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FEATURE

SUSTAINABLE HEALTHCARE

The greening of medicine

Ray Moynihan explores early preparations for a low carbon health system

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Three days after his kidney transplantation, saxophonist Andy Williamson was performing an impromptu lunchtime concert in the atrium at Guy's Hospital in London, accompanied by a piano player who also happened to be the donor. The dynamic duo were even doing requests, playing *Take the A-Train* for one of their surgeons.[1] Still a successful jazz musician, Williamson has embarked on another line of work in the years since his transplant operation: he's at the cutting edge of a new form of patient activism that is pushing the public, professionals, and policy makers for an urgent and comprehensive greening of medicine.

"Having kidney failure suddenly brings you into uncomfortable proximity with our disposable culture," says Mr Williamson, who developed end stage kidney failure in early 2006. A turning point came when he started dialysis at home, and a lorry would arrive regularly with a palette full of plastic and cardboard to be used once and then thrown away. "In a household geared to recycling and minimising packaging it was all a bit of a shock." Well aware that an ultra-cautious culture has driven a lot of the excess for good safety reasons, Mr Williamson, like others pushing for a sustainable health system, has become increasingly convinced of the need for change, and the possibility that it can come without doing harm. "There is so much unthinking waste that happens in hospitals, as it does in our everyday lives," says Mr Williamson. "It's just that it's writ large in the healthcare system."

Environmental scrutiny of medicine

The depth of the climate crisis has finally forced the spotlight of mainstream environmental scrutiny on medicine, quickly diagnosing the need to dramatically cut healthcare's unhealthy carbon footprint (fig 1⇓).[2 3] In England the National Health Service is believed to contribute a quarter of all public sector emissions, a footprint mandated to shrink by more than 80% within four decades.[4] Globally, the greening of medicine is also scaling the policy agenda. A special climate and health summit was held last month in Durban, South Africa, to coincide with the latest international talks on fighting global warming.

The Durban summit was co-organised by Health Care Without Harm, a non-governmental coalition of over 500 organisations in more than 50 countries, whose president is Gary Cohen. "We want to start creating a healthcare system that's carbon neutral," Mr Cohen said, "and we think healthcare can lead efforts to change within the wider society." The group recently released a road map for hospitals and health systems to reduce carbon footprints and make medicine healthier (box). It recommends 10 clear, measurable steps forward, including switching to renewable energy and reducing harmful wastes, and the approach is being well received by health authorities around the world, including in the United Kingdom.

Less is more

"Less is more," says David Pencheon, summing up recommendations in a raft of recent reports from the NHS's Sustainable Development Unit, which he runs.[6] Along with doing less, Dr Pencheon says making workplaces more energy efficient, moving towards more active methods of travel such as cycling, and assessing the environmental impact of what's bought and used are key strategies that are starting to be implemented to varying degrees across the sector—albeit tentatively.[6]

One example of assessing environmental impacts comes from a recent study comparing the carbon footprint of two different approaches to treating heart attacks. A team led from Cambridge University, and including Dr Pencheon, showed that using percutaneous coronary intervention, which is available only at a small number of hospitals, greatly increased ambulance journeys and more than tripled associated carbon emissions compared with giving thrombolysis in regional hospitals.[7] Making no judgments between the two approaches, the authors argued that their study's main contribution was "methodological"—offering an early example of quantifying environmental consequences of different interventions. They argue that this should become routine but will require a "paradigm shift in current health economics methods and

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10 goals for greening hospitals and health systems[5]

- Prioritise environmental health
- Substitute harmful chemicals with safer alternatives
- Reduce and safely dispose of waste
- Use energy efficiently and switch to renewable energy
- Reduce water consumption
- Improve travel strategies
- Purchase and serve sustainably grown food
- Safely manage and dispose of pharmaceuticals
- Adopt greener building design and construction
- Purchase safer more sustainable products

practice, as well as a substantial change in policy-making culture."

Elsewhere in the system, doctors' groups are directly confronting the need to reduce carbon emissions in their specialties. The Association of Anaesthetists of Great Britain and Ireland has, for instance, been running workshops on environmental effects, and an editorial in *Anaesthesia* recently outlined how its readers were not only helping warm the world but contaminating it as well. "Anaesthetists are prolific users of disposable devices and particularly plastics, which clutter landfill, generate dioxin when incinerated and contain plasticisers with emerging health effect."[8] The editorial urged clinicians to consider the potential harms of the materials they were using, look for alternatives, and influence purchasing decisions at their institutions.

Similarly, health professionals in kidney medicine are debating how they might become greener, with one English hospital calculating the emissions saved by replacing transplant patients' follow-up visits with telephone consultations.[9] And in December a workshop in London on saving money in renal services featured a session called "green nephrology," debating how to reduce and recycle dialysis consumables, reuse water, and reward green innovation. The session was run by a representative of the Centre for Sustainable Healthcare, which offers frontline clinicians skills in sustainable planning.

Transformative effect

Still horrified by the waste he regularly sees around him in hospitals, kidney patient Mr Williamson is also pleasantly surprised that so many medical folk are now promoting emissions reduction. In fact, like others, Mr Williamson thinks that if doctors began to shift their behaviour en masse, they might inspire a far wider and more rapid social and environmental change. Likewise, he says, the NHS—being so ingrained in society—could set a powerful practical example: "If carbon reduction became all pervasive in hospitals and doctors' surgeries, and if it was in your face that they were taking it really seriously, it could have a transformative effect on people, in the same way it happened with smoking, when doctors were leading that change."

Dr Pencheon has often wondered why more of his colleagues haven't started to clean up their carbon act. Apart from the obvious explanations like a sense of powerlessness or a lack of time, he speculates about "moral offset," a feeling among doctors that they're already doing enough good in their workplaces without having to worry about reducing its carbon footprint as well.

Staff at the Sustainable Development Unit, however, are paid to worry and to future proof. Deliberately avoiding the term "greening" as too much like "tree-hugging," Dr Pencheon argues that whole new models of care are needed, with new financial incentives that reward medical behaviour that benefits both human health and the environment. But even within the existing framework, his unit has shown that short term reductions in emissions of about 40% are "technically feasible . . . without compromising standards of care."[3] Major cuts could be achieved by refurbishing and replacing buildings, implementing low carbon travel plans, moving to renewable energy, maximising efficiencies in procurement, and minimising waste (fig 2⇓). What's more, these measures could produce savings of almost £180m (€217m; $280m) a year—with half of that saving from reducing drug waste alone.[2]

Pharmaceuticals in spotlight

Accounting for an estimated 22% of NHS emissions,[2] "pharmaceuticals have a very high carbon footprint," says Dr Pencheon, "because they're made of chemicals, highly refined in big factories, and moved around the world. And we waste a lot of them." His unit's reports suggest that, along with reducing unnecessary purchasing and waste, there might be investigation of models of care that are less drug intensive[2] and more research on the carbon footprint of drugs to "inform actions to produce significant reductions."[11]

Health Care Without Harm is also looking more closely at drugs, investigating the amount of toxic waste produced in manufacturing and working with a Swedish organisation to assess long term environmental impacts of different medicines, particularly on drinking water.[12] "There will be enormous pressure on the pharmaceutical industry to innovate," says Mr Cohen. "The environmental footprint of its products is going to have to change." Others are already planning for peak oil and a future where all drugs are made without petrochemicals.[13]

For industry's part, it's not quibbling with the figures showing drugs contribute more than one fifth of emissions, or with the need to reduce its footprint. Technical affairs manager at the Association of the British Pharmaceutical Industry, Mike Murray, says that industry "supports the aim of minimising medicines waste" and that personalised medicine should mean that prescribing is more targeted to those people most likely to respond. As for "less drug intensive" care, industry fully supports preventive medicine "as avoidance of disease is important for public health, and reduces clinical interventions required," though where people do need drugs, decision making "should not be undermined by non-clinical considerations." Mr Murray also revealed the industry will soon start funding the development of a standardised tool for measuring the carbon footprint of individual medicines.

Complicating all of these nascent changes is the fact that our chief measures of national economic success do not yet account for the wasteful and harmful consequences of our economic activity—a particular problem in healthcare, according to Martin

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Hensher, until recently a senior economic adviser to the Department of Health in London. "In the traditional model of gross domestic product or GDP, endless escalation of healthcare costs will generally appear to be beneficial and part of healthy economic growth, even though this might include a large amount of wasted expenditure on ineffective and futile care." While there are efforts to find broader new measures of prosperity and human welfare that can distinguish between healthy and unhealthy economic activity, such efforts are still in their infancy. What's ultimately needed, says Mr Hensher, are methods for making meaningful choices about the most healthy size and composition of the healthcare sector, but so far these have proved "stubbornly difficult to find."

Now living in rural Devon, Mr Williamson says it is time to make it "as socially unacceptable to be careless with resources as it is to drink and drive or smoke in public places." He urges particular care not to waste oil based resources in the health sector as some patients are reliant on petroleum derived drugs or devices. As it turns out, his 2006 kidney transplant is now failing, so along with his cocktail of powerful medicines, he's now back on the dialysis machine. But he tells me cheerfully that the cardboard boxes turning up regularly on the palette are so strong they make very good drawers, and he's starting to think about how to reuse the plastic drainage bags for irrigation systems and solar showers.

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Figures

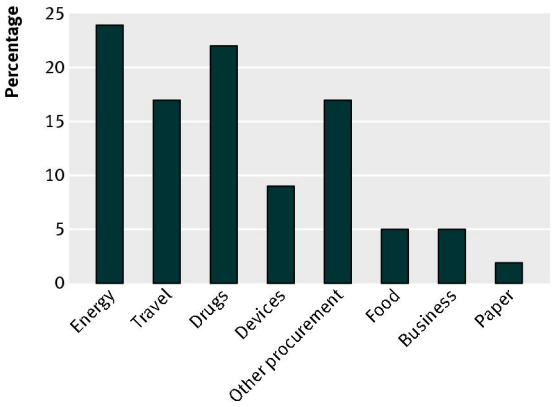
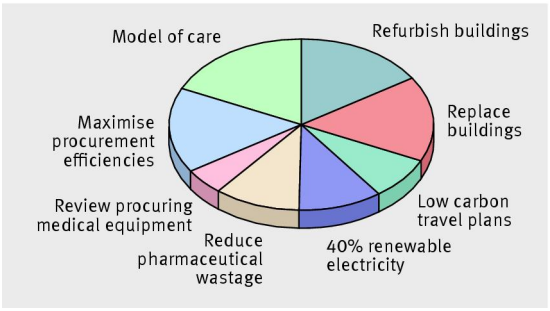


Fig 1 Key elements of the NHS carbon footprint[2]



How the NHS could cut carbon emissions by 40% by 2020[10]

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