Climate change and the health profession in South Africa

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Abstract

SA Fam Pract 2009;51(5):404-407

Climate change is arguably the most important public health issue of the next decade. The impact of climate change should be understood in the broader context of population growth, degradation of ecosystems, inequality, food insecurity, urbanisation, slums and peak oil. Climate change is the result of deforestation and excess greenhouse gases from the burning of fossil fuels. Environmental consequences include rising global temperatures, melting of sea ice and glaciers, rising sea levels, flooding, more frequent and severe storms and changes in climatic patterns. Medical consequences stem from extreme climatic events, changes in the patterns of infectious diseases, increased food insecurity, displacement of populations, lack of fresh water and conflict over resources. South Africa has a relatively high carbon footprint. The health profession should respond as opinion leaders, as professional bodies and as an industry.

Ⓟ **Peer reviewed. (Submitted:2008-09-06, Accepted:2008-11-06). Available online at www.safpj.co.za.**

Introduction

Climate change will arguably be one of the most important and urgent public health issues in South Africa over the next 10 years. Although it is not exclusively a health issue, it has major implications for the health of the South African population, the health industry and for us as opinion leaders and professionals.

Before discussing climate change specifically, I would like to broaden the picture to include a number of other interrelated global trends that catalyse and complicate the effects of climate change.[1]

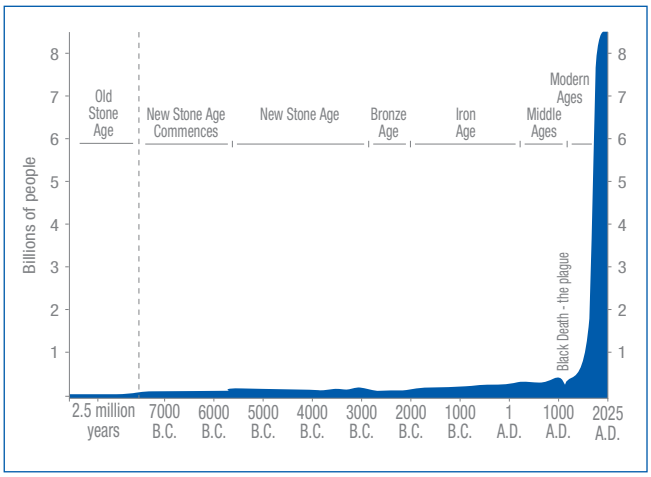
Population growth

During the past 10,000 years the global population has never risen above one billion, but by the time I was born in the 1960s we had reached two billion and within my lifetime the global population is predicted to top eight billion (Figure 1). A recent editorial in the BMJ concludes that "the annual increase in population of about 79 million means that every week an extra 1.5 million people need food and somewhere to live. This amounts to a new city each week, somewhere, which destroys wildlife habitats and augments world fossil fuel consumption".[2]

Degradation of ecosystems

Natural ecosystems provide many free and essential services to human populations, but are not counted in economic evaluations and have no legal rights. Services from soils, fresh water, oceans, animals and forests are essential to our survival. The Millennium Ecosystem Report has confirmed for the first time that 60% of the ecosystems that human systems depend on for survival are degraded and that the damage is largely irreversible.[4]

Figure 1: World population growth [3]



Inequality

The use of resources by global and national societies is extremely unequal. Globally the 20% of people who live in the richest countries account for 86% of private consumption and the poorest 20% only 1.3%.[5] If we were all to develop to the level of consumption currently enjoyed in Camps Bay Cape Town, we would need 14 planets to sustain this level of consumption.[6] The epidemic of non-communicable diseases such as obesity, diabetes, coronary heart disease and cancer amongst developed nations is to a large extent another by-product of this over consumption and obesogenic lifestyle.[7] The discipline of family medicine in South Africa has also raised concerns over the huge inequalities in relation to health care through the Rustenberg Declaration.[8]

Urbanisation and slums

Over the past 50 years there has been a global migration to cities and now for the first time more people live in cities than in rural areas.[9] People live in an artificial concrete world often removed from the natural environment. Transport is a challenge with use of private vehicles causing congestion, loss of productive time, pollution and greenhouse gases. Housing is another major challenge as 75% of the urban population in developing countries live in slums with health hazards such as fires, as well as inadequate access to basic services such as water, electricity or sewage.[10] Urbanisation has, however, also been seen as an opportunity because it is "easier to provide people with education, health services, jobs, shelter and family planning".[11] Energy use is now also concentrated in cities with 50% of South Africa's energy used in our six main cities.[12]

Food insecurity

Population growth combined with the degradation of ecosystems such as soils and water and inadequate local food production have resulted in food insecurity in many parts of the world.[13] The growing of cash crops in developing countries, for use as bio-fuels in more developed countries contributes to deforestation and may divert farmers from local food production to the more lucrative cash crops.[14] Rising fuel prices and political instability and conflict have also contributed to the problem – not least in Zimbabwe.[15]

Peak oil

There is no doubt that production from oil fields follows a peaked curve with many oil fields already exhausted.[1] Globally the same picture holds true, with many analysts believing that global peak oil production has already been passed. The rapid development of countries over the past 100 years has to a large extent been dependent on the availability of oil and our cities and economies are designed around the need for oil. Countries such as the Unites States are now "borrowing money from China to buy oil from the Persian Gulf to burn it in ways that destroy the planet." The Unites States is so dependent on oil that "27 senior statesmen and retired military leaders warned of the national security threat from an 'energy tsunami' that would be triggered by a loss of our access to foreign oil. Meanwhile, the war in Iraq continues, and now the war in Afghanistan appears to be getting worse."[16]

Climate change

Climate change therefore needs to be understood within this bigger picture of unsustainable living. The basic concept of climate change is simple and scientifically uncontested. Solar energy from the sun warms the planet and also escapes as infrared energy back into space. The amount of infrared energy retained depends on the concentration of greenhouse gases in the atmosphere. Over the past 100 years the concentration of carbon dioxide in the atmosphere has increased relentlessly and led to more heat being trapped with a resultant rise in mean global temperature. The increase in carbon dioxide and other greenhouse gases over this period is attributed to the burning of fossil fuels and loss of forests.

Fossil fuels such as coal, oil and gas are burnt directly to produce electricity, or in liquid form, to power vehicles and aeroplanes. Although 70% of carbon dioxide emissions are caused by burning of fossil fuels, the remaining 30% is due to deforestation.[12] Deforestation leads to fewer trees to absorb carbon and burning of forests contributes to gas emissions. Methane and nitrous oxide from agriculture and chlorofluorocarbons from refrigerators and aerosols also act as greenhouse gases.[12]

The rise in global temperature has a number of important environmental consequences, some of which we are already seeing, many of which are predicted and others which may also be unpredictable. Changes that we are already seeing include:[17]

- Melting of glaciers in Antarctica or Greenland which will increase sea levels and reduce fresh water supplies in the Himalayas.
- Melting of sea ice such as the North Pole. Sea ice reflects heat and its loss results in more heat being absorbed by the sea. Many animals such as the polar bear depend on sea ice for their natural habitat. It is predicted that the North Pole will become completely free of ice during the summer in the next few years.
- Warmer sea water with more frequent and extreme storms, tornados and hurricanes and changes to ocean current systems.
- Rising sea level with flooding of low lying areas. The Pacific nation of Kiribati became environmental refugees this year as their islands disappeared beneath the ocean. Many cities are in low lying areas and even the city of Cape Town has predicted an 80% likelihood of flooding of its city centre over the next 25 years.[18]
- Change in climate patterns with some areas becoming drier and drought ridden with more fires, while others experience severe storms and flooding. Martinus Van Schalkwyk, Minister of Environmental Affairs and Tourism has recently suggested that "global warming would make the western side of South Africa drier with a huge impact on agriculture because that's where our maize basket is. The eastern side would have longer spells of drought but heavier storms, with increased rainfall over-all, and the Western Cape would have heavier rains."[19] Drought, floods and fires will therefore become more extreme and unusual.

Medical consequences of climate change

The medical consequences of climate change flow from the above environmental changes and can be predicted as:[20]

- The direct effects of extreme and unusual climate such as heat waves, storms, floods and hurricanes. The recent heat wave in Europe which led to the deaths of 35,000 people and hurricane Katrina which almost completely destroyed New Orleans received much publicity.
- Changes in patterns of infectious diseases. In Africa malaria is predicted to spread as the mosquito's natural habitat is altered by climate change. An additional 20–70 million may live in malarious areas by 2080.[20] In China the snail vector for schistosomiasis may also change its natural habitat and put an additional 21 million people at risk.[21] Changes in disease patterns will also affect livestock and not just humans.

- Farming and food supply will be affected as traditional crops no longer grow well under new climatic conditions. Farmers may need to move or adapt and an increase in food insecurity and malnutrition is likely. Many farmers and farming communities may lose their livelihoods.
- Changes in fresh water supply. Fresh water may be less available in drought areas and in areas where natural sources such as glaciers have disappeared.
- Displacement of vulnerable populations from low lying areas. It is predicted that 150 million people may be environmentally displaced as refugees by 2050.
- Increased conflict over scarce resources resulting in traumatic deaths and collateral damage.

With many of these changes it may be possible for communities to adapt to the effects and thus reduce the impact of climate change. However, "the health effects of global environmental change will vary between countries. Loss of healthy life years in low income African countries, for example, is predicted to be 500 times that in Europe." One of the main reasons for this difference is the relative inability of low income countries to adapt to the changes.[20]

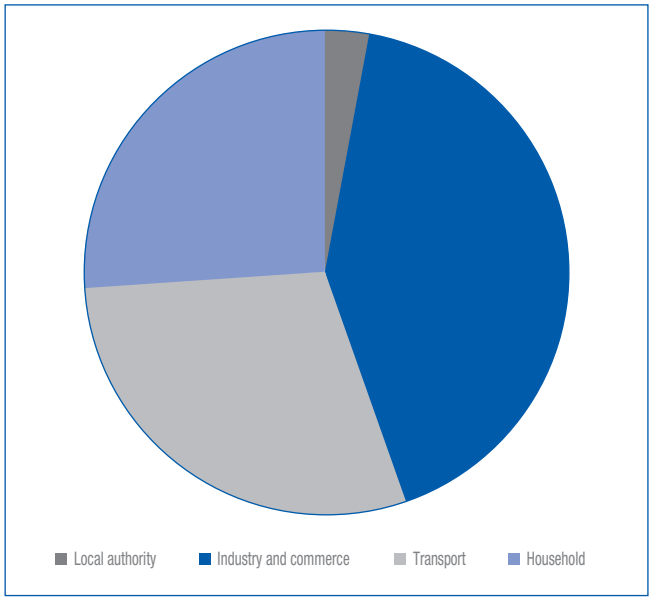
Is South Africa a villain or a victim?

It is clear that Africa contributes very little to climate change and yet will suffer the consequences more than other continents. The global per capita carbon dioxide emissions are estimated to be four tons per person per year and in Africa this is only one ton per person per year. South Africa however is not typical of the continent and is estimated to produce eight tons per person per year, well above the global average. As South Africa's population is relatively small, we only contribute 1.6% of all global emissions.[12]

Energy use in South Africa is almost entirely dependent on the burning of cheap coal. Thirty per cent of our energy comes directly from burning coal, 94% of our electricity from coal-fired power stations and 22% of our liquid fuels from conversion of coal. Our dependency on burning coal and inefficient use of energy in industry, commerce and households are largely responsible for our over-sized carbon footprint.[12]

The sources of carbon emissions from a city like Cape Town, with manufacturing and tourism as the main industries, are shown in Figure 2.[12]

Figure 2: Sources of carbonemissions in Cape Town



Development and the environment

The two issues of development and environment are often presented as antagonistic to each other. People who are for "saving the planet" are seen as being against "development" and alleviation of poverty, as further such development would mean more people consuming more resources and further degradation of the environment. The underlying argument is that we should first focus on development and then clean up the environment. The concept of sustainable development, however, is saying that the two are systemically interconnected and need to be tackled simultaneously. "Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs."[22] We need to develop, but with a set of different assumptions and with different technology. Ultimately "the earth will regenerate, but there may not be people. The earth has all the time in the world, but we don't."[23] Wangari Maathai, one of Africa's Nobel Peace Prize winners has practically demonstrated this inter-connectedness through her commitment to rural development, empowerment of women and the planting of trees in Kenya.[24]

What should the health profession be doing?

Internationally medical associations, professional bodies, academics and departments of health are taking the issue seriously. The National Health Service in the UK is the country's largest employer and contributes 18 million tons of carbon dioxide per year to the problem. The NHS has committed itself to a 60% reduction in its emissions by 2050.[25–27]

Our response can be in three different areas:

- *As opinion leaders and role models.* The health profession is influential and as individuals we should strive to live in ways that are congruent with health. In the same way that doctors have role modeled a non-smoking lifestyle, we should embrace a sustainable lifestyle. For example this will mean looking at our energy use in the home (for example solar water heating), our approach to private transport and air travel. A more sustainable lifestyle is a healthier lifestyle all round.
- *As a profession.* Professional bodies such as the South African Academy of Family Practice and Primary Care and the South African Medical Association should have clear and public positions on the need to address climate change. These bodies should engage with government and industry to advocate for the necessary changes in renewable energy production (for example solar and wind) and energy efficiency (for example in building design) as well as in public transport. Attention should also be given to adapting to the already inevitable effects of climate change.

- *As a health industry.* Hospitals and health centres are consumers of energy and resources as well as producers of waste. Important issues will be in the design and construction of new hospitals and clinics as well as the auditing and adaptation of existing buildings to use energy more efficiently. Two new district hospitals are about to be built in Cape Town and should be designed with sustainability in mind. The procurement of drugs and equipment also has a significant carbon footprint. Travelling required by both staff and patients to get to work or access health care should be another focus. The handling of organic, inorganic and medical waste is also important.

Conclusion

We have a 10-year window of opportunity to prevent the escalation of climate change. If global temperatures exceed an increase of 2°C it is likely that environmental feedback loops will make further rises in temperature inevitable. Prof Mark Swilling has commented that "what is widely agreed is that if nothing changes, it is highly probable that the conditions for human life as we know it will fall away within 30 to 50 years."[1]

A focus on sustainable living and sustainable development is however congruent with health in general and will also mitigate against the growing epidemic of non-communicable diseases as well as provide the conditions necessary to tackle epidemics such as HIV/AIDS and TB.

Let me end with the words of the novelist Ian McEwan "Pessimism is intellectually delicious, even thrilling. But the matter before us is too serious for mere self-pleasuring."[19]

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