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**Submission from OraTaiao: The New Zealand Health and Climate Council to the NWP UNFCCC on areas of climate impacts on human health in Aotearoa New Zealand**

OraTaiao: The New Zealand Climate and Health Council appreciates the opportunity to provide the UNFCCC NWP information on climate change impacts on human health in Aotearoa New Zealand (NZ).

OraTaiao was formed in 2009 and is an incorporated society of over 420 health professional members in New Zealand calling for urgent and fair climate action – with real health gains now and for our future. Within its membership, OraTaiao has leading climate-health experts and researchers, and is consolidating linkages with health bodies and other climate-health organisations in New Zealand and internationally.

This submission is based largely on our 2014 Special Article published in the New Zealand Medical Journal (Bennett et al).<sup>i</sup>

**Summary**

Under all the climate projections reported in the IPCC AR5 WG1, New Zealand will experience direct impacts, biologically mediated impacts, and socially mediated impacts on health. These will disproportionately affect populations that already experience disadvantage and poorer health.

However, if well-planned action to reduce greenhouse gas (GHG) emissions were undertaken globally and in New Zealand, there could be substantial positive impacts not only for limiting future climate change, but also substantial benefits to health, equity, and wellbeing.<sup>2-4,19</sup> including helping New Zealand tackle its costly burden of health inequity and chronic disease.

**1. Health impacts of climate change in Aotearoa-New Zealand**

Human-caused climate change is a serious and increasingly urgent threat to human health and wellbeing.<sup>1-5</sup> Globally and in New Zealand, leading health threats include high temperatures and extreme events (direct impacts), changing patterns of infectious diseases and water/food shortages or price changes (biologically mediated impacts), and risks related to economic change, loss of livelihoods and forced migration (socially mediated impacts).<sup>3,12-16</sup>

New Zealand is already experiencing climate change, and more change is expected.<sup>23</sup> According to the projections reported in the AR5, New Zealand will continue to warm over coming decades, and will be wetter in the west and drier in the east and north. Heavier and more frequent extreme

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<sup>i</sup> Bennett H, Jones R, Keating G, Woodward A, Hales S, Metcalfe S. Health and equity impacts of climate change in Aotearoa-New Zealand, and health gains from climate action [Special Article]. N Z Med J. 2014;127(1406):16-31. <http://www.nzma.org.nz/journal/read-the-journal/all-issues/2010-2019/2014/vol-127-no-1406/6366>

rainfalls are expected (with increased flood risk), along with more drought, the duration of drought in the north and east is projected to at least double by 2040.<sup>16,23,24</sup>

There is expected to be more extreme heat (up to 60 more days >25°C in the north by 2090), with increased wild-fire risk. Some of these trends (e.g. increases in heavy precipitation) have already been observed.<sup>16,23,24</sup>

Sea-level rise is expected to continue, with an increase in the frequency of extreme high tides and their associated risks, including coastal flooding, inundation, and erosion.<sup>16,23,24</sup>

These climate and related environmental changes have multiple implications for health and wellbeing in New Zealand (Table 1). The magnitude of health impacts will depend on the existing burden of climate-sensitive diseases, the extent and rate of climate change in New Zealand, the capacity of individuals and society to adapt, and the policies chosen to reduce and adapt to climate change.<sup>25</sup>

New Zealand is already affected by a range of diseases that are sensitive to climatic factors,<sup>26-29</sup> and climate trends may well be affecting New Zealanders' health and wellbeing, although such effects are not yet well quantified.<sup>25</sup>

Furthermore, given that global greenhouse gas emissions are continuing to track near the upper end of projections, it will be important to gain a better understanding of the health impacts in New Zealand under high-end scenarios of climate change.<sup>2</sup>

**Table 1. Expected health impacts of climate change in New Zealand**

<p><b>Food security and nutrition:</b> Increased global food prices, affecting some foods in New Zealand, may exacerbate food insecurity (inability to afford nutritious food), which could further compromise nutrition and nutritional outcomes for some groups.<sup>2,30-32</sup></p>
<p><b>Mental health and suicide:</b> Increased stress and mental health issues (e.g. farmers with drought, victims of extreme weather). Young people may suffer anxieties about catastrophic climate change, not unlike those experienced by children growing up with the fear of nuclear war.<sup>2,33-36</sup></p>
<p><b>Housing and health:</b> Healthiness of some housing will be affected by extreme weather, for example, indoor moisture (with heavy rainfall, flooding), high indoor temperatures (during heatwaves in poorly insulated houses).<sup>37</sup> It is also likely that people will arrive in New Zealand from climate-change affected areas. This may put further pressure on availability of low income-larger family homes, potentially impacting household overcrowding and the incidence of some infectious diseases.<sup>14,38,39</sup></p>
<p><b>Injury and illness from extreme weather events (e.g. flooding, storms, landslides, storm surges, drought):</b> Immediate trauma, and indirect health impacts in weeks to months after extreme events (e.g. mental health problems, exacerbation of pre-existing medical conditions).<sup>2,40-42</sup></p>
<p><b>Heat-related deaths and illness:</b> Increases in heat-related deaths and illness, particularly for those with chronic illness and those aged over 65 years. Heat stress for outdoor workers. Winter deaths may decline, but this is uncertain as winter deaths may be influenced by seasonal factors that are unrelated to climate.<sup>2,43-50</sup></p>
<p><b>Vector-borne and zoonotic (animal to human) disease:</b> Increased likelihood that mosquito vectors could establish in New Zealand, which could lead to local transmission of mosquito-borne diseases (e.g. dengue, Ross River virus). Also possible impacts on other vector-borne diseases (e.g. tick-borne) and zoonotic diseases.<sup>2,51-56</sup></p>
<p><b>Food- and water-borne disease:</b> Heavy rainfall can lead to contamination of drinking and recreational water/shellfish with faecal pathogens from animals and humans. Both high and low rainfall, and higher temperatures may impact on bacterial and parasitic diseases causing gastroenteritis (e.g. giardiasis, salmonellosis). Dry conditions could affect continuity of household water supplies, impacting diseases influenced by hygiene.<sup>2,56-59</sup></p>
<p><b>Ultraviolet (UV) radiation:</b> Climate change may delay recovery of stratospheric ozone. Warmer temperatures could promote increased or decreased outdoor time, affecting exposure to solar ultraviolet (UV) radiation—with possible</p>

impacts on rates of skin cancer, eye disease, and vitamin D levels. <sup>2,60-63</sup>
<b>Physical activity:</b> Warmer temperatures, and either increases or decreases in outdoor time, may impact on levels of recreational physical activity—an important determinant of health. <sup>64</sup>
<b>Cardio-respiratory disease from air pollution:</b> High temperatures can exacerbate photo-chemical air pollution with impacts on respiratory disease. Hot, dry conditions increase potential for bush/forest fires, where smoke impacts on people with cardiorespiratory disease. <sup>2,65-68</sup>
<b>Allergic diseases, including asthma:</b> Possible impacts on allergic conditions with changes in plant distribution, flowering, and pollen production. <sup>2,69</sup>
<b>Indoor environment:</b> Climate change may affect the healthiness of indoor environments (e.g. overheating of buildings, changes in indoor air pollutants, flood damage and indoor moisture). <sup>37,70</sup>

## 2. Effects on the Determinants of Health in Aotearoa-New Zealand

In addition to the health issues listed in Table 1, climate change will impact on the broader socio-economic determinants of health in New Zealand.<sup>14-16</sup>

The economy will be influenced by global climate change.<sup>15</sup> Reduced export income due to, for example, effects on agricultural production (or overseas markets) could lead to higher unemployment, less household money to secure the basics for good health, and a reduced tax-base for health and social spending. An analysis prepared for the Ministry of Primary Industries in 2013 reported that under a high end warming scenario (4.4°C average temperature increase by 2100) there would be a significant decline in dairy pasture production, along with increased dairy cow heat stress in many dairying areas of New Zealand.<sup>71</sup>

However, some positive effects on agriculture/horticulture in New Zealand are also possible.<sup>16,23,71</sup> Thus forward planning and adaptability within the sector will be required to safe-guard the economic output of climate sensitive primary industries,<sup>72</sup> which many New Zealanders rely on for good health and wellbeing.

Furthermore, responses to mitigate climate change also have the potential to adversely impact on health. For example, mitigation policies that raise costs for fuel and energy (and therefore increase costs of goods and services) without compensatory measures, could place extra financial burden on people, particularly for low income families, thus affecting ability to afford the basics for good health.<sup>73</sup>

## 3. Risks of climate change to health equity and Māori health in Aotearoa-New Zealand

Climate change will cause different impacts for different population groups depending on geographic location, age, ethnicity, health status, and socioeconomic circumstances.<sup>2,25</sup> Māori, Pacific, and low income groups in New Zealand are at risk of greater adverse health impacts from climate change.<sup>10,14,74</sup>

Māori are at risk of greater impacts (compared with NZ European people) because of a disproportionate burden of disease across many of the health conditions affected by climate change: infectious diseases (e.g. gastrointestinal infection),<sup>75,76</sup> chronic conditions (e.g. cardio-respiratory disease),<sup>75,77,78</sup> and mental ill-health.<sup>75,79,80</sup>

The disproportionately high number of Māori living in deprived circumstances<sup>78,81</sup> means that climate change effects on food security<sup>30,82</sup> and vulnerable infrastructure and housing<sup>25,83,84</sup> will be more difficult to prepare for and recover from—meaning that important determinants of health (such as healthy nutrition, safe drinking water, healthy homes) are undermined.

Any additional pressure on the availability of low income and/or larger family homes resulting from arrival of climate migrants in areas with existing housing pressures (e.g. Auckland region)<sup>14,85,86</sup>

would also disproportionately affect Māori who have higher levels of household overcrowding and crowding-related infectious diseases.<sup>87,88</sup> Previous experience in New Zealand has shown that factors that affect the ability of low income families to buy or rent adequately sized houses can lead to families co-habiting, with resultant household overcrowding.<sup>89</sup>

Additional factors which increase climate-health risks for Māori include indigenous relationships with the environment, greater exposure to food-borne disease risk through customary practices such as collection of kaimoana (seafood),<sup>90</sup> greater exposure to outdoor heat whilst undertaking outdoor labour (Māori are overrepresented in semi-skilled/unskilled workforces),<sup>91,92</sup> and poorer access to and through health and social services.<sup>93-100</sup>

Perhaps even more significant are the implications for the economic determinants of health for Māori. The Māori economy is heavily invested in climate-sensitive primary industries;<sup>23,84</sup> and policy responses that place extra financial burden on low income families (disproportionately Māori), without counter-balancing measures, would exacerbate Māori experience of poverty and poverty-related diseases.<sup>73,76</sup>

It is important to note that while this section has focussed on the equity impacts for Māori, many of these issues are also relevant to Pacific peoples in New Zealand and to low income New Zealanders<sup>10,14</sup>.

#### **4. Health benefits of climate action**

The other important link between climate change and health is the substantial opportunity to improve current population health and wellbeing through well-designed policies to reduce greenhouse gas (GHG) emissions.<sup>2-4,19</sup> Knowledge in this area has increased substantially in the last five years, and the health chapter in the recent Fifth Assessment Report of the IPCC included, for the first time, a dedicated section about the health co-benefits of climate action.<sup>2</sup>

Health and health equity gains are possible for heart disease, cancer, obesity, musculoskeletal disease, Type 2 diabetes, respiratory disease, motor vehicle injuries, and mental health, with resultant cost savings for the health system.<sup>2-4,19.</sup>

These co-benefits arise because some emission reductions measures impact on important determinants of health, especially energy intake (nutrition) and expenditure (physical exercise). For example:

- Active transport (walking, cycling, public transport) in addition to reducing CO<sub>2</sub> emissions, improves physical activity and can reduce air pollution and road traffic injuries.<sup>2,101-107</sup> Walking and cycling are inexpensive, and public transport is used proportionately more by people with lower incomes. Thus improved active and public transport infrastructure has the potential to benefit health, climate and equity.<sup>101</sup>
- Healthy eating, including increased plant and less red meat and animal fat consumption, would reduce agricultural GHG emissions, and likely lead to reduced rates of bowel cancer and heart disease.<sup>2,108-111</sup>
- Improving indoor environments (e.g. energy efficiency measures such as home insulation) can reduce illnesses associated with cold, damp housing (e.g. childhood asthma and chest infections which are leading causes of hospital admissions, particularly for Māori and Pacific children).<sup>112-114</sup>
- Increasing energy efficiency and/or moving away from fossil fuels would reduce health-damaging air pollution (e.g. particulates) from fuel combustion, in both indoor and outdoor environments, with health gains.<sup>2</sup>

Thus well planned climate action could contribute to significant reductions in the large burden of chronic disease and health inequity in New Zealand, leading to large cost savings for the health

sector and society as a whole. This could offset a great deal of the early costs associated with climate change mitigation measures.<sup>2,3</sup>

The New Zealand research community continues to make a strong contribution to the body of knowledge on the health co-benefits of climate action. The housing and health programme (University of Otago, Wellington) has led the way in quantifying the costs and benefits (including health) of insulation and clean heating.<sup>112,113</sup>

Research at the University of Auckland, using novel modelling techniques, has indicated that transport policy that enables safe commuter bicycling in Auckland has the potential to yield benefits (with respect to injury, physical activity, fuel costs, air pollution, and carbon emissions) that are 10–25 times greater than costs.<sup>107</sup>

## Conclusion

Climate change poses an urgent threat to human health, wellbeing, and health equity globally, and in Aotearoa-New Zealand.

On the other hand, well-planned action to reduce greenhouse gas emissions offers opportunities to improve population health, equity, and reduce chronic disease burden. This could result in large cost savings for the health sector and society as a whole.

Again, we are grateful for the opportunity to contribute to the NWPO UNFCC discussion. We would be happy to provide further information on request.

Yours sincerely

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