



Statement on the health co-benefits of policies to tackle climate change

Climate change poses a significant threat to human health. This threat can be decreased by mitigating its causes, particularly by reducing greenhouse gas emissions, and adapting to its impacts. There is concern that measures to mitigate climate change will be socially and economically demanding. However, a growing body of evidence indicates that certain actions to tackle climate change can, of themselves, improve health. When negotiating strategies and implementing national policies to combat the increasing danger of climate change, political leaders around the world should do so with these often overlooked health co-benefits in mind and give greater consideration to policies that achieve both environmental and health goals.

Climate change and health

Climate change

It is widely agreed that human activities are changing Earth's climate beyond natural climatic fluctuations.¹ The emission and accumulation of greenhouse gases associated with the burning of fossil fuels, along with other activities, such as land use change, are the principal causes of climate change. Depending on how fast greenhouse gas emissions increase, the Intergovernmental Panel on Climate Change (IPCC) estimates that the global average surface temperature at the end of this century is likely to be between 1.1°C and 6.4°C greater relative to 1980-1999.²⁻³ To avoid the worst impacts of climate change considerable, though as yet inadequate, effort is being focused on limiting the global average temperature increase to 2°C above pre-industrial levels.⁴ Nevertheless, even a 2°C rise could have a significant impact.⁵

The health impacts of climate change

Climate change poses a significant threat to human health in many direct and indirect ways.⁶ More frequent and extreme severe weather events, such as floods, storms and droughts, could cause an increase in deaths, injuries, common mental health disorders, some infectious diseases and large-scale displacement of people. Increased concentrations of ground-level ozone may exacerbate existing respiratory disease and increase cardiopulmonary mortality. There may be increased incidence of food poisoning and increased prevalence of malnutrition due to reductions in crop yields. Rising temperatures may increase heat related deaths and heat stress, particularly in urban centres as a result of the urban heat island effect. There may be changes in the incidence and distribution of some vector-borne diseases, particularly at the edges of their distributions, and increasing incidence of emerging infections among livestock and humans.^{7,8}

Interactions between population growth and climate change will place further stress on supplies of food, shelter and fresh water.⁹ These may contribute to large-scale human migrations that would then put additional pressure on often weak public health infrastructure, generate unsanitary conditions for environmental refugees and pose a security risk by increasing the potential for conflict. Based on the IPCC assessment, particularly in developing countries, the impact of the adverse health effects of climate change will outweigh any small positive effects, such as reduced deaths from cold as global temperature rises.¹⁰

The poorest people will be affected most

Climate change poses the greatest threat to health in poorer countries that are least responsible for historical greenhouse gas emissions and have the lowest greenhouse gas emissions per

capita.¹¹ The effects of global climate change are predicted to be heavily concentrated in poorer populations at low latitudes, where the most important climate-sensitive health outcomes, such as malnutrition or diarrhoea, are already common, and where vulnerability to the effects of climate change is greatest.

Pregnant women, children and the elderly are particularly susceptible to many of the adverse health outcomes associated with climate change.¹² Especially in low-income countries, the health of families, communities and economies is tied to the health of women.^{13,14} Climate change will therefore greatly undermine global efforts to reduce poverty; increase development; improve the health of women and children; and achieve the Millennium Development Goals.¹⁵

The occupational health hazards of climate change, such as heat stress when undertaking physical activity, are often neglected and are particularly important for those from poorer countries where reduced daily work capacity could further undermine efforts to reduce poverty.¹⁶

Resident indigenous populations in the Arctic, where temperatures over the last century have increased quickly, are particularly vulnerable to climate change and may be neglected because of their relatively small numbers and dispersed living.¹⁷

Mitigation and adaptation

Although there are some uncertainties about the magnitude of climate change and its impacts, there is widespread consensus that to mitigate climate change and reduce its impact on health, near term deep cuts in global greenhouse gas emissions are needed. Actions should be greatest in those high-income countries that have benefited most from burning fossil fuels. The longer we delay, the more severe the impacts on health, the environment and the economy; and the greater the future cost of mitigation.¹⁸ Since some degree of climate change is now inevitable, countries will have to adapt to the associated health risks.¹⁹

Health co-benefits of mitigation

It is widely assumed that the measures required to mitigate climate change will be socially and economically demanding. This is not necessarily so. Recent research indicates that overall the main policies proposed to mitigate climate change can also lead to localised improvements in the health of those populations undertaking the mitigation. These health co-benefits - which are additional to the global health benefits that will flow from mitigation - would offset at least in part and in some cases could even exceed the costs of tackling climate change. For example, a recent meta-

analysis of studies of air quality co-benefits from greenhouse gas mitigation strategies finds that the potential benefit was between \$2 and \$196 per ton with a mean of \$49 per ton of CO₂ and the highest co-benefits in low-income countries.²⁰ The co-benefits are of a similar order of magnitude to the costs of the abatement strategies. This gives substantial extra weight to arguments in favour of emissions reductions and provides added incentives for countries to adopt such policies early.²¹

Scientific evidence

Much of the evidence for the health co-benefits of measures to tackle climate change comes from a series of studies undertaken by an international scientific task force that examined sectors that make major contributions to greenhouse gas emissions in both high-income and low-income countries.²² The task force modelled a number of case studies in four sectors that each contribute significantly to greenhouse gas emissions and have important influences on health.

Household energy: Replacing existing inefficient cookstoves or open fires with increased efficiency low emission stoves for burning local biomass in India would reduce several household pollutants, including black carbon - a short lived pollutant that contributes to climate change. This would also result in substantial health benefits through the reduction of childhood respiratory infection and adult heart and lung disease. It is estimated that a ten year programme in India to introduce 150 million low-emission cookstoves could prevent around 2 million premature deaths particularly from chronic obstructive pulmonary disease in women and acute lower respiratory infections in children.²³

Urban transport: Transport accounts for almost a quarter of the world's energy-related greenhouse gas emissions and emissions in this sector are rising rapidly.²⁴ Results for the cities of London and Delhi show that a combination of substantially increased active travel, such as cycling and walking, and lower-emission motor vehicles could lead to substantial reductions in greenhouse gas emissions and the burden of chronic diseases.²⁵ The great majority of the benefits in both cities would arise from increased active travel because a high burden of disease arises from sedentary behaviour. In London, the strategies could reduce the disease burden from heart disease and stroke by 10-20%, breast cancer by 12-13%, dementia by 8% and depression by 5%. In Delhi, they are projected to bring a 11-25% cut in the burden of heart disease and stroke, and a 6-17% reduction in diabetes.

Electricity generation: Changing methods of electricity production to reduce greenhouse gas emissions, particularly by reducing the use of coal, would reduce particulate air pollution that can harm health.²⁶ The cost of these changes would be significantly offset by the reduced costs of death from particulate air pollution, especially in China and India. The provision of clean energy to low-income countries can meet both climate protection goals and global health targets providing that the costs are kept low enough not to disadvantage poor people.

Food and agriculture: Livestock production, particularly methane from ruminants, is a major source of global agricultural greenhouse gas emissions. Wet rice production and changes in land use also make significant contributions. Emissions from the livestock sector are likely to increase in the future given rising global demand for animal source foods due to population growth and economic development. Technological improvements, more efficient livestock farming and reduced production in those countries that already produce high per capita quantities of food from animal sources could effectively contribute to emissions targets. With appropriate policies this could be achieved while not compromising the goal of adequately and equitably feeding the world's population. Reduced consumption of animal source food could also benefit health in populations that already consume large amounts. For example, a

30% fall in adult consumption of saturated fat from animal sources was estimated to reduce heart disease burden by around 15% in the UK and by 16% in the city of Sao Paulo, Brazil.²⁷

However, some climate change mitigation strategies have the potential to damage health. For example, if biofuels are grown on land which could support food crops they could reduce food availability and increase food prices.²⁸ Therefore all climate change mitigation strategies should be subject to health impact assessment.

Towards low-carbon health systems

Health systems are major sources of greenhouse gas emissions and therefore present an opportunity for emissions reductions. For example, the National Health Service in England is estimated to have been responsible for emitting over 21 million tonnes of CO₂ equivalent in 2007. The main contributions came from procurement (59%), building energy (24%) and travel (17%).²⁹ NHS England has a target to reduce greenhouse gas emissions by 10% by 2015 through a range of policies including encouraging active transport amongst staff, energy efficiency and low carbon energy sources, and procurement of supplies with a lower carbon footprint.

Recommendations

The growing body of evidence concerning the relationship between climate change and health shifts the lens through which climate change is perceived. It offers a new political space in which climate change negotiations and national policy formulation can take place. While the climatic effects of mitigation are long-term and dispersed throughout the world, the health co-benefits are more local and can be realised more directly and quickly, making them more tangible and attractive to policymakers and the public. In view of the strong health co-benefits arising from some measures to mitigate climate change the signatory academies recommend that:

- The improvement of health both locally and globally should be one of the main criteria motivating climate change mitigation measures. The potential health co-benefits and harms should be considered when making choices about mitigation policies.
- The health co-benefits of climate change mitigation should be given greater prominence in international negotiations, for example through dedicated sessions on this topic.
- Health Ministers and ministries should actively engage in promoting mitigation strategies that result in health co-benefits in their own country and should make the case for such strategies to their national climate change negotiators in advance of international meetings.
- Health policymakers, scientists, health professionals and industry should reach beyond national and disciplinary boundaries to collaborate with each other to study, develop and implement climate change mitigation measures that also benefit health.
- The health community must provide leadership by reducing the emissions from health systems.

NB

- **ACADEMIES THAT HAVE SIGNED THE STATEMENT³⁰**
- **EXPERT ADVISORY COMMITTEE³¹**

References

- ¹ Solomon S, et al. (2007). *Climate change 2007: the physical science basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge University Press, Cambridge and New York.
- ² The Intergovernmental Panel on Climate Change is the leading body for the assessment of climate change, established by the United Nations Environment Programme (UNEP) and the World Meteorological Organization (WMO) to provide the world with a clear scientific view on the current state of climate change and its potential environmental and socio-economic consequences.
- ³ Alley, A et al. (2007). *A report of Working Group I of the Intergovernmental Panel on Climate Change. Summary for Policymakers*. Cambridge University Press, Cambridge and New York.
- ⁴ G8 (2009). *Declaration of the Leaders the Major Economies Forum on Energy and Climate*. http://www.g8italia2009.it/G8/Home/Summit/G8-G8_Layout_locale-1199882116809_Atti.htm
- ⁵ Department of Health (2008). *Health effects of climate change in the UK 2008: an update of the Department of Health report 2001/2002*. http://www.dh.gov.uk/prod_consum_dh/groups/dh_digitalasset/s/@dh/@en/documents/digitalasset/dh_082836.pdf
- ⁶ Parry ML, et al. (2007). *Climate change 2007: impacts, adaptation and vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.
- ⁷ European Science Academies Science Advisory Council (2010). *Climate change and infectious diseases in Europe*. EASAC, Halle, Germany.
- ⁸ Parry ML, et al. (2007). *Climate change 2007: impacts, adaptation and vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.
- ⁹ Costello A, et al. (2009). *Managing the health effects of climate change*. *Lancet* 373, 1693-733.
- ¹⁰ Parry ML, et al. (2007). *Climate change 2007: impacts, adaptation and vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA
- ¹¹ Patz JA, et al. (2007). *Climate Change and Global Health: Quantifying a Growing Ethical Crisis*. *EcoHealth*, 4(4), 397-405.
- ¹² The Interagency Working Group on Climate change and Health (2010). *A Human Health Perspective On Climate Change*. National Institute of Environmental Health Services, NC, USA.
- ¹³ G8 Science Academies (2010). *Joint G8 Science academies' statement on Health of Women and Children*. G8 Science academies.
- ¹⁴ WHO (2009). *Gender, climate change and health. Draft discussion paper*. http://www.who.int/globalchange/publications/reports/final_who_gender.pdf
- ¹⁵ United Nations (2009). *Millennium development goals report*. http://www.un.org/millenniumgoals/pdf/MDG_Report_2009_ENG.pdf
- ¹⁶ Kjellstrom T, Holmer I and Lemke B (2009). *Workplace heat stress, health and productivity – an increasing challenges for low and middle income countries during climate change*. *Global Health Action*. doi: 10.3402/gha.v2i0.2047
- ¹⁷ Parkinson AJ and Evengard B (2009) *Climate change, its impact on human health in the Arctic and the public health response to threats of emerging infectious disease*. *Global Health Action*. Stockholm, Sweden. doi: 10.3402/gha.v2i0.2075
- ¹⁸ Stern N (2006). *The economics of climate change*. HMSO, London.
- ¹⁹ Pachauri RK and Reisinger A (2007). *Summary for policy makers. In Climate change 2007: synthesis report. Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*. IPCC, Geneva, Switzerland.
- ²⁰ Nemet, GF, Holloway T, and Meier P (2010). *Implications of incorporating air-quality co-benefits into climate change policymaking*, *Environmental Research Letters*, 5, 014007, doi:10.1088/1748-9326/5/1/014007.
- ²¹ Haines A, et al. (2009). *Public health benefits of strategies to reduce greenhouse-gas emissions: overview and implications for policy makers*. *The Lancet*. doi:10.1016/S0140-6736(09)61759-1.
- ²² The Lancet (2009). *Health and climate change. The Lancet Series*. <http://www.thelancet.com/series/health-and-climate-change>
- ²³ Wilkinson P, et al. (2009). *Public health benefits to strategies to reduce greenhouse-gas emissions: household energy*. *The Lancet*. doi:10.1016/S0140-6736(09)61713-X
- ²⁴ Metz B, et al. (2007). *Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.
- ²⁵ Woodcock J, et al. (2009). *Public health benefits of strategies to reduce greenhouse-gas emissions: urban land transport*. *The Lancet*. doi: 10.1016/S0140-6736(09)61714-1
- ²⁶ Markandya A, et al. (2009). *Public health benefits of strategies to reduce greenhouse-gas emissions: low-carbon electricity generation*. *Lancet*. doi:10.1016/S01406736(09)61715-3
- ²⁷ Friel S, et al. (2009). *Public health benefits of strategies to reduce greenhouse-gas emissions: food and agriculture*. *The Lancet*. doi: 10.1016/S0140-6736(08)61345-8.
- ²⁸ Tilman D, et al. (2009). *Beneficial biofuels – the food, energy and environmental trilemma*. *Science*, 325 (5938), 270-271.
- ²⁹ Further information is available from: http://www.sdu.nhs.uk/page.php?page_id=160.

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