

## Climate change: a creeping catastrophe

The possible links between climate change and health form one of the most controversial topics of our time. In this interview, Dr Colin Summerhayes talks about how the world's climate is changing and the expected consequences on health.

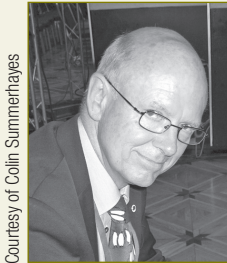
*Q: People often blame unseasonal weather on climate change. Could you please explain the difference between weather and climate?*

A: Weather is what we see hour-to-hour and day-to-day, and weather forecasts can tell us if it will rain, say, tomorrow afternoon, but because the weather is innately chaotic, forecasts for longer than 10 days are extremely poor. Climate is different. It is an average of the weather, usually taken over periods of 10 to 30 years, and it can tell us things like what the average day- and night-time temperatures are likely to be for any month and the average precipitation for that month. That is because there are elements of the climate system that are not chaotic; indeed we all know that winter follows summer (which means we are making a climate forecast). But climate forecasts cannot tell us if it will rain tomorrow, only what the monthly probabilities of this are.

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*Q: What do you predict to be the main effects of climate change around the world?*

A: There will be winners and losers from climate change. We project that by 2100, eastern China, Colombia and Ecuador will receive more rainfall, while the Caribbean, Chile, western China, the Mediterranean and Peru will become drier. Africa has a mixed forecast, with the north and south being dry, and places such as Kenya, very wet. From these projections, we can forecast where agriculture and water supplies will be stressed. In the moist tropics and high latitudes, there



Courtesy of Colin Summerhayes

Dr Colin Summerhayes

Dr Colin Summerhayes is the president of the Society for Underwater Technology and an emeritus associate of the Scott Polar Research Institute at the University of Cambridge, England. In April 2010, he stepped down as executive director of the Scientific Committee on Antarctic Research, International Council for Science. He is an oceanographer and geologist who has worked in academia, government and industry in several countries. Summerhayes holds a Bachelor of Science in Geology from University College London, a Doctorate

of Philosophy in Applied Geochemistry from Imperial College, and a Master of Science and Doctorate of Science in Marine Geology from Victoria University in Wellington, New Zealand. Widely published, he has served on many national and international scientific management committees, and is a past member of the Steering Committee for the Global Climate Observing System.

will be increased water availability but, in the mid-latitudes and semi-arid low latitudes, water availability will decrease and drought conditions will intensify, exposing hundreds of millions of people to increased water stress.

*Q: How is climate change affecting water supplies?*

A: Land glaciers in the Himalayas lock up water and release it nicely for countries such as India and Pakistan in a regular manner throughout the year. The same applies to the Andes and the water supplied to countries such as Peru. If the land glaciers retreat by a significant amount, the whole release mechanism will probably be compromised. Also, depending on the extent to which sea levels rise, global warming may also cause problems to water supplies and sewage disposal in coastal cities.

*Q: When can we expect to see climate change making a noticeable impact on health?*

A: The rise in temperatures as a result of global warming will be quite slow over the next 30 years. We should not expect an instantaneous change in health factors. It is what I call a creeping catastrophe. A predicted rise of 1.5 metres in sea level by 2100 is equivalent to an almost invisible 1.5 centimetres per year. This is not a tsu-

nami: it is changing at a rate slow enough for engineers to deal with in many parts of the world. But with 146 million people living within one metre of sea level, doing nothing about climate change over the next 100 years would have a significant effect on many lives.

*Q: How will it specifically affect people's health?*

A: As well as increased morbidity and mortality from extreme weather events such as heatwaves, droughts and floods, climate change is likely to increase the burden of malnutrition and diarrhoeal and infectious diseases. There is also likely to be a rising frequency of cardio-respiratory diseases because of changes in air quality and in distribution of some disease vectors. All of this could impose a substantial burden on health services.

*Q: What is expected to happen in the case of malaria?*

A: Scientists believe there will be both contractions and expansions in the occurrence of malaria, with changes in transmission seasons. Malaria cases documented in Colombia have revealed epidemic rises in line with increasing precipitation resulting from El Niño episodes. Since Colombia is projected to become wetter, it is likely there will be more cases of malaria there in the future.

*Q: What effect will climate change have on ocean ecologies?*

A: Higher temperatures will increase coral bleaching and this could affect the livelihoods of fishermen around reefs. Higher levels of carbon dioxide emissions will make the oceans more acidic, harming the plankton and endangering the whole food-chain for all creatures, including humans, relying on the oceans for food.

*Q: What are some of the indirect dangers that climate change poses to health?*

A: It is not mentioned often, but warfare is something that has a bearing on health and is potentially related to climate change. Global warming will also produce winners and losers when it comes to water supply. In those areas that become much drier, there will be an increased likelihood of fighting over water resources. It has been said that some of the conflicts in Darfur today are related to the ongoing drought and competition for water resources.

*Q: Will climate change have any positive impacts on health?*

A: Scientific projections about climate change lack certainty. But there are some things we do know. During cold winters, mortality rates increase, even among people who live in heated homes. These winter deaths may decline if the normal distribution of the climate shifts and there is less cold stress on populations. On the other hand, more people will be subject to heat stress.

*Q: So what can we do to limit the negative impacts of climate change?*

A: To mitigate the effects on health, it will be important to plan for prevention rather than cure; to encourage improved development, good sanitation and supplies of clean water and to move to low-carbon economies.

“Global warming will also produce winners and losers when it comes to water supply.”

*Q: What is required to manage the impacts of climate change in specific settings?*

A: We need a monitoring system that identifies threats, then develops mechanisms to assess changes in those threats, as well as the effects they could have on the population. Marking the changes will enable us to monitor progress and to take appropriate preventive steps or mitigation measures.

*Q: Has anyone developed such a monitoring system?*

A: A good example of this is the Arctic Council, an inter-governmental body that carried out an Arctic climate impact assessment in 2005. Its objective was to look at changes in the health of populations of reindeer herders and the

Inuit people, as well as of animals such as polar bears. The Arctic concentrates pollutants from various industries. These persistent organic pollutants accumulate in humans and animals, causing high levels of certain metals in the blood and a level of PCBs [polychlorinated biphenyls] much higher than for those living in western Europe. The council is developing a climate change scorecard with various attributes to be checked on a regular basis to track changes and decide on appropriate adaptations. What is happening in the Arctic is a good beginning.

*Q: From an international perspective, is climate change being monitored with health care in mind?*

A: No. There is a disconnection between the meteorological agencies that measure climate change and the agencies responsible for health care. Until the two communities come together in each country, we won't know precisely what needs to be measured or whether there is a link at all between climate change and health. Until such a mechanism is set up to collect the right kind of data, climate change may be affecting health but we will fail to see it.

*Colin Summerhayes was interviewed as a guest speaker at the World Health Organization's global health history seminars series. Access the seminars at: [http://www.who.int/global\\_health\\_histories/seminars](http://www.who.int/global_health_histories/seminars)* ■

## Recent news from WHO

- On 17 May, the Director-General of the World Health Organization (WHO), Dr Margaret Chan, opened the **World Health Assembly** by celebrating the eradication of smallpox 30 years ago as proof of the power of collective action. "As we enter the second decade of the 21st century, and the homestretch for reaching the Millennium Development Goals, we need to draw on every lesson, every approach, instrument and innovative way of raising funds or collaborating together, from heads of state to civil society," she told the annual meeting of WHO's Member States. "We need to move forward fast," she said.
- On 14 May WHO welcomed a United Nations General Assembly resolution to halt the increasing trends in **premature deaths from noncommunicable diseases**. Cardiovascular diseases, cancers, chronic respiratory diseases and diabetes kill nearly 35 million people each year, including almost 9 million before the age of 60. If trends continue unabated, deaths will rise to an estimated 41.2 million a year by 2015.
- On 10 May WHO released the **World health statistics 2010** in Geneva, which features a global update on progress towards the Millennium Development Goals (MDGs). For the first time, this report provides the major causes of deaths among newborns. Globally, about 40% of deaths in children aged less than five years are estimated to occur in the first month of life, and most deaths occur in the first week. These child deaths have dropped by 30% from 12.5 million in 1990 to 8.8 million in 2008. The *World health statistics*, which is published annually, is based on more than 100 health indicators.

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