Submission to the Garnaut Review
From Doctors for the Environment Australia

The World Health Day, celebrated on April 7 each year, creates awareness of a specific health theme to highlight a priority area of concern for the World Health Organisation. For 2008 the World Health Organisation has selected the topic "protecting health from climate change". This submission to the Garnaut Committee will indicate why this topic is so important and will document from the medical and scientific literature the implications for health in Australia.

Doctors for the Environment, Australia (DEA) is a voluntary doctor's organization formed in 2001 with membership in all States and Territories. DEA's stated aim in to inform and educate the public, the medical profession and policy makers about environmental effects on health.(1) The health effects of climate change are a priority area for the organisation. Some members of the Committees of DEA have participated in the work of the Intergovernmental Panel on Climate Change (IPCC) and related international reports.

In preparing this submission we have read the Garnaut Interim report and offer congratulations on the work done so far. We note that the health effects of climate change have not yet been addressed except for a summary of possible effects in Table 1: *Possible climate impacts in Australia for a range of temperature increases.*

DEA submits that the Garnaut Climate Change Review needs to cost the expected health outcomes to be incurred in dealing with the expected climate changes in Australia. In themselves the health outcomes provide a powerful argument for proceeding with early and vigorous greenhouse gas mitigation.

It is important to comprehend the nature and expected scale of the health impacts before we proceed to document specific effects. Heat stroke and injury from storm, flood and fire are direct consequences that are occurring already in many countries including Australia. Changes in the incidence and spread of infectious diseases depend upon subtle effects of climate change on ecology: they are more difficult to predict but are measurable. However the most significant effects on health are likely to be due to the loss of ecological services which are in effect human life support systems for the nutrition and fresh water required for health.

The impacts and issues that we address (2) are

1. **An increase in climate change induced extreme weather events** (3, 4, and 5).
   These will cause:-

   - Increased illness events and deaths from more frequent and severe heatwaves, especially in urban environments.

   - Increased injury, death, post-traumatic stress and other psychological disorders from more intense and frequent floods (6), storms, cyclones, drought (7) and bushfires.

2. Increases and changes in the distribution of infectious diseases.

a) vector borne diseases—in particular those transmitted by insects (8,9 and 10).

- Increases in the range and seasonality of outbreaks of mosquito borne infections (eg. dengue fever, Ross River virus, Barmah Forest virus).

- Arrival and spread of tropical diseases from neighbouring countries eg malaria.

b) water borne diseases (eg 11).
Including increased risks of gastroenteritis (eg. from Salmonella, Campylobacter, temperature sensitive vibrios).

3. Health impacts from damage to ecological services.
In the long term these are likely to be the most important consequences of climate change for they will affect the production of food and the availability of natural nutritional resources.

4. Increases in respiratory diseases.
Experience in other countries indicates increases in pollution related respiratory disease and increases in asthma and other allergic manifestations of an increase in pollens and spores.

5. An increase in mental health problems.
For example in rural communities exposed to long term drying and /or loss of livelihood it is likely that there will be an increase in mental distress and mental disorders in adults and children.

Points 1-5 are not mutually exclusive. Consider for example the effects on rural and remote communities:- These communities will suffer from an increased number of extreme weather events. As a result, there will be more mental stress and illness. Both drought and flood may have infectious disease sequelae. Drought may bring gastroenteritis. Flood leads to the proliferation of mosquitos and the spread of endemic viruses such as Ross River; for example, an increase in the incidence of this viral disease is occurring after the recent floods in Queensland. Aboriginal communities with pre-existing health problems and lack of services are likely to suffer the worst. Weather events leading to drought and marginalisation of land will cause permanent damage to ecological services with loss of livelihoods and more mental stress. Thus rural communities are expected to suffer many of the impacts detailed above and in many cases an impact will be enhanced by other impacts.

It is not the purpose of this submission to provide a comprehensive report of the health implications of climate change in Australia. This would require extensive time and resources commensurate with those applied to the UK reports of 2001/2002 and 2008 the latter being a detailed 111 page report. (12) There is no such report for Australia presumably because the previous government had little commitment to the concept of climate change. We will limit ourselves to providing a few examples to illustrate to the Garnaut Committee the nature, complexity and magnitude of the problem.

Specific data relevant to Australia.

Heat related deaths.
International data is available, for example, for the European heat wave in August 2003 which caused in excess of 30,000 deaths. Studies in France looked at vulnerable populations. Factors contributing to death in those over 65 living at home during the heat wave were lack of mobility, preexisting illness, housing that lacked insulation, living on the top floor and being in an urban heat island as shown by satellite imaging. Appropriate dress and air conditioning were protective. These happenings in Europe lead to computer projections for UK and Australian cities and urban areas. In the UK, the Department of Health Report in 2008 (12) indicates that there could be over 6000 heat related deaths throughout Britain during a 9 day heatwave in 2012. The risk will be 1 in 4 years in the decade centred around 2012. In Australia the ACF/AMA report prepared by Professor Tony McMichael and colleagues (13) presents a number of scenarios for the year 2100 depending on whether climate change is addressed vigorously. With no *climate change policy* action the number of heat-related deaths may be 8,000-15,000 each year. *Strong action* to control greenhouse gas emissions could halve the number of heat-related deaths. The implications for costs are discussed below

The spread of dengue fever
This is a viral infection transmitted by mosquitos and which may result in serious illness and death. Knowledge of the environmental conditions advantageous to the breeding of the responsible mosquitos allows computer modelling of the expected spread of the infection with climate change.
Presently the climate of north Queensland is suitable for the establishment of the dengue-carrying mosquito, but the virus is not yet endemic in Australia. Local transmission of dengue, passed by infected travellers, has recently been observed in most years in north-eastern Queensland (Cairns, Townsville, Charters Towers) and would seem to be increasing. By 2100 the climate of Australia may support dengue transmission as far south as Sydney, including the population-dense coastal and hinterland strip to the north of Sydney if there is no action to reduce greenhouse emissions. With strong climate change policy action the zone of potential dengue transmission is limited to Brisbane (13). These scenarios also apply to the west coast of Australia.

These are but two of many health scenarios that must be considered in assessing mitigation and costs. In terms of the two examples above, some implications are as follows:-
Heat related deaths. Older people in Australia will have to be educated and monitored. Urban planning and housing design will have to be greatly modified. And recognizing that increased use of air conditioners will be costly, there will have to be concessions. There are implications for housing developments—for example avoidance of heat islands. As in Barcelona, Spain, meteorological offices will need to issue health warnings to hospitals when prolonged heat waves are expected, so that emergency planning for increased admissions can be implemented.

Dengue fever and other emerging infectious diseases. There are significant implications for public health services with increased surveillance and community control measures both at a national and local level. Epidemics of Dengue fever will also stress family practice and hospital services. There are implications for quarantine services. Recognising that these problems will arise in huge geographical regions, significant additional resources are likely to be needed.

SUMMARY.
From this brief review it is apparent that any comprehensive economic assessment of the costs and benefits of mitigation of climate change by the reduction of greenhouse gases must incorporate the substantial predicted public health impacts of climate change (14, 15) and include the substantial public health planning and resources needed to deal with the anticipated health impacts of warming. (16, 17) Indeed the 4th IPCC Report (5) indicated that the health impact would incur substantial costs. **These impacts provide a powerful argument for proceeding with early and vigorous greenhouse gas mitigation.**

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