LANCET COUNTDOWN: TRACKING PROGRESS ON HEALTH AND CLIMATE CHANGE

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Lancet Countdown 2018 Report: Briefing for Australian Policymakers

November 2018

Introduction

This briefing, launched in parallel with the 2018 Lancet Countdown report, focuses on the links between health and climate change, and their implications for Australia's political commitments. It has been developed in conjunction with the Royal Australasian College of Physicians and the Australian Medical Students' Association. This policy brief presents key findings from and recommendations based on the Medical Journal of Australia (MJA)-Lancet Countdown's inaugural 2018 assessment of progress on health and climate change in Australia, and on the 2018 Lancet Countdown global report.

Acknowledgements

The concept for this brief was developed by the Lancet Countdown on Health and Climate Change. The brief was written by Georgia Behrens, Ying Zhang and Paul Beggs. Critical review and editorial comments were provided by Fiona Armstrong, Helen Berry, Anthony Capon, David Harley, Courtney Howard, Selina Lo, Lynne Madden, Alice McGushin, Peter Sainsbury and Nick Watts.

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About the Medical Journal of Australia-Lancet Countdown

The MJA-Lancet Countdown initiative forms part of an international assessment conducted by the Lancet Countdown: Tracking Progress on Health and Climate Change (the Lancet Countdown). The Lancet Countdown is a collaboration of 27 leading academic institutions from every continent, and United Nations and intergovernmental agencies. The inaugural Australian report presents data on 41 indicators across five domains: climate change impacts, exposures, and vulnerability; adaptation, planning and resilience for health; mitigation actions and health co-benefits; economics and finance; and public and political engagement. These indicators and the methods used for each are largely consistent with those used in the Lancet Countdown's global assessment, adjusted to an Australian context.

About the Royal Australasian College of Physicians

The Royal Australasian College of Physicians (RACP) connects, represents, and trains over 17,000 Physicians and 8,000 trainee Physicians in Australia and New Zealand.

About the Australian Medical Students' Association

The Australian Medical Students' Association (AMSA) is the peak representative body for Australian medical students. AMSA is a vibrant student-run organisation that represents, informs and connects all of Australia's 17,000 medical students.

About the Medical Journal of Australian

The Medical Journal of Australia (MJA) is the leading peer-reviewed general medical journal in the Southern Hemisphere. It has been publishing ground-breaking research, perspectives on health care delivery and informed analysis on policy since 1914.

Introduction

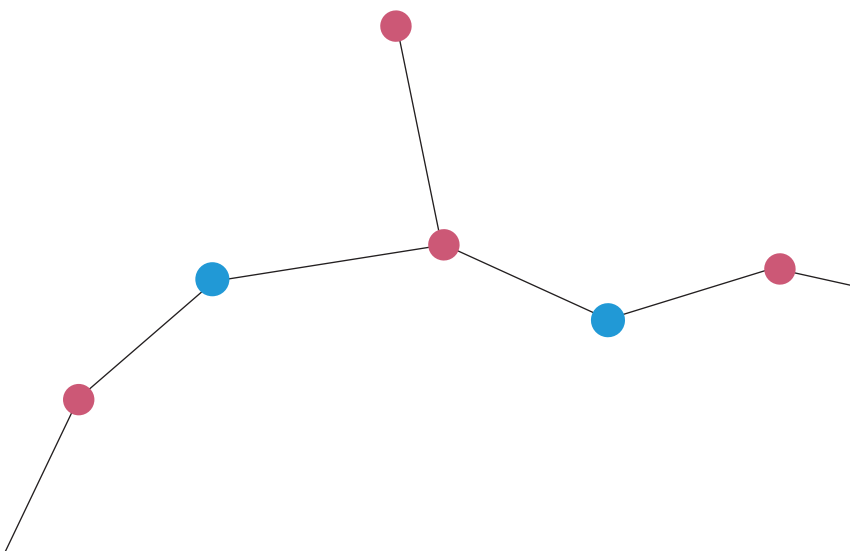
The MJA-Lancet Countdown analysis has found that Australia is vulnerable to the impacts of climate change on health and that policy inaction on this threatens human lives.[1]

Australia continues to lag behind comparable high-income countries in its response to climate change and its impacts on human health. There is significant capacity for climate and health action in Australian in the coming years. The MJA-Lancet report will produce annual assessments of climate change & health indicators, with targeted recommendations based on current Australian data sets.

The MJA-Lancet Countdown, the Royal Australasian College of Physicians and the Australian Medical Students' Association highlight the report's implications for Australian policy-makers with a focus on the following four areas:

1. Climate-sensitive infectious diseases;
2. Decarbonisation of Australia's energy system;
3. Sustainable travel infrastructure and uptake; and
4. Mental health impacts of climate change.

In each of these areas, national data demonstrate that there is significant scope for policy action by all levels of government on the public health risks and opportunities associated with climate change in Australia.



Recommendations

Our policy recommendations, developed in response to Australia's current performance against the MJA-Lancet Countdown's indicators, are to:

Recommendation 1

Increase investment in monitoring and early warning systems for climate-sensitive infectious diseases to inform necessary preparation of public health systems.

Recommendation 2

Update all Australian medical school curricula to include the impacts of climate change on human health in order to build the health sector's capacity to help prevent and respond to the health impacts of climate change.

Recommendation 3

Accelerate decarbonisation of Australia's energy sector, with strong political and financial commitments to achieve phase-out of coal-fired electricity generation.

Recommendation 4

Provide adequate funding and support to active transport initiatives nationwide in order to capitalise on the environmental, health and economic benefits of a more active population and a less polluting transport system.

Recommendation 5

Invest in research to identify, map and examine populations particularly vulnerable to the mental health impacts of climate change, and to inform the development of appropriate resilience-building measures in all communities.

Background

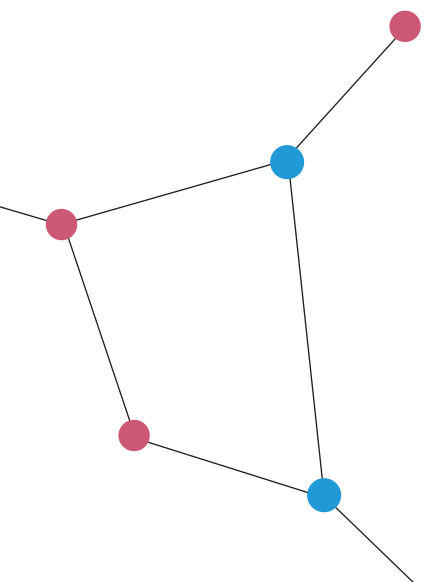
Health and Climate Change

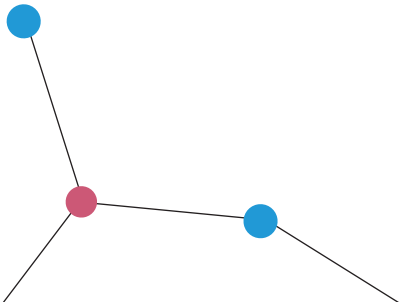
Climate change has emerged as the defining public health challenge of the twenty-first century.[2]

A large and growing body of scientific evidence has established relationships between anthropogenic climate change and adverse health outcomes – existing and potential – worldwide.

Accordingly, the importance of a well-planned, coordinated and comprehensive Australian government response to climate-related health challenges cannot be overstated. As a warm, dry country, Australia is particularly vulnerable to an array of health risks linked with climate change.[3] The MJA-Lancet analysis has shown, for example, that human exposure to warming from 2000-2016 in the three biggest Australian cities was on average about 0.9 degrees Celsius higher than it was between 1986-2008.[1] Rising temperatures,[4] extreme weather events,[5] changing infectious disease patterns,[6] increasing food insecurity,[7] and migration and population displacement[8] all threaten Australians' health and wellbeing and increase the burden on our health system. Ongoing delays in confronting these challenges exacerbate both the extent of the adverse health outcomes that they may cause and the scale of the responses that they will ultimately require.

Importantly, tackling the causes and consequences of climate change presents significant opportunities for Australian policymakers across a variety of sectors. From a health perspective, taking action to curb emissions will accrue numerous population-level benefits, such as reductions in cardiovascular and respiratory disease rates,[9] with associated healthcare cost savings. Meanwhile, proactive measures to increase the resilience and adaptive capabilities of Australian health systems are likely to generate long-term economic savings, partly due to their positive impact on mental health.





Climate-sensitive infectious diseases

Climate conditions such as temperature and rainfall modify the incidence and impact of many of the world's most significant infectious diseases, potentially altering Australia's vulnerability to these conditions as they change.

Malaria and dengue fever, for example, are sensitive to climate-mediated changes in the range and reproductive capabilities of disease-carrying mosquitoes.[6] Likewise, extreme weather events can optimise conditions for infectious disease transmission by undermining water and sanitation infrastructure, thereby increasing the risk of food and waterborne disease outbreaks.[6]

In Australia, climate change is likely to alter transmission of mosquito-borne diseases such as Ross River virus,[10-12] Barmah Forest virus and dengue fever.[13] Rising temperatures, tidal level changes and altered rainfall patterns, in interaction with other social and biological factors, affect the ability of mosquitoes to transmit these diseases to humans – in other words, these factors increase mosquitos' 'vectorial capacity', which incorporates interactions between host, disease and vector. [2]

The MJA-Lancet Countdown analysis has shown a 13.7% increase in the vectorial capacity of the *Aedes aegypti* mosquito, the main carrier of dengue virus, in Australia between 1950 and 2016 (Figure 1).[1] In particular, there has been a strong increase in its winter vectorial capacity over this period (Figure 2).[1] Changes in vectorial capacity predicted to occur along two IPCC greenhouse gas trajectories, RCP 2.6 (less rapid warming) and RCP 8.5 (faster warming), are mapped below (Figure 1), with the latter associated with a greater increase.[1] RCP 8.5, the faster warming trajectory, is more in line with current trends than is the slower trajectory. These findings indicate that Australia is increasingly vulnerable to dengue fever outbreaks, with the potential for these to occur in previously unexposed regions or seasons. This is consistent with global increases in vectorial capacity for the transmission of dengue virus which, in 2016, was the highest on record.[2]

Climate-mediated changes in dengue and other infectious disease exposure will require a comprehensive public health response to prevent an associated increase in morbidity and mortality, especially in health districts vulnerable to new or increased disease outbreaks. Such a response should include the development of effective early warning systems for potential disease outbreaks, with coordinated monitoring systems, risk analyses considering local climatic variations and risk communication strategies to ensure informed decision-making. Further research should be conducted to determine the most effective interventions to mitigate the health impacts of climate-sensitive infectious diseases in Australia.[14]

Additionally, measures should be undertaken to build the resilience and adaptive capacity of health systems in response to changing infectious disease patterns, along with other health challenges posed by climate change. Improved education and training of medical staff and students on these issues would help to ensure more rapid and appropriate responses in a clinical context. As such, all Australian medical school curricula should be updated to incorporate the impacts of climate change on human health over the coming decade.

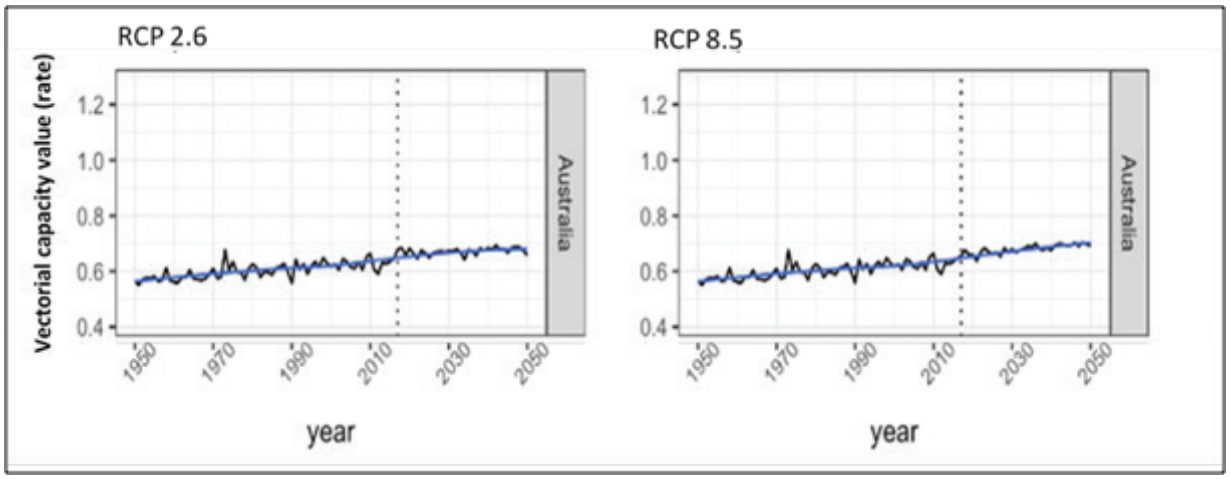


Figure 1: Aedes aegypti vectorial capacity averaged yearly for two representative concentration pathways (RCP 2.6 and RCP8.5) for Australia, 1950-2050

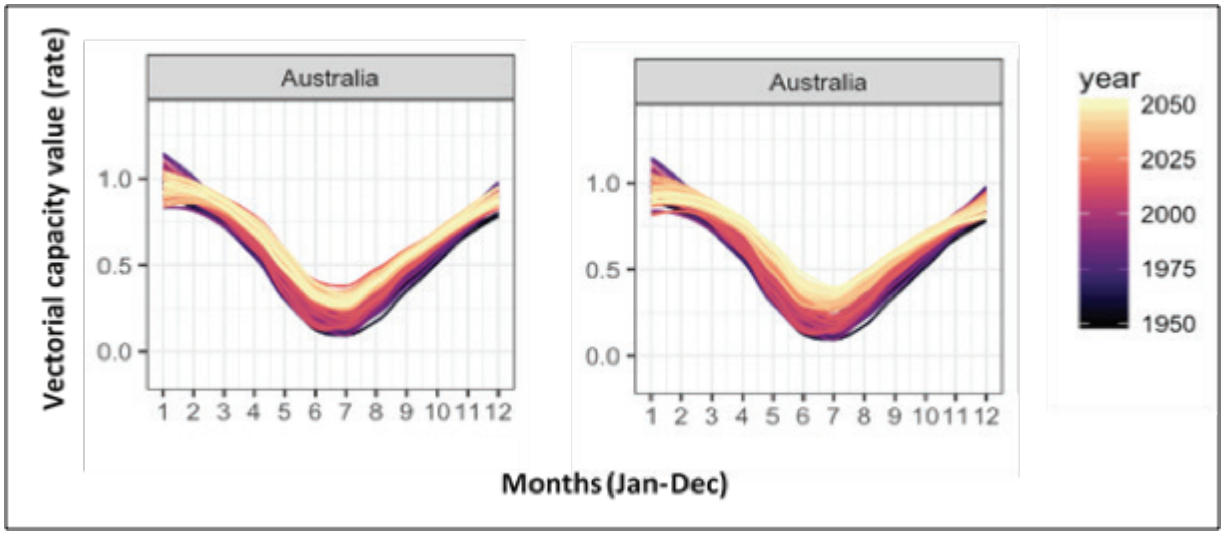


Figure 2: Average monthly Aedes aegypti vectorial capacity for two representative concentration pathways (RCP 2.6 and RCP 8.5) for Australia, 1950-2050

Decarbonisation of Australia's energy system

Transitioning the energy sector away from fossil fuels is a uniquely powerful way to reduce greenhouse gas emissions and has wide-ranging benefits for present-day health.[9]

Most global greenhouse gas emissions result directly or indirectly from fossil fuel-dependent energy production. As such, limiting global average temperature rise to well below 2°C (and aiming for 1.5°C), as per the Paris Agreement, will require a systematic transformation of the energy sector in favour of renewable energy generation. This must occur quickly: the Intergovernmental Panel on Climate Change (IPCC)'s 2018 report found that in order to limit global warming to the less dangerous level of 1.5°C, global net human-caused emissions of carbon dioxide would need to fall by about 45% from 2010 levels by 2030, reaching 'net zero' emissions around 2050.[15]

Australia's energy system remains highly carbon-intensive (Figure 3). The carbon intensity of Australia's total primary energy supply (TPES) has decreased slightly since 2005 but remains higher than that of many other nations, including the UK, the US, and Germany, and is significantly higher than the world average.[3] This is mainly due to the large proportion of Australia's electricity produced from coal, which powered 63% of Australia's supply in 2016.[16] There have been only limited increases in Australia's renewable and low-carbon energy production[17]: between 1990 and 2015, the share of total electricity generation from renewable sources only increased from 11% to 17% (Figure 4).[1] Meanwhile, the number of people employed in renewable energy activities in Australia has been declining, after an increase between 2009 and 2012.[1] Encouragingly, however, 92% of the capacity added to the Australian National Electricity Market between 2012 and 2017 came from renewable sources, with substantially decreased investment in coal capacity since 2009/10.[18]

Transformation of the energy sector can leverage reductions in disease and deaths caused by air pollution and environmental contamination in the short-term and by temperature changes and extreme weather events in the long-term.[9] The MJA-Lancet Countdown analysis produced a conservative estimate of 2,900 premature deaths in Australia in 2015 due to exposure to anthropogenic sources of fine particulate matter (PM2.5), much of which is produced from fossil fuel combustion.[1] Research has shown that reducing fine particulate matter exposure by 10% in Sydney would prevent 650 premature deaths and 700 hospital visits over ten years—with consequent healthcare savings.[19]

Ongoing stagnation in the decarbonisation of Australia's energy sector jeopardises Australian lives. As such, total phase-out of coal-fired electricity generation should be a core objective of all state and federal energy policy. Complementary legislation – such as ambitious emissions reduction targets, carbon pricing mechanisms and moratoria on fossil fuel subsidies – will be necessary to ensure that Australia meets its Paris commitments and maximises the potential health benefits associated with cleaner energy production.[20] As a high-income country with substantial technical and economic capacity, Australia is in a strong position to invest in, and benefit from, infrastructure and incentives to expedite the transition to a clean energy system. International increases in renewable energy uptake, reliability and cost-competitiveness may help accelerate this transition in the coming years.[21] In particular, as the cost of solar power installation drops precipitously, a focus on solar power growth in sunny Australia could pave the way for a bright future in health, the environment and employment.

From an international perspective, decarbonisation of the global energy sector is progressing too slowly to optimise benefits to health. Although there has been a rapid increase in renewable and low-carbon energy generation in countries such as Germany and the UK, Lancet Countdown analysis has found no change in a key marker of global energy system decarbonisation – the carbon intensity of total primary energy supply – since 1990.[2] Parts of the international energy system are heading in the right direction. There has been a global reduction in coal consumption since 2013, with 46 country, state and city partners, including Canada and the UK, having joined the Powering Past Coal Alliance, committing to phasing out coal-fired power generation. Unfortunately, growth in the use of other fossil fuels (such as oil and natural gas) has hampered progress towards zero emissions. A global transition to renewable energy sources is urgently required, and Australia's leadership would make a substantive international contribution.

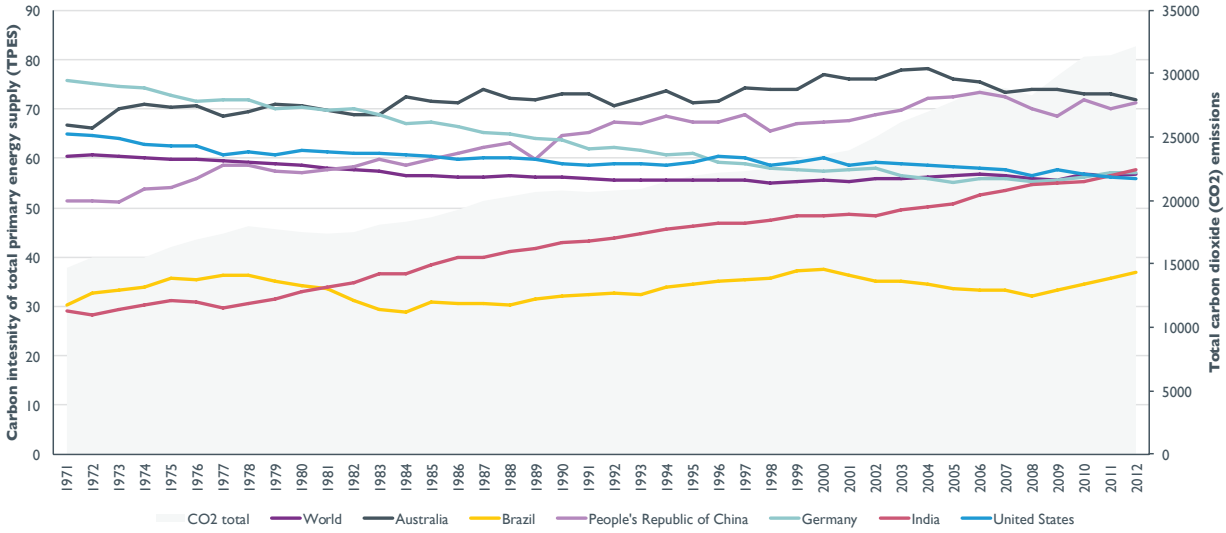


Figure 3: Carbon intensity (left hand y axis) of total primary energy supply (TPES) for Australia, selected countries, and the world, and corresponding total carbon dioxide emissions (right hand y axis), 1971-2012

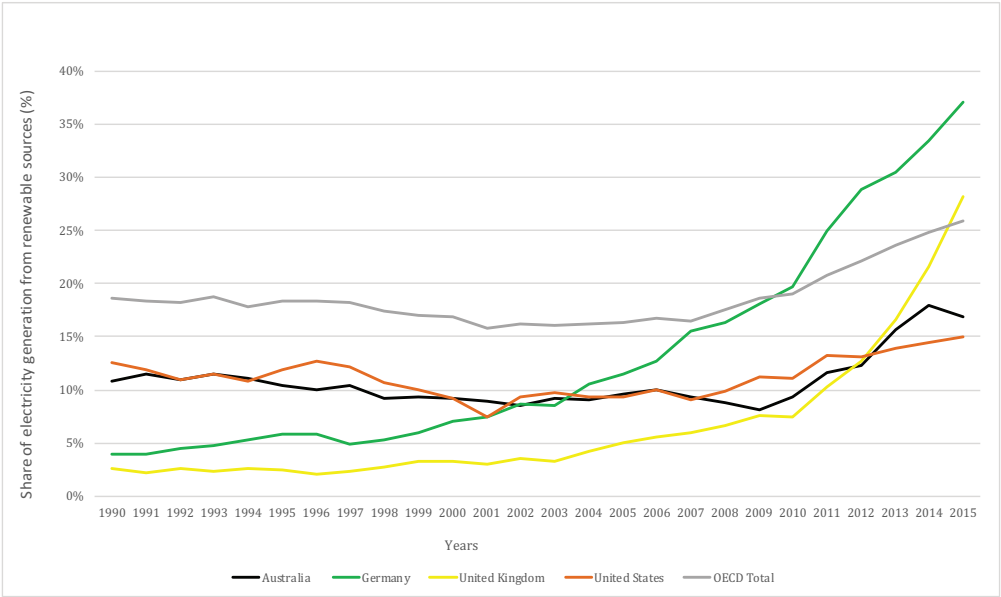


Figure 4: Share of electricity generation from renewable sources in Australia, Germany, United Kingdom, United States, and the Organisation for Economic Co-operation and Development (OECD total), 1990-2015

Sustainable travel infrastructure and uptake

In Australia and worldwide, transport is a major source of greenhouse gas emissions and urban air pollution. The transport sector contributed 17.6% of Australia's total greenhouse gas emissions in 2015.[22]

Reducing emissions from the transport sector is therefore an essential climate change mitigation measure, which confers the manner in which such measures tend to confer health co-benefits on both an individual and population level.

Replacing single-occupant-vehicle use with more active modes of transport (such as walking and cycling) is beneficial to health. Globally, cycling currently comprises less than 10% of total journeys taken in three quarters of a sample of global cities.[2] Increasing active transport improves public health by reducing air pollutant emissions and raising levels of physical activity, leading to smaller risks of non-communicable diseases such as obesity, cardiovascular disease, and diabetes.[9] In Adelaide, for example, it was shown that shifting 40% of vehicle kilometres travelled (VKT) by passenger vehicle to active transport would result in a significant reduction in urban air pollution, along with the yearly prevention of 543 premature deaths and 7,647 disability-adjusted life years through a combination of improved air quality, improved physical fitness, and changes in traffic injuries.[23]

Currently, Australian cities are highly dependent on private cars for transportation, and lag behind other major global cities in terms of achieving a sustainable balance of different modes of transport. In Melbourne, close to 80% of trips are undertaken in private cars; in Sydney, the proportion is close to 70%.[2,24] Results of the 2017 national cycling participation survey indicate a significant decrease in cycling participation across the country since 2011, especially in New South Wales, Victoria and South Australia.[25] The relatively high modal share of private cars, in combination with relatively slow uptake of electric vehicles,[26] contributes to the significant emission-intensity of Australia's transport sector.[22] This is further compounded by growing rates of domestic and international air travel, with carbon emissions from domestic aviation projected to rise 2.2% per annum until 2034-35.[22]

To maximise health benefits and associated economic savings from the transport sector, governments should develop and allocate more funding to programs and infrastructure that promote a shift from driving to more sustainable, and ideally active, modes of transport. A variety of measures, including sustainable urban planning, will need to be considered to discourage private car use and improve active transport uptake. The newly launched Cycling and Walking Australia and New Zealand is a step in the right direction, with its goal of implementing 'strategies and actions that will rapidly improve the conditions for and uptake of cycling and walking on Australia and New Zealand transport and recreation networks'.[27] Active transport promotion measures should be complemented by stronger national emissions standards for motor vehicles, alongside incentives to improve uptake of clean, renewable-powered electric vehicles.[16] Carbon pricing mechanisms should also be considered; such mechanisms could go towards curbing current rapid growth in aviation transport emissions.[22]

Mental health impacts of climate change

In recent years, evidence has emerged regarding some of the impacts of climate change on mental health.

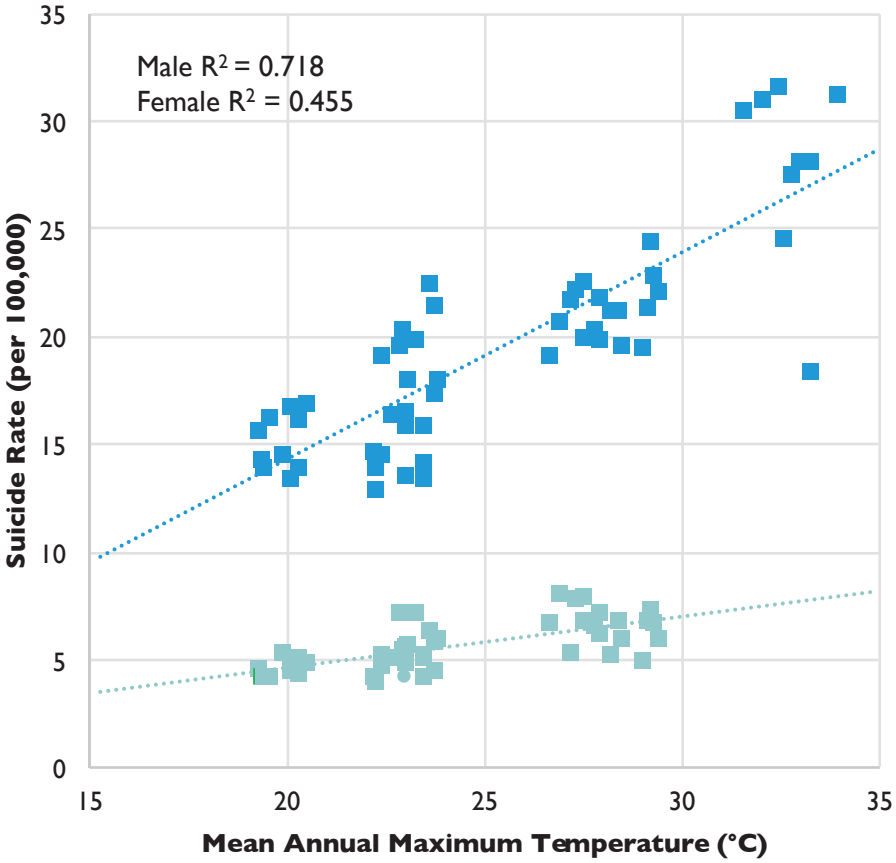
The mechanisms by which climate change affects mental health range from temperature-associated sleep disturbances triggering acute mental health crises to depression and anxiety due to climate-induced migration.[8] Given the prevalence of mental health problems in Australia and worldwide, and the potential for climate change to exacerbate the scale and severity of these problems, mental health needs urgent consideration.

Critically, a warming planet means more hot weather, a known cause of harm to mental health. In Australia, hot days have a detrimental effect on population-level mental health equivalent to that of unemployment,[28] and they predict hospitalisation for self-harm.[29] The MJA-Lancet Countdown has therefore produced a preliminary baseline calculation of the relationship between hot years and suicide rates in Australia, finding that higher mean annual maximum temperatures are strongly associated with elevated suicide rates in most of Australia's states and territories (Figure 5a). However, in the two cooler states and territories (Tasmania and the ACT), the opposite association was only found where suicide rates were elevated in cooler years (Figure 5b). Continuing warming can, therefore, be expected to lead to increased suicide rates, a risk that requires urgent policy-led mitigation.

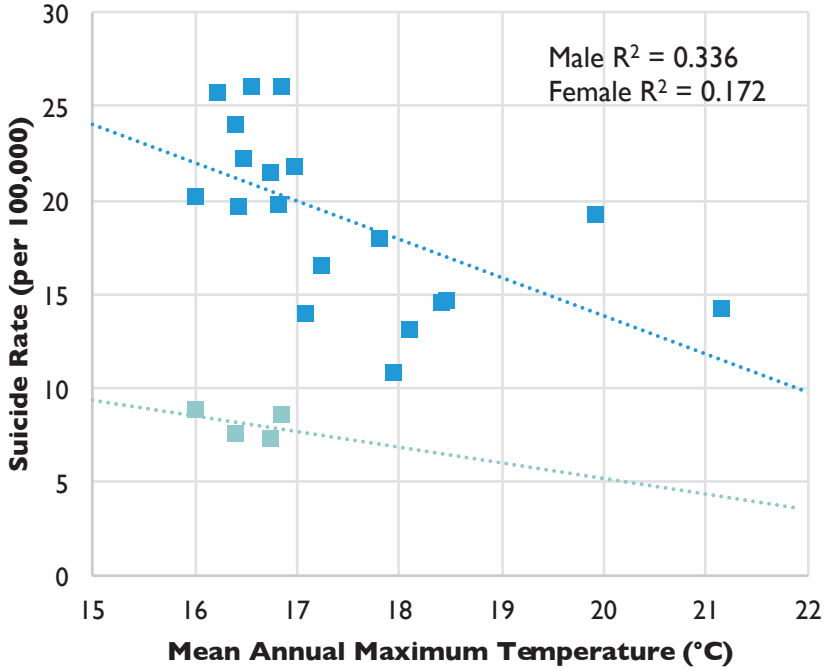
Anecdotal evidence about the stress caused to rural residents by the 2018 drought in New South Wales has been widely reported in the Australian media. This episode provides a clear example of the many ways in which droughts can harm mental health.[30] Periods of relative dryness followed by extreme lack of precipitation are linked to psychological distress among rural Australians.[31] Adaptation to drought in the context of climate change must include consideration of mental health, particularly in rural and remote Australia.

MJA-Lancet analysis has also concluded that certain demographic factors may modulate the risk of mental health problems caused by climate change, with men and residents of the Northern Territory (many of whom are Aboriginal and/or Torres Strait Islander) significantly more likely than other Australians to die by self-harm.[1] This provides further evidence that some Australian people and some places face elevated risks from climate change and this needs urgent, targeted policy and research attention.

Research into the mental health impacts of climate change in Australia is still in early stages and will require further investment coming years. Policy measures must keep pace with this increasing evidence-base in order to maximize mental-health and wellness supports for Australians as the climate changes.



(a) Warmer states and territories (NSW, VIC, QUT, WA, SA and NT)



(b) Cooler states and territories (TAS and ACT)

Figures 5a & 5b: Association between mean annual maximum temperature and death rates due to self-harm (suicide) by sex (blue markers = males, green markers = females) in (5a, top) warmer states and territories and (5b, bottom) cooler states and territories of Australia, 2007-2016

Recommendations

Our policy recommendations, developed in response to Australia's current performance against the MJA-Lancet Countdown's indicators, are to:

Recommendation 1

Increase investment in monitoring and early warning systems for climate-sensitive infectious diseases, to inform necessary preparation of public health systems.

Recommendation 2

Update all Australian medical school curricula to include the impacts of climate change on human health in order to build the health sector's capacity to help prevent and respond to the health impacts of climate change.

Recommendation 3

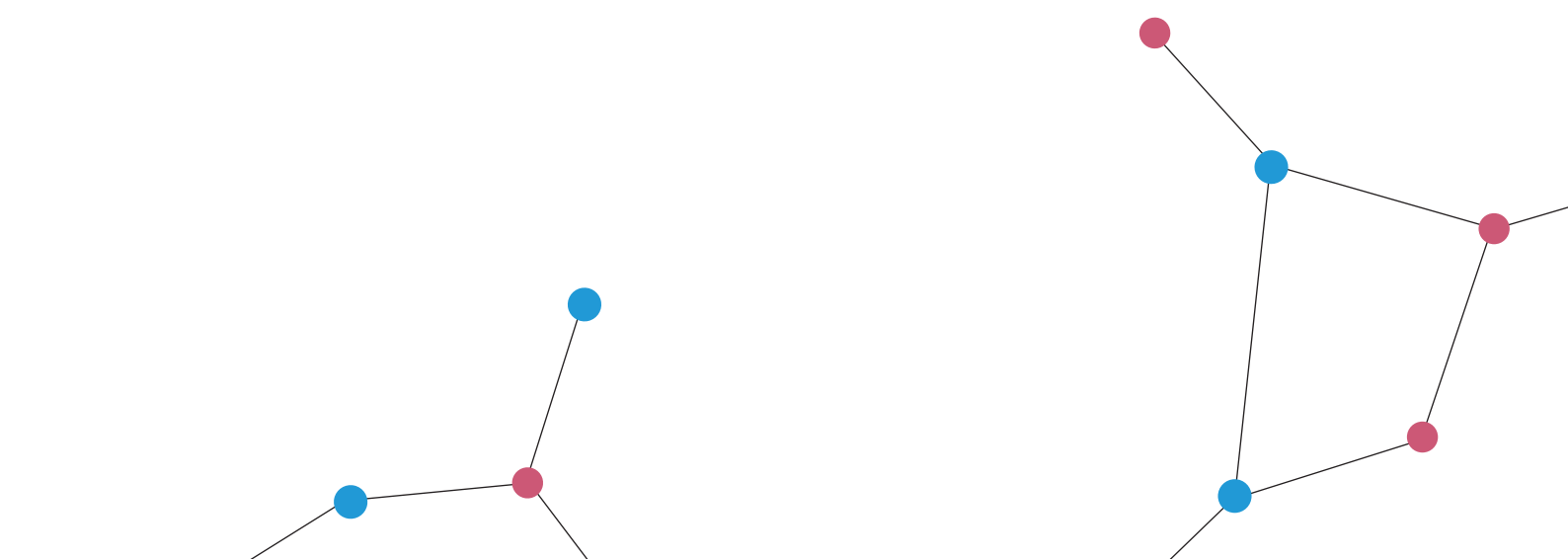
Accelerate decarbonisation of Australia's energy sector, with strong political and financial commitments to achieve phase-out of coal-fired electricity generation. All state and federal energy policies should be geared towards achieving the goals of the Paris Agreement. Investing in substantial renewable energy infrastructure and ending government subsidies to fossil fuel production are both necessary policy measures in this regard.

Recommendation 4

Provide adequate funding and support to active transport initiatives nationwide in order to capitalise on the environmental, health, and economic benefits of a more active population and a less polluting transport system. Coordination and collaboration with relevant stakeholders will facilitate the realisation of objectives such as improved urban planning to support active transport; increased investment by all levels of government into active transport promotion measures; and enhanced public awareness of the co-benefits of active transport. This presents significant opportunities to address a variety of the multifaceted challenges facing Australian cities.

Recommendation 5

Invest in research to identify, map and examine populations particularly vulnerable to the mental health impacts of climate change, and to inform the development of appropriate resilience-building measures in all communities. Particular consideration should be given to the mental health needs of rural and Aboriginal and Torres Strait Islander communities.



Additional information

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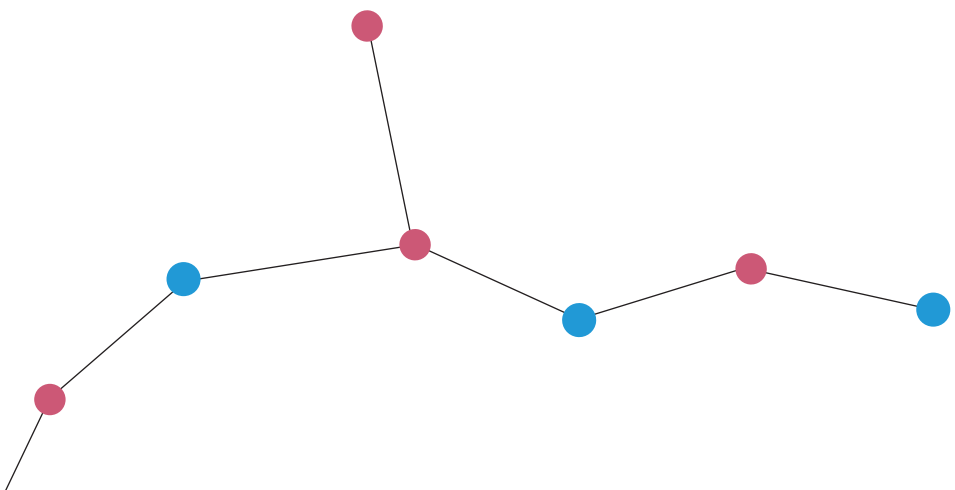

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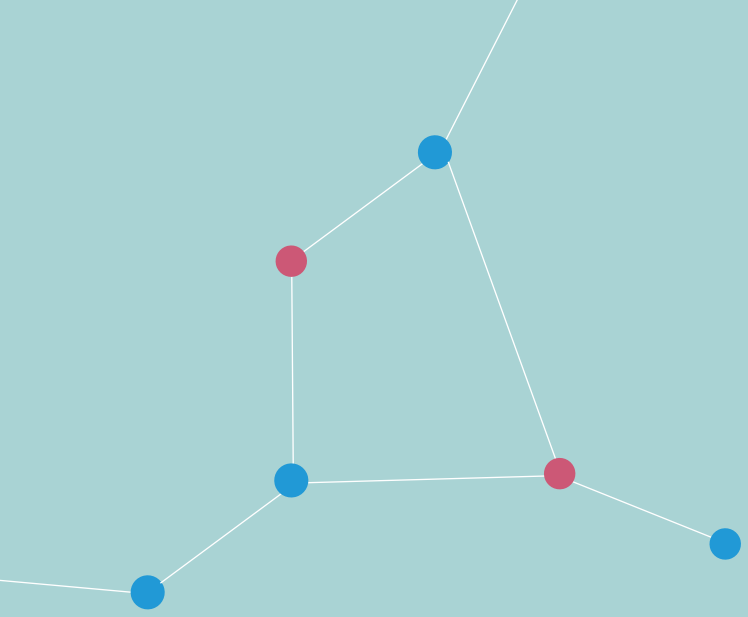

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