes, where environmental sustainability is not necessarily the primary rationale for the action but an important secondary benefit ('indirect').

Table 1 Changes needed to deliver more sustainable health and social care

	Innovation	Behaviours, attitudes and cultures	System governance and policies
Direct	■ Less resource-intensive buildings and equipment ■ Low carbon care pathways ■ Reducing 'care miles' through telecare, care closer to home, etc ■ 'Green' drug manufacturing ■ Improved waste management ■ System preparedness for environmental change	*In services:* ■ Engaging professionals and developing leadership for sustainability ■ Sustainable procurement and commissioning practices *In society:* ■ Engaging public and patients in sustainable service delivery ■ Building community resilience to health impacts of environmental change	■ Developing metrics for sustainability ■ Identifying levers at national level (eg, financial incentives, regulation, targets, NICE guidelines) ■ Improving data systems for environmental accounting
Indirect	■ Prevention, shifting care upstream ■ Efficient, effective care ■ Well-co-ordinated, integrated care ■ Effective medicines management ■ Patient empowerment, self-care, enablement	*In services:* ■ 'Learning organisations' that encourage experimentation ■ Devolving managerial powers to clinical teams ■ Clinical behaviours (eg, addressing variations) *In society:* ■ Promoting healthy behaviours	■ Understanding incentives/drivers for prevention, care closer to home, integrated care ■ A policy framework that permits a long-term focus in organisations ■ Enabling hospital reconfiguration

Recommendations for health and social care organisations

Health and social care organisations need to take a dual approach towards environmental sustainability, including both direct and indirect actions (*see* Table 1 above). There is scope for considerable improvement by tackling issues typically associated with the environment, such as energy use in buildings. But professionals also need to examine new models of care that address the triple bottom line of environmental, social and financial sustainability.

Organisations should exploit opportunities for service changes (planned primarily for other reasons) to help improve environmental performance. Health and social care are 'high churn' environments, and much can be achieved by working with the natural cycle of change and renewal. There are close conceptual connections between sustainability and other system goals – notably productivity, prevention and integration – and if the right approach is taken, there are opportunities to achieve multiple objectives simultaneously.

Our key recommendations for health and social care organisations are as follows.

■ Develop a more detailed local understanding of the problem by measuring the environmental impacts of the organisation's activities, and assessing the potential impact of environmental change on future care needs and services.

■ Engage staff with the sustainability agenda, through strong leadership and by empowering staff to take responsibility for reducing the environmental impact of their own activities.

- Actively exploit the synergies between environmental sustainability and other objectives – for example, by identifying changes that may bring health or financial benefits as well as environmental ones.

- Invest in preventive approaches to reduce demand for formal care, by promoting self-care and self-management among other strategies.

- Explore the opportunities presented by new technologies such as telehealth and telecare, or combined heat and power generation in hospital facilities.

- Improve medicines management and prescribing practices to reduce inefficient or wasteful use of pharmaceuticals.

- Engage with suppliers and use procurement and commissioning processes to drive sustainable practices in supply chains and service providers.

- Engage with patients and the public to build wider support for environmentally sustainable approaches to delivering care.

Although this report has focused largely on the environmental impacts of health and social care, and what can be done to mitigate these, there is also a need to focus on preparedness for environmental changes. Organisations should assess the risks posed to their operations by the health impacts of climate change, increased incidence of extreme weather events, and rising prices for energy, water and other natural resources. They will also need to consider their social impacts on the communities in which they operate – an issue outside the scope of this report, but closely connected with environmental and financial sustainability.

Implications for policy-makers

The current policy framework creates a number of barriers to organisations developing more sustainable approaches locally. Policy-makers need to explore how they can create a more supportive environment, and how existing policy agendas such as personalisation can be delivered in the most sustainable way. In particular, they need to consider how payment systems can be re-designed to provide adequate reimbursement for innovative approaches such as teleconsultation, while removing incentives to maintain or increase activity levels.

Policy-makers should also consider how regulatory mechanisms and other levers can be used to drive the adoption of more environmentally sustainable approaches to delivering care. For example, there is ongoing work funded by the National Institute for Health and Clinical Excellence (NICE) to explore how carbon emissions could be included within health technology assessments and guidelines. This will be important in developing methods for measuring cost-effectiveness that include external costs and benefits.

Sustainability should increasingly be seen as an essential dimension of quality akin to equity or accessibility. Health and social care organisations, and the system as a whole, need to be accountable for achieving the triple bottom line – environmental, social and financial sustainability. Assessing progress in all three areas must be part of routine management processes. Metrics for sustainability need to be improved so that they can be included in outcomes frameworks for the NHS, social care and public health.

While there are many opportunities to improve environmental sustainability alongside improving service quality and reducing costs, there are also likely to be situations where trade-offs arise. Clear processes must be put in place for weighing the value of environmental benefits against financial and other costs.

An immediate priority in the current policy context is ensuring that responsibilities for delivering environmentally sustainable care within the reformed system are clarified and emphasised. Health and wellbeing boards, for example, should be encouraged to include a sustainability perspective within their health and wellbeing strategies for local communities.

Further research evidence is needed to inform decision-making at the national and local levels. The full report of the scoping review on which this paper is based describes how a co-ordinated programme of research is needed to address gaps in the existing knowledge base. Such a programme could play a critical role in supporting the development of environmentally sustainable approaches to health and social care.

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