

Climate Health Impacts for Dummies

(Summary for Policy Makers)
by the Climate Conversation Group

An accessible, human-readable version of the ROYAL SOCIETY NZ report
Human Health Impacts of Climate Change for New Zealand

Overview

Climate change is affecting the health of New Zealanders. It will get worse.

- **Direct effects** – heat waves, weather events, flooding and fires.
- **Indirect effects** – microbial contamination, pollen, air particulates and new diseases.
- **Social effects** – migration, housing & livelihood stresses¹, food security, and health inequality.
- **Consequences** – adverse mental health and community health effects.

Emission-reduction policies could improve health and reduce inequalities. More research is needed to quantify health impacts.

Health Impacts of Climate Change

Human health is affected by weather patterns and increased variability in temperatures. Many of the fundamental building blocks for health and well-being are threatened by climate change.

Climate forecasts

In the Australasian region our climate is changing. There are long-term trends toward higher air and sea surface temperatures; increased frequency of extreme heat events; fewer events of extreme cold; and changes in rainfall patterns.

In NZ, if global greenhouse gas emissions continue to rise at close to current rates, we can anticipate air temperatures to rise by another 2.5°C to 5°C by the end of this century, averaged across the country, and sea temperatures to rise by 3°C.

¹ Including “socioeconomic deprivation” and “disruption to health services”. Effects will not be spread evenly, exacerbating existing inequalities.

Effects

By 2100, we will see:

- Sea level rise (SLR) is expected to accelerate, rising by 0.6 to 1.1 metres.
- 1-in-100-year storm surges will occur every year or so.
- Seawater pH around NZ will decrease from 8.1 to 7.8.
- Heavy rainfall will become more frequent (in most parts).
- Severe droughts will become more frequent and rainfall will fall by 10% (in north & east).

Health impacts – global

As warming increases, health will be impacted: 250,000pa more deaths by 2030 from heat exposure, diarrhoea, malaria and childhood undernutrition; 500,000 more deaths by 2050 from reductions in fruit and vegetable availability in south & east Asia.

The IPCC AR5 expects climate change will only exacerbate existing problems until 2050, (especially in poor countries). After 2050 other effects will occur (see “Effects”, above). People living on low-lying coral atolls are at risk of SLR affecting their health.

Risk levels

Health risk depends on exposure (geography) and vulnerability – which depends on age, education, income, job, housing quality, social networks and culture.

In NZ, children, elderly, disabled and low-income earners have most health risks. Existing health inequalities and coastal locations make climate change a particular risk for Maori.

Direct Health Impacts

Extreme events, such as the June 2015 flooding in South Dunedin and the 2017 Edgumbe floods and Christchurch fires pose immediate risks associated with being burnt by fire, or being swept away when driving or walking through floodwaters or landslides. Such events may also cause disease outbreaks, toxic chemical contamination, damp buildings, mental health issues, disruption to healthcare access and damage to homes.

SLR may require people to leave their homes, leading to mental health issues from the trauma of leaving familiar surroundings, the breaking of social ties and the difficulty of resettlement.

Heat waves: Hot days have negative impacts on levels of illness and death, especially when temperatures rise quickly². Most parts of NZ typically see

² Cities, with large impermeable surfaces, can also act as heat islands, increasing the temperature of hot days and retaining the heat at night.

between 20-40 days pa above 25°C, but by 2100 this could rise to 80 days in many places. E.g., in Auckland & Christchurch about 14 deaths pa occur among over-65s when temperatures exceed 20°C. This could rise to 28, 51 and 88 deaths per year if averages increase by 1, 2 and 3°C, respectively. The proportion of elderly people is increasing.

Heat is also a risk for outdoor workers and there are 171,000 farm, forestry and fishing workers in NZ. Heat also incites aggressive behaviour, violence and suicide. The risk of death during heat waves is trebled for the mentally impaired.

Indirect Health Impacts

Toxic algal blooms, including blue-green algae, are more likely with rising temperatures and changes in the “natural” turnover and refreshing of freshwater bodies. Either increased rainfall (greater run-off) or decreased rainfall (nutrient concentration) can expand the growth and range of algae species. Seawater algae species can contaminate shellfish in NZ or cause Ciguatera fish poisoning in the Pacific Islands. Warm water conditions during the 1998 El Nino triggered widespread toxic blooms along the NZ east coast.

Microbial contamination might increase with warmer temperatures and increased rainfall. This possibility extends to bacteria, viruses and protozoa, such as *Giardia*, *Cryptosporidium*, *Campylobacter* (e.g., Havelock North), *Salmonella*, *E Coli*, *Leptospira*, *Norovirus*, and *Vibrio*. Most of these cause gastrointestinal illness, particularly diarrhoea.

There has been no detailed research on any of these risks, but NZ already has relatively high rates of waterborne illnesses. WHO modelling finds there could be **an additional 1 – 3 deaths per year by 2050** due to all causes of diarrhoeal disease resulting from climate change.

Food production may fall due to changes in weather patterns. In 2050, there are predicted to be **an additional 140 deaths** per annum as a result of changes in fruit, vegetable, and red meat consumption, and bodyweight-related risk factors (including coronary heart disease, stroke, and cancer) in the adult NZ population.

Reduced food safety can happen with higher temperatures and flooding. Changing soil and water properties may lead to higher levels of heavy metals – e.g., mercury in fish.

Health Consequences

Mental health and wellbeing can suffer from the stress of extreme weather events. Degradation of a familiar environment or the retreat from threatened coastal communities can cause grief, loss and anxiety.

The threat of current and projected climate change, through routine exposure to images, headlines and risk messages, provides a powerful and ongoing

stress-inducing aspect of NZ life. Between 2005 and 2016, there were on average 422 articles published per month mentioning global warming in print and online media in NZ³.

Outdoor air quality affects chronic health conditions such as asthma (1 in 9 adults) or COPD (3rd leading cause of death). Increased seasonal fire severity in the north and east could cause increases in PM10 and PM2.5 particulates. Increased CO2 and rainfall, with warmer temperatures, increases the duration of the growing season for everything. CO2 fertilises plants and increases yields of grasses, crops and trees with consequential increases in pollen loads. Annual birch (and birch pollen) production is predicted to be 1.3 times higher in 2020 and 8 times higher by 2100, relative to 2000 values.

Carriers of new diseases, mainly mosquitos, ticks and fleas, could bring *dengue fever, malaria, West Nile, Ross River, Barmah Forest, Chikungunya* or *Zika* viruses, or *Japanese* or *Murray Valley encephalitis*. The seasonality and distribution of the diseases are influenced by the population size and density of the carriers, whose reproduction rate might increase if temperatures are higher. Flooding and drought can also increase mosquito populations, so diseases like malaria and dengue may become significant in areas where temperature is currently the limiting factor. Tropical diseases, parasites and insects might also come to NZ.

Potential Health Benefits

Cold-related illness/deaths might reduce if temperatures rise. In New Zealand, around 1600 more winter deaths occur each year compared with the summer, with winter mortality rates from all causes (including those only indirectly related to temperature), being 18% higher than non-winter rates. But it is difficult to establish how much reduction in death rates there might be in warmer winters.

Health Impacts From Mitigating Climate Change

Co-benefits: Reduction in fossil fuel use will reduce PM10 particulates. There could be 5.6 fewer deaths from vehicle emissions and 116 fewer deaths pa as a result of physical activity, if walking/cycling was substituted for 5% of short vehicle journeys. More home insulation could reduce respiratory ailments.

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³ According to the global media database Factiva (vii). In the US, psychological responses to such stress have been shown to include heightened risk perceptions, general anxiety, pessimism, helplessness, eroded sense of self and collective control, stress, distress, sadness, loss and guilt.