



climate change

By Jason and Rachel Roach

The evidence for climate change is irrefutable and it is more than 90% certain that most of the warming is due to the observed increase in man-made greenhouse gas emissions. Global warming has serious consequences for health; most are negative, but some are positive because actions that are good for curbing climate change are also good for health. Christians have a special mandate to care. Suggestions are made for tackling the causes and the effects of climate change.

In the year 2000 alone, climate change is estimated to have caused the loss of over 150,000 lives.¹ Since the industrial revolution began more than 200 years ago, the average global surface temperature has risen by 0.76°C. This warming is leading to disrupted seasonal weather patterns and an increased frequency and severity of extreme events. In different parts of the world this means more heatwaves, more floods and droughts, and more intense storms and hurricanes. Each of these consequences increases deaths and the occurrence of various diseases around the globe.

According to the Intergovernmental Panel on Climate Change (IPCC) there is more than 90% certainty that most of the warming is due to the observed increase in man-made greenhouse gas emissions.² Many of the national science academies of the world (including in the USA) have publicly pledged their agreement.³

Climate science

The 'greenhouse effect' has been known for nearly 200 years. Greenhouse gases in the atmosphere (such as water vapour and carbon dioxide) act as a blanket over the earth's surface. By absorbing infra-red radiation from the earth's surface they keep it on average 20-30 degrees Celsius warmer than it would be otherwise. This warming effect, however, is increasing. As a consequence, the global average temperature is projected to rise by between 2-6 degrees Celsius from the pre-industrial level over the 21st century.⁴

It is true that the climate record over the last 1,000 years shows a lot of natural variability; for example, as a result of volcanic activity and changes in the sun. But the rise in global average temperature (and its rate of rise) during the 20th century is well outside the range of known natural variability. The evidence is very strong that most of the warming over the last 50 years is due to the increase of greenhouse gas emissions, especially carbon dioxide. It is therefore labelled as man-made, or anthropogenic.

Two basic observations illustrate the reality of anthropogenic climate change. First, climate scientists are able to compare historic concentrations of atmospheric carbon dioxide with the present day. This is possible using measurements from air bubbles trapped in the ice cores of the Antarctic and Greenland ice caps. From these ice core readings we know that carbon dioxide in the atmosphere has increased by nearly 40% since the beginning of the industrial revolution (around 1750). It is now at a higher concentration than it has probably been for millions of years. This increase is due largely to the burning of fossil fuels – coal, oil and natural gas.⁵ There has been a close correlation between the concentration of greenhouse gases and global temperature over the past 800,000 years.⁶ Secondly, computer models of

climate (of which there are many) only show good agreement between observed and simulated global average temperatures when both natural and anthropogenic factors are included.⁷

The most reliable source of scientific information about climate change is the Intergovernmental Panel on Climate Change (IPCC). The body was founded in 1988 and has involved scientists from around the world in producing four major reports, the most recent in 2007. It has been a massive undertaking; involving 450 lead authors and 800 contributing authors. During three stages of review, more than 2,500 expert reviewers collectively submitted 90,000 review comments on the various drafts, all of which are on public record. The final report is comprised of three volumes, which are one thousand pages each. In a document of this scale and size, it is likely (some would say inevitable) that small mistakes will be made even with a rigorous review system in place. However, the very few errors that have been identified and subsequently rectified cannot legitimately be used to negate the rest of the report.⁸

The precautionary principle

It is difficult to predict with certainty the precise rise in temperature and the precise scale of the effects in such a multifactorial process. But in the face of such uncertainties, the precautionary principle is an important guide. It reminds us that on the one hand scientific conclusions are always made on the basis of the information available at a particular point in time. They are therefore subject to change in the light of further observations. On the other hand, however, inaction in the light of current compelling evidence cannot be justified on this basis. While this principle does not commit us to a particular course of action in the light of the evidence, it does legitimate acting on the present data even while being uncertain about some long term outcomes.⁹

Health implications - negative

Emerging evidence on the effects of climate change shows three major health implications that have been observed.¹⁰ The first is the direct effect of increased heatwave and coldwave-related deaths (eg 35,000 excess deaths in Europe in 2003).¹¹ There were eighteen heatwaves reported in India between 1980 and 1998, resulting in 1,300 deaths. However, three heatwaves between 1998 and 2000 caused an estimated 2,200 deaths in India. Coldwaves are also problematic. Extreme cold lasting from hours to weeks tends to affect the socially deprived (the homeless and alcoholics) and the elderly. Even in countries that experience regular cold spells, this increase in adverse weather conditions can be lethal when heating systems either fail or are not affordable.

The poor will die

The second effect is the altered distribution of some infectious disease carriers (vectors). For example, bird migration patterns and the prevalence of insects such as mosquitoes, ticks and blackflies are changing. They are being found in increasing numbers in areas where the temperature would previously have been unfavourable for their flourishing. This raises the possibility that the distribution of diseases which they carry, such as malaria, may well shift and increase over time, with a longer season of transmission. In many cases it is too early to identify changes in disease patterns exclusively with climate change or to know precisely how these might develop, but we would expect the effects to become increasingly marked.

Thirdly, altered seasonal distribution of some allergenic pollen species has been observed. Changes in climate have already caused the spring pollen season in the northern hemisphere to begin earlier. Certain types of pollen have increased, and some animal species are experiencing a longer pollen season already. This naturally has an effect on the distribution and length

of duration of pollen-related diseases such as allergic rhinitis.

It is also predicted that in time there will be additional health consequences. These are predominantly negative, such as increased:¹²

- burden from malnutrition (as a result of drought)
- diarrhoeal disease (as a direct effect and from reduced water availability)
- cardio-respiratory disease (as a result of changes in air quality facilitated by heat and light in urban contexts)
- disability and death as a direct result of heatwaves, floods, and droughts
- burden on health services

A number of other indirect effects are also predicted. For example, financial pressures generated by climate change may impact international pledges to respond to other areas of global health development. The huge numbers of environmental 'refugees' will worsen issues of rapid urban growth such as pollution. And in addition it is feasible that conflict may arise over these population shifts, as well as over the limited resources available to society.¹³

All these health impacts will be greatest in low-income countries. In all countries, those at greater risk include the urban poor, the elderly and children, traditional societies, subsistence farmers, and coastal populations. As one author put it, 'The rich will find their world to be more expensive, inconvenient, uncomfortable, disrupted and colourless; in general, more unpleasant and unpredictable, perhaps greatly so. The poor will die.'¹⁴

Health implications - positive

New evidence has identified many positive health implications of addressing climate change. For example, developing low carbon transport and encouraging more walking, cycling and public transport will combat diseases made worse by inactivity, such as heart disease. It would also be likely to reduce traffic injuries. Clean-burning stoves in developing countries will drastically change exposure to indoor pollution and so greatly impact the prevalence of short and long term lung disease. Household energy efficiency measures in developed countries will reduce the incidence of lung cancer

and respiratory disease from breathing in pollutants like radon particles, carbon monoxide, second hand tobacco smoke, and mould.

The food system is also a major contributor to greenhouse gas emissions. Half of these are from farming-related greenhouse gas emissions from livestock (eg methane and nitrous oxide) and deforestation to create space for them (carbon dioxide). Reducing consumption of animal products will also reduce our intake of saturated fats which cause heart disease. Low carbon fuel solutions will reduce air pollution and so again reduce heart and lung damage.¹⁵

The size of these health impacts is difficult to predict. Some will depend on the completeness of societal change or the particular policy intervention. Some will accrue over years, some more quickly. Many effects will vary between regions, cultures and individuals. However, there is broad agreement that the benefits for health of tackling climate change are significant and should influence public policy.¹⁶

Should we care?

The Bible affirms that Jesus rules the physical and spiritual realms of the universe.¹⁷ Humanity is given the role of using and enjoying his creation responsibly, remembering that it ultimately belongs to him.

Secondly, God commands us to love our neighbours as ourselves. A 'neighbour' is simply anyone who happens to cross our path.¹⁸ In our age of globalisation and 24-hour news media we are confronted daily with how people in poorer nations are affected by climate change. The impacts of flooding, hurricanes and other extreme weather events are regularly reported in the news. Caring for these 'neighbours' models the generosity of God.¹⁹

Thirdly, climate change impacts our poor and vulnerable 'neighbours' most severely. These are the very people for whom Christians are encouraged to show particular care.²⁰

What we can do

Tackling climate change requires effective action in all areas of society, from

international bodies down to individuals. As Christians we of course must recognise that climate change is one of many important issues that need addressing in our world. However, if we are to obey our call to be a distinctive community, then we must consider how to respond to the ethical issues that face us today in a biblical and appropriate way.

Nationally, responding to climate change might mean lobbying our governments to consider changes to their public health policy. Priorities may vary from country to country, between developed and developing world situations. However, what the latest research highlights is that what is good for climate change is good for individual health.

Low carbon societies bring global health benefits. Therefore for a public health policy to be comprehensive in the 21st century it must integrate strategies to tackle the causes of climate change.²¹ Hence lobbying the appropriate government sectors to increase access to clean energy, reduce consumption of animal products, and encourage cycling, walking and public transport should be on the healthcare policy agenda.²² In addition better research, surveillance and accountability systems are necessary. Such investment is especially needed in low income countries least prepared to deal with climate change issues. Health policy across the board (public and private, national and local) will need to be more integrated in practice as well as committed to it on paper.²³

Corporately and individually, the healthcare workforce should be encouraged to reduce their greenhouse gas emissions as appropriate for their setting. In this respect, responding to the climate change problem mainly requires us to do what we already do – but to do it *differently*. Whenever we seek to respond to climate change, in any area of life, we need to view what we are doing from a different perspective by asking two questions:

- How can we reduce the greenhouse gas emissions produced by this action/department/church etc? (Thereby tackling the cause of climate change)
- How can we reduce the negative consequences that are going to arise

as a result of climate change for people we are working with in this sector/geographical area? (Thereby tackling the effects of climate change)

Tackling the causes

Whether we are thinking about a hospital, a surgery, our church or home, the answers to question one are often similar. There is a wide range of practical (often simple) steps we can take to reduce our emissions, or ‘carbon footprint’, and lots of information is available on how to do this. Three key areas to think through are:

- **Energy use:** 70% of energy use in primary care is attributed to heating so optimising thermostat and air conditioning settings, combined with checking natural ventilation and insulation is essential. In addition, turning off lights and stand-by functions and using energy saving light bulbs will provide substantial savings.
- **Transport:** 5% of UK road transport emissions can be traced to NHS-related journeys. Therefore where feasible, driving less or when necessary driving in a way that reduces fuel consumption will help. Promoting and developing car-share and public transport initiatives, perhaps by providing bicycle storage and changing facilities, may encourage this.
- **Waste disposal:** *reducing* (using email and telephone communication and electronic storage rather than paper), *reusing* (eg using reusable coffee/water cups in surgeries rather than paper or styrofoam ones), and *recycling* (eg collection bins for patients and staff, using refill printer cartridges, and recycling the huge quantities of paper used in healthcare administration).

These actions may sound familiar, and run the risk for some of being over-familiar, but we must not become numb to them. They *will* make a difference. For example, with around a quarter of the UK’s emissions coming from the energy used to run our homes, these simple steps would have a significant impact if we all did them. Healthcare institutions also have enormous power to reduce emissions, particularly the NHS as one of the largest employers in the world.²⁴

In workplaces, voluntary organisations and churches we need people who are asking questions and pushing for change. For example, encourage colleagues to recycle or ask your church to change to energy saving light bulbs. Passionate individuals could brief leaders of voluntary organisations and churches on how best to effect change. Just asking the relevant staff what policies are already in place can help to raise the profile of the issue. It often works well if there is a group of like-minded people from across an organisation who work together to identify areas for change. Coming up with innovative ideas to motivate and inspire people is really important.

Tackling the effects

Minimising the negative effects of climate change is perhaps more complicated, and certainly very context-specific. In this case, strengthening public health services will need to be a central component of our response.²⁵ Doing so is the only way to ensure our public health interventions will be robust anyway. We suggest four specific areas:

First, public health services will increasingly need to anticipate risks, becoming more proactive rather than reactive. For example, more heatwaves will necessitate improvements to housing, management of chronic diseases, and care of the elderly and vulnerable.²⁶ Therefore participation in public health will need to broaden, for example, to include climate scientists, urban planners and housing specialists. A few countries have already developed warning systems for imminent heatwaves and floods.²⁷ Moreover, surveillance of risk indicators (eg mosquito numbers and allergen concentrations) and health outcomes (eg outbreaks of infectious disease and seasonal asthma peaks) will need to improve.²⁸

Secondly, current public health projects need to be screened for future risks to climate change, to ensure they improve the wellbeing of communities in the long-term.²⁹ This is a complex task, and there will be some uncertainties.³⁰ Nevertheless, disease protection strategies must be reviewed and strengthened, and communication to the public must be enhanced, to raise awareness of the increased risks of food-borne diseases and allergic disorders.³¹

Thirdly, infectious disease programmes will need to be enhanced to ensure that food safety, vaccination programmes and detection and treatment facilities are deployed more broadly (in emerging at-risk areas) and more quickly (where increased risk of disease has been identified).

Fourthly, with increasing frequency and severity of natural disasters particularly affecting developing countries, there will no doubt also be an increased need for expertise and practical assistance on the ground. Health professionals could consider devoting a block of time to an area of the world recovering from disaster, or be on standby for new ones.

Conclusion

The case for man-made climate change is now widely accepted as irrefutable. Its health consequences include changes in disease distribution and increased disease and death from extreme weather conditions. Steps must be taken at national, institutional and individual levels to address both the causes and effects.

The case for action has recently been strengthened by clear evidence that addressing the climate change problem will have additional health benefits. Despite political reluctance, economic research has shown that the cost of attempting to mitigate the effects of climate change now will be cheaper than the cost of dealing with the consequences later.³²

However, even if we take a pessimistic view of our ability to tackle climate change, the Christian response amounts to basic discipleship. This means we cannot excuse ourselves from doing it any more than we can excuse ourselves from fighting lust, envy and greed. Such a response among our communities will include calls for government action accompanied by individual action. In addition, as we take stewardship seriously we may well gain opportunities to explain the gospel.³³

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Further reading

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