

# Climate change and health systems

*Climate change is recognised as a threat to human health.*

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In a current editorial, Fiona Godlee, editor of the *British Medical Journal*, writes: "The greatest risk to human health is neither communicable nor non-communicable disease, it is climate change".<sup>1</sup> Earlier, the World Health Organization (WHO) had estimated that by 2002 global warming and trends in rainfall due to human-induced climate change already claimed over 150 000 lives annually as a result of extreme weather conditions, changing transmission patterns for water-related diseases such as diarrhoea, vector-borne infections including malaria, and increased malnutrition from the impacts of changing weather patterns on food production.<sup>2</sup>

**Given these wide-ranging and devastating impacts of climate change on health, it is ironic that health systems contribute substantially to climate change through their own large greenhouse gas (GHG) emissions.**

But, as Richard Smith, previous *BMJ* editor, points out on his blog, the health effects of climate change go beyond the consequences of altered weather: "Until comparatively recently we talked mostly about infections like malaria, dengue fever, and schistosomiasis extending their range and high death rates during heat waves. Now we realise that much more death and suffering will come from hunger, drought, flooding, mass migration, and war."<sup>3</sup>

Given these wide-ranging and devastating impacts of climate change on health, it is ironic that health systems contribute substantially to climate change through their own large greenhouse gas (GHG) emissions. This negates the very reasons they exist – to promote, protect and improve people's health – and is perhaps the supreme example of cultural iatrogenesis. Globally, it vindicates Ivan Illich's famous 1975 indictment that "The medical establishment has become a major threat to health."<sup>4</sup> Furthermore, unless it can be mitigated, it renders health systems fundamentally unsustainable.

This article looks at how health systems contribute to GHG emissions and how this can be addressed in South Africa. It argues that recent initiatives by the National Department of Health provide unique opportunities to reduce GHG emissions.

## Health system greenhouse gas emissions in England, the USA and Australia

In 2008 the National Health Service (NHS) in England established the Sustainable Development Unit (SDU) to ensure that NHS development is sustainable – that it meets the healthcare needs of today without compromising those of tomorrow.<sup>5</sup> Research by the SDU showed that in 2004 the carbon footprint of the NHS was 18.61 million tons of CO<sub>2</sub> equivalent (MtCO<sub>2</sub>e) per year, representing 25% of England's public sector emissions and 3.2% of England's total emissions. It has since grown to 21 MtCO<sub>2</sub>e per year, which is larger than that of some medium-sized countries.<sup>6</sup>

This carbon footprint comes from a wide range of health system activities including

heating; cooling and lighting buildings; powering equipment; procuring goods and commissioning services; sending waste to landfill; and patient, staff and visitor travel. The major components of the NHS carbon footprint in 2004 were procurement (60% of the total); energy for heating, hot water, electricity consumption and cooling (22%); and travel (18%).<sup>6</sup> (Fig. 1.)

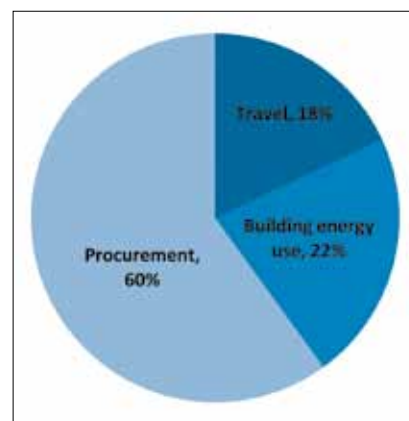


Fig. 1. National Health Service greenhouse gas emissions in 2004.

Emissions from the manufacture and transport of pharmaceuticals and medical equipment accounted for half of the procurement emissions – pharmaceutical emissions alone were equivalent to either building energy or transport emissions.<sup>7</sup>

Hospital admissions result in far greater GHG emissions than outpatient appointments. Table 1 shows that a typical hospital admission in the UK leads to CO<sub>2</sub> emissions that are approximately seven times greater than those of an outpatient visit.

Studies in other high-income countries show similar massive health sector GHG emissions. In the USA, Chung and

**Table 1. Comparison of CO<sub>2</sub> emissions from inpatient and outpatient visits**

Activity type	Carbon footprint
Inpatient admission (including 3.6 bed days associated with admission)	380 kgCO <sub>2</sub> e
Additional bed day	80 kgCO <sub>2</sub> e
Outpatient appointment	50 kgCO <sub>2</sub> e

colleagues estimated that in 2007 the healthcare sector contributed an estimated total of 546 MtCO<sub>2</sub>e, equivalent to 7% of total USA CO<sub>2</sub> emissions. As in the UK, the largest contributors were the hospital and prescription drug sectors (39% and 14%, respectively).<sup>8</sup> In Australia, health facilities account for 53% of the total New South Wales government building energy usage.<sup>9</sup> It is clear that where data exist, health systems are major contributors to climate change, and there is an urgent need to reduce GHG.

### Hospital admissions result in far greater GHG emissions than outpatient appointments.

While there are no systematic data on the GHG emissions of the South African health sector, they are likely to be at least of the order of those of the UK, particularly in the private sector. South Africa ranks among the top 30 GHG emitters in the world, and relies on coal for 70% of its energy requirements. Its total carbon emissions per capita are remarkably similar to those of the UK. In 2008, for example, the carbon footprint of the UK was 8.5 metric tons of CO<sub>2</sub> per capita, while in South Africa it was 8.8.<sup>10</sup>

South Africa's health sector has 28 hospital beds per 10 000 people. The private sector however, which is more hospital-centred than the public health system, has 38 beds per 10 000, almost identical to the UK's 39 per 10 000 people. Therefore, in the absence of data it is reasonable to assume that, conservatively, health system emissions in South Africa are comparable in scale with those of the UK, particularly in the private sector. Public sector per capita emissions are likely to be far lower

because of the greater proportion of facilities that serve mainly outpatients (clinics and health centres) with relatively fewer energy-consuming, GHG-producing inpatient beds and technology.

### Climate change increases the urgency of health sector transformation in South Africa

The extreme vulnerability of sub-Saharan Africa to the effects of climate change has major implications for health in South Africa and increases the urgency of health system transformation.

Fig. 2 shows the global distribution of deaths from climate change for 2002 as estimated by the WHO.<sup>2</sup> Already more people die from the effects of climate change in Africa than anywhere else, particularly in sprawling cities where the effects of urbanisation aggravate extreme climatic events.<sup>11</sup> Therefore, the very people who already have the highest disease burden and depend on poorly functioning, overburdened health systems are the most vulnerable.

This is highly pertinent for South Africa, given that climate change leads to mass migration, national insecurity, conflict

and war. Humanitarian disasters like the current famine in Somalia, due to a deadly combination of drought, conflict and political instability, are likely to become more frequent. With refugees pouring into refugee camps in Kenya at the rate of 1 500 a day – 80% of them women and children – and hundreds of thousands of deaths, this is Africa's worst humanitarian crisis in decades.<sup>12</sup> Such droughts will increase with climate change, and we should anticipate increasing migrations from the region and other parts of sub-Saharan Africa. This will increase the burden on our already crisis-stricken public and private health systems.

We cannot allow our health sector to lag behind these complex challenges; it must respond to the consequences of climate change as an integral part of its proposed transformation.

### Tackling health sector emissions in the context of the National Health Insurance

The challenge is to ensure that our new health system not only provides good health care for all, now and in the future, but that it minimises its impact on the planet and is sustainable. The initiative around the

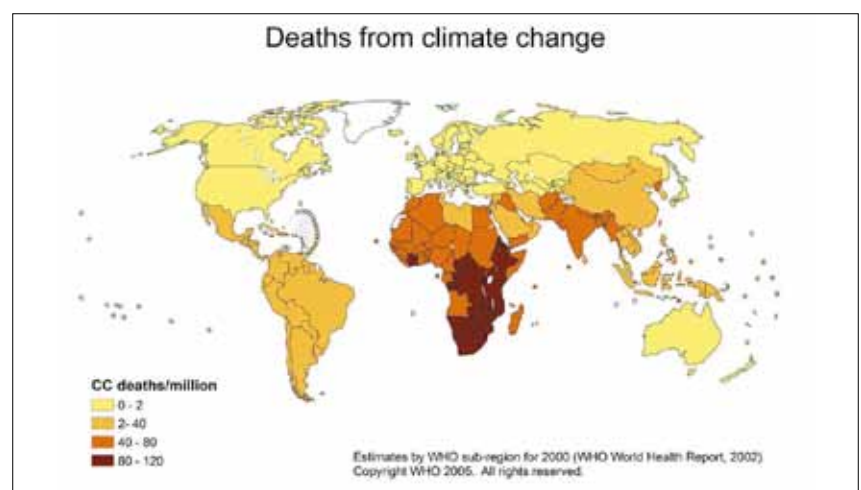


Fig. 2. Deaths from climate change.<sup>2</sup>

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government's National Health Insurance (NHI) proposal provides opportunities that will make this possible.

Addressing climate change and its consequences requires action in three broad areas.

- Firstly, the health sector has to reduce its current GHG emissions and ensure that the transformed health system has low emissions.
- Secondly, it has to take on a more prominent leadership role in reducing people's vulnerability to climate change. This vulnerability is rooted in social and economic inequality, implying a need to address the social determinants of health more proactively, and for more powerful advocacy for social justice and equality not only in the country, but throughout Africa and the world.
- Finally, it must prepare itself to deal with the changing patterns of disease and disease burdens that inevitably arise from climate change.

### The extreme vulnerability of sub-Saharan Africa to the effects of climate change has major implications for health in South Africa and increases the urgency of health system transformation.

Fortunately, the guiding principles contained in the NHI green paper embody values that align closely with these imperatives. Among these are social solidarity, a commitment to equity, and the right to health, access and affordability. The re-engineering of primary health care based on the principles of the 1978 Declaration of Alma Ata provides a strategic way forward with its strong emphasis on community-based services.<sup>13</sup>

It is essential to build excellence in all three primary health care streams: the district clinical specialist teams, the school health

promotion services and the municipal ward-based primary health care teams. This will move the centre of gravity of the system out of the hospitals and into the community, closer to where people live. It entails a shift in emphasis in human resources from the hospital-based, doctor-centred model to a community-based model that incorporates more community and mid-level health workers.

These processes will require political will and a participative multisectoral approach, and an acceptance by professional bodies

of the necessity to work in collegial, non-hierarchical health-worker teams in community settings. The potential benefits are immense, better and more accessible health services and a healthier nation, and significant reductions in GHG emissions.

Panel 1 lists a number of practical suggestions for reducing the carbon footprint of hospitals and health facilities. Many of the above measures have been researched by the SDU in the UK, and they should be urgently explored here.

#### Panel 1. Reducing the organisation's carbon footprint

In calculating their total carbon footprint, institutions such as hospitals must include indirect emissions through visitor, patient and staff travel and the carbon dioxide (CO<sub>2</sub>) emitted as a result of procurement of goods and services. This total footprint is expected to be two or three times higher than direct emissions alone, although more difficult to measure.

#### Intervention strategies

The best way for health sector organisations to achieve significant and long-term carbon savings is by developing a holistic carbon reduction strategy, whereby a carbon footprint is calculated, opportunities for reductions are assessed and a structured action plan is developed. Areas to consider include:

- **New buildings and refurbishments.** Better building design.
- **Procurement.** The right procurement choices can reduce harmful environmental impacts by producing less waste, minimising the need to transport goods, and reducing carbon emissions and other pollution. Local sourcing of food and supplies can bring economic, environmental and health benefits.
- **Transport.** Green travel plans can promote healthy modes of transport and help to change travel patterns of patients, staff and visitors: Encouraging

active travel will reduce the carbon footprint of the organisation and deliver multiple public health benefits.

- **Food.** Reducing expensive imported processed foods and replacing them with sustainably grown local food for staff and patients, ideally procured from small local farmers or produced on the premises on food and vegetable gardens.
- **Waste.** An effective waste strategy can be an important contributor to carbon reductions. Recycling targets can lead to big emissions savings.
- **Leadership.** Although individual champions can be impressive, only with consistent board-level commitment can optimum results be achieved.
- **Capital improvements.** Investing in large-scale capital improvements so that they are also sustainable can pay dividends in terms of financial and carbon savings.

#### Energy-saving tips

- Combined heat and power (CHP) is the on-site generation of electricity, utilising the energy from the heat that is a by-product of the generation process. In an appropriate application, CHP can reduce energy bills by up to 20 - 30% and reduce carbon emissions.
- Harnessing renewable energy sources such as wind and solar power can be a sound investment to reduce carbon emissions and make long-term savings.

- Around a quarter of a building's heat can escape through an uninsulated roof – insulating roof spaces and unfilled external cavity walls is an effective and inexpensive way of reducing heat losses.

**Small-scale measures**

There are many opportunities to achieve energy and cost savings simply by implementing a few simple and fundamental improvements. The biggest savings can be made through adjustments to heating, hot water, lighting, ventilation and the effective use of electrical equipment.

- Lighting can account for over 20% of the total energy use in a typical hospital, so motion-sensitive lighting and energy-saving light bulbs can make a huge difference.
- Maintaining and insulating boilers and pipes is an effective measure – a regularly serviced boiler can save as much as 10% on annual heating costs.

Understanding where energy is being used and wasted and implementing a formal energy policy accordingly can

make savings of up to 20%, for very little investment.

**Behaviour and personnel**

Staff need to be supportive to help you deliver carbon savings. Management decisions can provide the incentives needed to persuade people to choose low carbon options.

Build in incentives: Reviewing the allowance given for fuel miles and considering a generous allowance for cycling miles can help to change travel patterns, as can provision of changing and showering facilities. Introducing a car-sharing scheme can be a good low-cost option to encourage change. Raising staff awareness of issues, and methods of reducing energy use, can deliver great results. Once staff are engaged they can be the eyes and ears around an organisation, identifying and implementing energy-saving suggestions.

Adapted from: *Hospitals Sector Overview*. London: The Carbon Trust, 2007. <http://www.carbontrust.co.uk/publications/publicationdetail?productid=CTV024> (accessed January 2011).

socio-economic development in order to minimise the impacts on the poor and vulnerable; and finally, being prepared and ready to deal with the inevitable changes in disease patterns that emerge in the wake of climate change.

References available at [www.cmej.org.za](http://www.cmej.org.za)

**IN A NUTSHELL**

- Climate change is a major threat to health and to the sustainability of health systems. Sub-Saharan Africa is the most vulnerable region of the world.
- Health systems and organisations are a major contributor to climate change through their own GHG emissions.
- The three most important GHG emitting areas are procurement of supplies and resources, building energy and travel.
- Inpatient hospital admissions have seven times the carbon footprint of outpatient visits.
- Health system transformation in South Africa should include a commitment to reducing the health sector's carbon footprint.
- A number of practical suggestions for GP practices, health centres and hospitals are made.

The SDU estimates that the NHS can save at least £180 million per year by reducing its carbon emissions. Thus, greening the health system is also likely to save money.

It is also likely to lead to technical innovations in building, alternative energy generation and energy conservation, local food production and urban farming. This will lead to employment opportunities not only in the health sector, but also in agriculture, transport and science and technology.

Low GHG emissions should be an overriding concern in the development of the health system. Yet neither the NHI Green Paper nor the 10-point plan mentions the impacts of climate change on health, or the need for the sector to reduce GHG emissions. A possible way forward is to consider including low carbon emissions

in the requirements for the accreditation of service providers under the NHI.

Another concern is the limitation of the right of access to South Africans, legal permanent residents, refugees and asylum seekers. This excludes people who migrate because of the impacts of climate change, since they are unlikely to fall within these categories. Furthermore, there is no accepted legal definition of climate change refugees, nor any legal instrument for their protection.<sup>14</sup>

**Conclusions**

The advent of the NHI gives us a historic opportunity to build a sustainable national health system that not only meets the health care needs of all, but that also addresses and minimises the growing impacts of climate change by reducing its own GHG emissions; playing a leading role in promoting social justice and equitable