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The health profession and climate change: Advocacy needed

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Advocacy is defined as support or argument for a cause or a policy. The lead article in this journal certainly suggests major changes in lifestyle, which will not be palatable to all in the health profession. Do we need to be advocates for the policy of auditing and curtailing our use of energy? One thing is certain – as a result of overpopulation and a massive reliance on fossil fuels for energy we are releasing far more carbon dioxide into the atmosphere than ever before. Together with other greenhouse gases this will result in global warming and major changes in climate.

The World Medical Association and World Health Organization have been strong advocates for policy changes related to our carbon emissions.[1,2] The World Medical Association has pledged to fully involve physicians and national medical associations in the development of policies to prevent or reduce the health impact of climate-related emissions, in particular those initiatives which will also improve the general health of the population.[1] The following priority interventions are summarised from the World Health Organization's regional committee for Africa in 2011:[2]

- Undertake baseline risk and capacity assessments.
- Build capacity based on the needs and gaps identified in the above assessment.
- Implement integrated environment and health surveillance to support timely and evidence-based decisions.
- Undertake awareness raising and social mobilisation.
- Promote public health-orientated environmental management.
- Scale up existing public health interventions.
- Strengthen and operationalise the health components of disaster reduction plans.
- Promote research on climate change impacts and adaptation.
- Strengthen partnerships and intersectoral collaboration.

The South African government and the Department of Health have individually published their responses to the problem.[3,4] However, we need a united front to deal with these problems. We have to include not only the health department, but all departments involved in the environment, such as energy, agriculture, mining and water affairs. The government must realise that the time for only speaking the right words is far behind us and action is needed. Africa will bear the major burden of the negative impacts of global warming, and most countries on the African continent are ill-prepared for this event. As one of the most privileged countries in Africa we need to take a leading role. The Government White Paper on Climate Change published in October 2011 states:[3]

'Amongst a range of environmental constraints that are of necessity playing an increasing role in social development planning, climate change represents the most urgent and far-reaching challenge of our time. While every country will have to develop its own adaptive responses to the effects of climate change, mitigating climate change to ensure the disruption caused to human and natural systems is within manageable parameters, can only arise out of a global response. Furthermore, responding to climate change is a cross-generational challenge. The effects of action or inaction will not be felt immediately, but will have significant consequences for future generations.

'It is within this context, and informed by an appropriate sense of urgency, that the South African government has developed this National Climate Response Policy. The current plan represents the first iteration of South Africa's ongoing efforts to adapt to climate change and contribute to the global mitigation effort. In terms of our contribution to the global mitigation effort, the decision to institute sectoral desired emission reduction outcomes and carbon budgets is momentous – it represents a concrete and practical commitment by South Africa.

'Realising this commitment will require sustained effort and cooperation from all spheres of government, the private sector and civil society formations, and ultimately will depend on decisions by individual citizens to embrace climate-friendly lifestyles and habits. Everyone is a stakeholder in this plan, and the level of engagement from the public in the process of drafting the national Climate Change Response suggests that there is no shortage of the requisite will to make the far-reaching changes that are required.'

In December 2011 the South African government hosted the 17th Conference of the Parties and alongside this Dr Motsoaledi, our national Minister of Health, gave the keynote address at a summit on health and climate change (http://www.climateandhealthcare.org). The summit was attended by many professional groups in South Africa, including the South African Medical Association (SAMA). Dr Fazel Randera spoke about SAMA's current response and explained that a 5-member task team has been set up to look at the issue and that a draft policy had been created. He also mentioned a campaign to sensitise members and interact with key stakeholders as well as an awareness poster. SAMA endorsed the final Durban Declaration from the summit which is summarised in Panel 1.[5]

We hope that health professionals will support these statements through practical action in their own lives, communities and practices and through membership of these professional bodies advocate for the necessary action by government and international bodies.

Panel 1. Durban Declaration from the Global Climate and Health Summit[5]

Having gathered at the first Global Climate and Health Summit in Durban on 4 December 2011, we – as health professionals, public health advocates, and healthcare policy makers from more than 30 countries – hereby call on national delegations to the UNFCCC's 17th Conference of the Parties to:

- Recognise the health benefits of climate mitigation and take bold and substantive action to reduce global greenhouse gas emissions in order to protect and promote public health.
- Ensure greater health sector representation on national delegations as well as within key mechanisms of the UNFCCC, recognising the role of the World Health Organization as the voice for public health within the UN system.
- Actively include the participation and empowerment of youth, women and indigenous peoples in the climate change processes.
- Adopt a strong second commitment period of the Kyoto Protocol which currently includes emission reduction targets for the time until 2012, to protect and continue the only binding climate law the world has.
- By 2015, negotiate a fair, ambitious and binding agreement that, consistent with the Prescription for a Healthy Planet, endorsed by more than 130 health organisations in Copenhagen in 2009:
  - Places the protection of human health as a primary objective of any agreement.
  - Establishes an ambitious fair shares framework to reduce global emissions (based on the principles of equity and common but differentiated responsibilities and respective capabilities) in order to avoid a global public health disaster.
  - Fosters both energy efficiency and clean, renewable energy that protects public health by reducing both local and global pollution.
  - Provides the immediate necessary resources to operationalise the Green Fund, and in the longer term, appropriate mitigation and adaptation funding required to address the health impacts of climate change, assuring all countries' rights to sustainable development and their ability to pursue a low carbon development pathway.

The matter is urgent. The health of the world's population is at risk. The time for action is now.

References available at www.cmej.org.za

The carbon cycle

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Understanding the global carbon cycle is the key to understanding climate change. The carbon cycle makes it clear that, if we want our grandchildren and their children to live decent lives, we have to achieve a world free of fossil fuels – a post-carbon civilisation – within a few years.

Carbon is essential to life. All living organisms are constructed out of carbon-containing organic molecules. These are made possible by the carbon cycle: the exchange of carbon between the earth's carbon reservoirs, as shown in Fig. 1.

The diagram shows how an enormous carbon cycle moves carbon between these reservoirs in a number of sub-cycles. It shows carbon reservoirs (in gigatons), and the flux between them (in gigatons per year).

The sub-cycles can be grouped into *biological cycles* (i.e. between the atmosphere and the land, ocean surface and vegetation) and *geological cycles* (exchanges with the deep ocean, sediments and rocks, including the formation – but not the combustion – of 'fossil fuels').

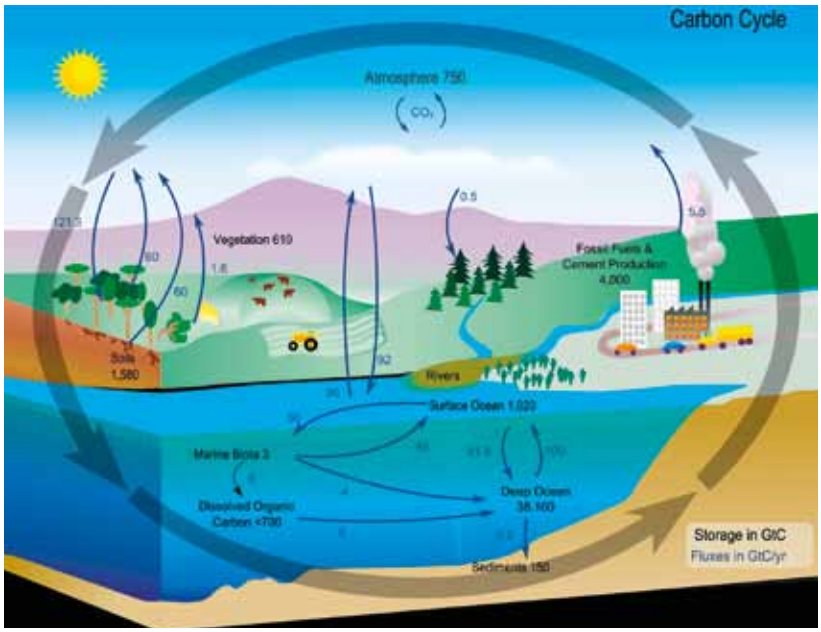

Fig. 1. The carbon cycle. (The diagram is a file from the Wikimedia Commons. Commons is a freely licensed media file repository. The copyright owner has given permission for it to be used freely for any purpose and without any conditions. See: http://en.wikipedia.org/wiki/Carbon_cycle.)

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Geological cycles run at geological time-scales of millions of years. This means that for practical purposes, no new fossil fuels are being produced. Fossil fuel burning is not a feature of the natural biological cycle. The geological cycle has no meaningful relationship with climate change.

Natural biological carbon cycles, on the other hand, run at seasonal or annual time scales – we can see them happening in our daily lives: photosynthesis in green leaves, respiration, veldfires and combustion of wood, rotting plants, and so on.

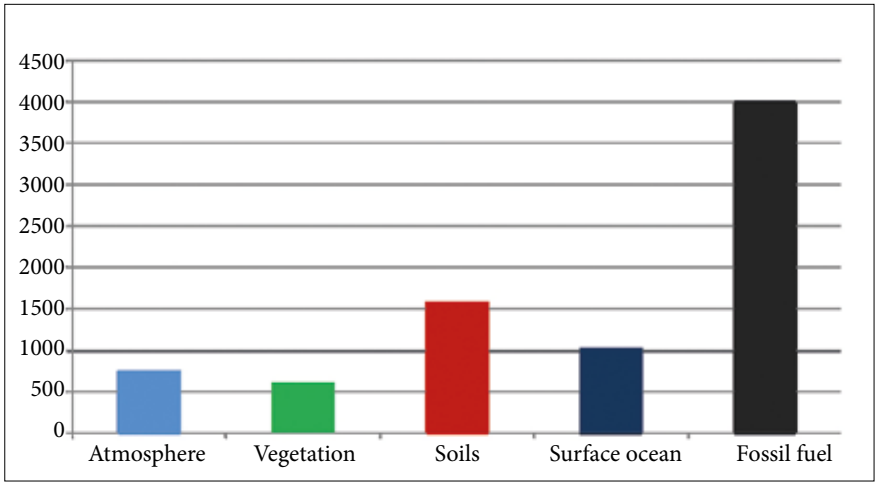

Fig. 2. Amount of carbon in the world's reservoirs (gigatons carbon).

Banner at the COP-17 Conference on the UN Framework Convention on Climate Change.

Using the fluxes in the diagram, we can construct a natural carbon balance where positive and negative contributions refer respectively to removing carbon from, or releasing it into, the atmosphere. Table 1 demonstrates this in gigatons of carbon per year.

This means that the planet, in its natural, pre-industrial state, is a *carbon sink*, capable of removing 2.2 gigatons of carbon from the atmosphere each year, mainly through photosynthesis. It is this natural solar-powered ability to sequester carbon that made life on earth what it is today by reducing the atmospheric CO_2 concentration down to 0.04%, and safely storing the sequestered carbon, with all the solar energy that went into its photosynthesis, as what we now call fossil fuels.

The industrial revolution brought an end to this. Ever since we discovered that there are enormous amounts of stored fossil fuel energy, we have been doing our best to reverse the process. To the negative side of our carbon balance we now have to add 5.5 gigatons of carbon from fossil fuel burning per year. This brings the overall balance to minus 3.3 gigatons of carbon, accumulating in the atmosphere as CO_2, and leading to climate change and global warming through its greenhouse effect.

Fig. 2 shows the current carbon reservoirs that are part of this rapid carbon cycle. Fossil fuels are included because, since the industrial revolution, they have become part of the rapid biological cycle. However, unlike the exchange of carbon among the other reservoirs, fossil fuel combustion is a one-way process. It is not a true cycle. Effectively, it means moving carbon from the tall black fossil fuel bar on the chart and piling it onto the shorter blue atmosphere

Table 1. Positive and negative contributions to the biological carbon sub-cycle

Sub-cycle	Positive	Gt C	Negative	Gt C
Land and vegetation	Mainly photosynthesis	121.8	Respiration	60
			Decay	60
			Burning biomass	1.6
Surface ocean	Mainly photosynthesis	92	Respiration, decay	90
Total		213.8		211.6

bar – the greenhouse gas-containing bar, responsible for climate change.

The result is, effectively, reversal of the process that supports life as we know it – planetary suicide. The planet cannot recycle all that carbon, and if we don't reverse it, will become uninhabitable by humans.

The only lasting solution: Keep fossil fuels in the earth, where nature has put them

Ecuador has large oil reserves in one of the most biodiverse regions of the world. Some years ago social movements and civil society organisations who wanted to protect the biodiversity and indigenous lifestyles began a campaign for a world emancipated from the need to burn fossil fuels – a post-oil civilisation. The campaign is supported by the Ecuadorian government, and by campaigning groups in a growing number of countries. Germany has pledged financial support. The campaign slogan is: *Keep the oil in the soil, keep the coal in the hole, and keep tar sand in the land.*

Although it originated in Ecuador around local issues, the campaign has worldwide implications. If we look at the carbon cycle and its implications, it is clear that its simple, yet radical, slogan points to the only effective and lasting way to combat global climate change.

How well are we teaching health science students about climate change and health?

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Climate change and the issues of sustainable development are a new component of the health sciences curriculum. While the topic is now included in basic education the relevance to healthcare providers, health systems and the healthcare industry needs to be incorporated within higher education institutions.

Health sciences faculties are themselves part of the problem. For example, the Faculty of Health Sciences at Stellenbosch University used 16.4 million kWh in 2010, making it a

Fig. 1. Students and author paint a mural on climate change.

Table 1. Consensus on the medical school curriculum for climate change

Learning objectives

We propose nine learning objectives, of which four are core objectives to be used by all educators, regardless of the teaching format. Learning objectives are based on the WHO Health and Climate Change module.

Core objectives (with optional sub-topics)

1. Climate change as an environmental hazard: explain how climate change impacts on health inequalities and the wider determinants of health

a) Outline the effects of climate change on health:
- Mechanisms by which climate change affects the wider determinants of health
- Disease processes affected by climate change
- Examples of health effects that have already been observed
- Examples of projected health effects

b) Describe the impact of climate change on health inequalities:
- The exacerbation of inequalities through the impact of climate change
- The role of inequalities in causing climate change
- The theory of contraction and convergence

c) Discuss ethical issues over distributive justice in carbon reduction

2. Define the relationship between adaptation and mitigation and the health co-benefits of each

a) Define mitigation and adaptation

b) Give an example of an adaptation measure which runs counter to mitigation strategies

c) Give an example where adaptation and mitigation strategies are synergistic

d) Health co-benefits relating to policies on:
- Redistribution of resources (e.g. carbon allowances)
- Transport, food production, energy generation, home energy efficiency
- Population control

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Table 1. Consensus on the medical school curriculum for climate change (Continued)

3. Demonstrate clinical, leadership and management skills for low carbon healthcare

a) Describe how sustainable lifestyle interventions (e.g. promoting active travel, dietary change, home energy efficiency, sustainable occupations) can be used to prevent common diseases.
b) Describe ways in which patients may be supported to care for themselves (e.g. through patient information & training, provision of direct access to health data, supporting uptake of home therapies, use of shared decision-making techniques, development of patient-centred care plans, provision for flexible/patient-initiated access to care)
c) Demonstrate effective conduct of a telephone consultation with a patient
d) Understand the principles and methods of service improvement with respect to sustainability, efficiency and patient experience. Describe how to obtain feedback from staff and patients, analyse processes, identify improvements and plan how these could be implemented and evaluated
e) Demonstrate awareness of the role of doctors as managers, including seeking ways to continually improve the environmental impact of care, and the use and prioritisation of resources

4. Demonstrate advocacy skills for action on climate change and the determinants of health

a) Demonstrate understanding of the wider implications of the duty of a doctor to 'protect and promote the health of patients and the public': give three ways in which doctors may influence the determinants of health for their patients
b) Explain how behaviour change models apply to promoting healthy, sustainable lifestyles
c) Informal advocacy: discuss with colleagues whether or why individuals in the health system should act on climate change, e.g.:
   - Importance of a healthy global and local environment to the health of patients
   - The potential benefits of sustainable care to patient experience
   - Health economics: increased productivity with fixed resources
   - Compliance with carbon reduction legislation and targets
   - Leadership in local communities
d) Formal advocacy: give a 15-minute presentation or write a letter to senior colleagues on what the health system can do to mitigate against climate change, covering, e.g.
   - Carbon reduction strategy
   - Trust level involvement: monitoring, reporting and reviewing carbon
   - Clinician engagement (prevention, self-care, lean pathways, low carbon treatment choices)
   - Partnerships with local councils and community organisations
   - Advocacy and awareness raising
e) Describe strategies for creating a support network to increase the effectiveness of professional actions
f) Discuss the potential conflicts of interest presented by a transition to sustainable healthcare (e.g. challenge to dominance of bio-medical models in healthcare, patient expectations, commercial interests)

Additional (optional) objectives

5. Explain the basic scientific evidence base for global warming and climate change. Make reference to systems theory and importance of feedback loops (normative and amplificatory) in auto-regulation of climate and global biological systems
6. Critically appraise scientific evidence linking climate change and health
7. Access information sources on climate change, health and mitigation measures and use the information in relation to patient care, health promotion, giving advice and information to patients and research and education
8. Explain the concept of 'carbon footprint' of individuals, organisations, products and clinical pathways, various methods of foot printing and the advantages and disadvantages of each
9. Discuss psychological aspects of environmental behaviour change (why and how people change or don't change)

Source: East of England Teaching Public Health Network (www.eetphn.org), The Campaign for Greener Health Care (www.greenerhealthcare.org), NHS Sustainable Development Unit (http://sustainablehealthcare.org.uk)

'very large power user' according to Eskom. This is the equivalent of 16.8 million kg of carbon dioxide and would require planting 45 073 trees to offset the greenhouse gas emissions. As with all large organisations, faculties need to consider their behaviour in relation to energy use, water use, travel, food consumption, waste and re-cycling, and use of land.

At the Faculty of Health Sciences at Stellenbosch University 'greening up the campus' has been a focus area for the last 2 years. Students, academics and support staff have worked together to create a more sustainable organisation. Current initiatives include retro-fitting the buildings to be more energy efficient, introducing a comprehensive waste and re-cycling plan, establishing a worm farm to handle the organic waste from the student cafeteria, planting trees to offset research air travel, and researching patterns of staff and student travel as well as the sustainability of the student cafeteria. Faculty media and communication channels have been used to regularly promote more sustainable activities. Students have also introduced an

'Earth Week' festival to draw attention to green issues.

Apart from striving for congruence with more sustainable and healthy living on campus the issues have also been introduced into the undergraduate curricula. A network of medical schools in the UK has reached consensus on the core curriculum as shown in Table 1. The elements of this curriculum can be integrated as a 'golden thread' into the existing modules and teaching activities.[1]

Reference available at www.cmej.org.za

SINGLE SUTURE

Immune system may help to trigger the menopause

The immune system may play a role in stopping a woman's biological clock.

John Perry at the University of Oxford and colleagues looked at 43 genomic studies of the menopause, covering more than 50 000 women. By comparing the age that menopause began, Perry's team identified 13 regions with possible links to menopause timing. Three of the regions were housed within genes associated with the immune system. Other regions occurred within genes that control gene repair, regulate hormones and trigger inflammation.

It's not yet clear whether the immune system is the main driver of the menopause or merely a backseat player to biological forces such as hormonal fluctuations. 'This will become clearer when we have identified more of the genetic basis of menopause onset,' says Perry. However, a genetic test to predict when menopause will begin is still a distant prospect.

The link between ovulation and the immune system isn't unexpected; some women with primary ovarian insufficiency, who undergo an unusually early menopause, have an autoimmune disease of the ovaries.

New Scientist, 28 January 2012.