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# *Policy Document*

## Climate Change and Health (2023)

### Position Statement

AMSA believes that:

1. Climate change is a health emergency posing immense threat to human health and wellbeing and requires urgent action to avoid permanent and irreversible consequences through realisation of climate-related risks, and should be treated as such in political discourse and legislative priorities;
2. Efforts to prevent warming above 1.5 °C have been unsuccessful and immediate and sustainable action on climate change must be taken at local, state, federal and international levels to limit further warming and protect health globally;
3. Health impacts must be placed at the centre of international negotiations surrounding climate change with urgent action to adapt to and mitigate effects of climate change in alignment with the Intergovernmental Panel on Climate Change (IPCC);
4. Underserved communities bear a disproportionately large burden of the impacts of climate change, despite often producing the least emissions;
5. Use of renewable energy sources over fossil fuels is critical to reduce greenhouse gas emissions and create a sustainable economy going forwards;
6. The healthcare sector has a responsibility to address its contribution to anthropogenic climate change, and take action to ensure the sustainability and climate resilience of the sector;
7. All people working and studying within the healthcare system should contribute to a resilient and sustainable method of healthcare delivery, political advocacy, and role-modelling of individual adaptation and mitigation strategies.

### Policy Points

AMSA calls upon:

1. The Australian Federal and State Governments to:
  - a. Act in alignment with the Intergovernmental Panel on Climate Change (IPCC), the United Nations Framework Convention on Climate Change (UNFCCC) and the COP27 key objective of limiting average global surface temperature increase to 1.5 °C , and limiting further warming;
  - b. Provide consistent messaging across state and federal governments and declare climate change as a health emergency;
  - c. Proactively take measures and restructure current policies to achieve a reduction in greenhouse gas emissions by a minimum of 50% of

- 2005 levels by 2030 in accordance with the Paris Agreement and the Climate Change Authority, and net zero emissions by 2045;
- d. Take a leading role within the international community by fulfilling obligations under the United Nations Framework Climate Change Convention;
    - i. Become members of the Global Methane Pledge and Powering Past Coal Alliance;
    - ii. Re-join and contribute climate finance to the Green Climate Fund;
  - e. Develop, implement and invest in a National Climate Change and Health Strategy to ensure that healthcare infrastructure is capable of responding to changing disease patterns and adapting to climate pressures:
    - i. Improve healthcare capacity to cope with direct and indirect pressures on the healthcare system, including but not restricted to:
      1. Prudent hospital business continuity planning for climate and natural disaster scenarios;
      2. Preparedness and proactive management of increased patient loads as a result of health impacts of climate change, such as worsening air quality leading to increased respiratory disease presentations;
    - ii. Implementation of training for healthcare workers on climate-sensitive diseases and the broader impacts of climate change on health;
    - iii. Ensuring adequate, climate-resilient supply chains for essential medicines and vaccines;
    - iv. Committing to the institution of a National Sustainable Healthcare Unit to:
      1. Support the healthcare sector's ambition to deliver improved environmentally and financially sustainable high-quality health care;
      2. Undertake national monitoring and evaluation framework for disaster recovery programs;
      3. Financially support emergency services in management of natural disasters;
  - f. Employ a range of mitigation techniques to attain rapid and meaningful reductions in emissions and thus cultivate health co-benefits including but not restricted to:

- i. A moratorium on all new fossil fuel projects, in accordance with IPCC recommendations;
  - ii. Working to achieve complete renewable energy use by investment in renewable energy technologies over coal mining and hydraulic fracturing to reduce the burden of respiratory and cardiovascular diseases;
  - iii. Incentivise the adoption of renewable energy sources by implementing policies such as carbon pricing mechanisms and emissions trading schemes;
  - iv. Investing in public transport and active transport infrastructure to reduce car use and promote practical, active living;
  - v. Incorporate food sustainability considerations into the Australian Dietary Guidelines, in line with the Planetary Health Diet;
  - vi. Reforestation and increased green spaces to decrease air pollution, promote physical activity, and improve mental health;
  - vii. Subsidising sustainable agricultural methods and moving away from monocultures and industrial agriculture;
  - viii. Subsidising existing renewable energy technologies to increase affordability for the average consumers to allow them to adapt current homes to be sustainable and safer;
  - ix. Investing in electric infrastructure, subsidising electric vehicles and starting the phasing out of petrol and diesel vehicles;
- g. End subsidies to fossil fuel industries and immediately redirect these funds for commitment to climate change mitigation and adaptation programs;
- h. Support and fund long-term community health impact studies on the impacts of climate change, and use this to inform policy and implement interventions in areas such as:
- i. Infectious diseases;
  - ii. Heat-related illness;
  - iii. Mental health and its intersections with underserved populations;
  - iv. Natural disaster victims and bolstering emergency response services;
  - v. Pollution-related illnesses;
  - vi. Priority group support including rural, regional and Aboriginal and Torres Strait Islander communities;

- i. Continue funding and implementation of just transition programs to retrain and relocate workers in the fossil fuel industry into industries which are ecological, sustainable and ethical;
- j. Increase domestic waste and recycling processing capacity and schemes, and cease the exportation of waste;
- k. Strengthen the adaptive capacity of underserved populations to minimise the adverse impacts of climate change by providing adequate financial, technological, and logistical support, including but not limited to:
  - i. Investment in improving food and water security;
  - ii. Investment in remediation efforts to best safeguard local ecosystems;
  - iii. Training of the health workforce capable of effectively managing the immediate and long term health effects of climate change;
  - iv. Contingency planning and development of supportive policy and funding for internal displacement as a result of climate impacts;
  - v. Education programs for these populations exploring the impacts and adaptive solutions of climate change;
- l. Work in collaboration with Aboriginal and Torres Strait Islander communities to uphold the international consensus on the determinants of planetary health, whilst ensuring that their concerns as central stakeholders are acted upon, and adequate support is provided to adapt to the health challenges posed by climate change;
  - i. Recognise that Aboriginal and Torres Strait Islander identity is intrinsically linked to Country and thus, destruction of natural environments has significant impacts on Aboriginal and Torres Strait Islander individuals and communities;
  - ii. Respect and abide by the self-determination and cultural lore of Aboriginal and Torres Strait Islander communities, organisations and their work on their country;
  - iii. Establish land, water and conservation management practices that uphold Aboriginal and Torres Strait Islander sovereignty and by engaging with appropriate local cultural authorities incorporates Aboriginal and Torres Strait Islander knowledges and practices;
- m. Take measures to prevent, minimise, address, and facilitate solutions to displacement due to climate change, and establish a framework to assist climate migrants and refugees and facilitate migration with

- dignity, particularly for populations disproportionately vulnerable to displacement, such as the Pacific Island nations;
- n. Urgently address the threat of increased infectious disease burden due to climate change by;
    - i. Establishing and supporting an Australian Centre for Disease Control;
    - ii. Enhancing the accessibility, specificity and sensitivity of disease surveillance systems specifically in rural and remote areas;
    - iii. Collaborating at national and global levels to monitor the changing patterns of infectious diseases and identify emerging threats;
    - iv. Committing to funding and roll-out of interdisciplinary research and intervention programs under the framework of One Health;
    - v. Ensuring adequate water, sanitation and food safety to prevent and reduce infectious disease transmission.
  2. Australian universities, medical schools and medical colleges to:
    - a. Integrate climate change and its relationship to health within the medical curriculum, and other health-specific courses. This may include, but is not limited to, teaching on:
      - i. The changing pathogenesis and burden of diseases;
      - ii. Clinical skills relevant to new disease diagnostics and management; and health crises resultant of climate change;
      - iii. How disease outbreak models, management plans, emergency protocols and health services need to adapt to climate crises and disasters;
      - iv. How to better engage with other health specialties including allied health professionals and emergency personnel to adapt to a changing burden of disease;
      - v. The disproportionate distribution of health impacts as a result of climate change on underserved communities and priority groups;
      - vi. Planetary health and One Health into curricula to educate students on adaptation and mitigation strategies to manage the social determinants of health impacted by climate change;
      - vii. The value of Aboriginal and Torres Strait Islander peoples in the response to the health impacts of climate change, including local cultures' environmental and health knowledge and lore;

- viii. The role and responsibility of the healthcare system and practitioners:
  1. To collaborate on adaptation and mitigation strategies on an international level;
  2. To act as leaders and advocates from a community to a national scale;
  3. To individually make changes within their practice and educate their patients;
- ix. The need for effective environmental health policies as public health measures;
- x. Health co-benefits from sustainable infrastructure such as active transport methods, green spaces and carbon neutrality;
- xi. An analysis of the current healthcare sector and potential for improvement to ensure health sector preparedness;
- xii. The Planetary Health Diet and its role in nutrition and climate mitigation;
- b. Recognise the burden of climate anxiety and its contribution to burnout in student populations and implement proactive short and long-term management strategies, including education on tangible solutions to the impacts of climate change on health;
- c. Invest in, support and promote research on the impacts of climate change on health, including but not limited to:
  - i. Health effects;
  - ii. Mitigation and adaptation strategies;
  - iii. Medication supply and access;
  - iv. Healthcare worker preparedness;
  - v. Healthcare system and economic preparedness;
- d. Be open and transparent about links to fossil fuel institutions regarding funding and subsidies, and divest where possible.
- 3. Hospitals and health institutions to:
  - a. Employ a range of mitigation and adaptation techniques and set targets to reduce their ecological and carbon footprint. These may include:
    - i. Audit, measure, monitor and reduce consumption of resources such as energy, water, and materials;
    - ii. Create infrastructure for action, such as Sustainability Development Units;
    - iii. Reduce overall energy consumption and costs through increased efficiency and conservation practices;



- iv. Produce and/or consume clean, renewable energy onsite where possible;
  - v. Use green principles in design and construction of new facilities;
  - vi. Improve waste management through waste reduction including potential reusable options, increased composting and recycling procedures, and reduced incineration of medical waste that can be alternatively disposed of;
  - vii. Optimise sustainable transport options for staff by using electric vehicle fleets and incentivising walking, cycling and use of public transport;
  - viii. Implement water conservation strategies and eliminate use of bottled water if potable water is available;
  - ix. Purchase sustainably produced products from local providers where feasible and improve availability of plant-based options on facility menus;
  - x. Employ a sustainability officer responsible for ensuring that sustainability measures are implemented effectively;
  - b. Educate hospital staff about the intersection between climate change and health, and their role in meeting targets set for the reduction of carbon footprints;
  - c. Be open and transparent about links to fossil fuel institutions regarding funding and subsidies, and divest where possible;
  - d. Commit to the institution of a National Sustainable Healthcare Unit.
4. AMSA Executive to;
- a. Divest by:
    - i. Transferring investments from companies who derive over 10% of their business from fossil fuels into investments that support renewable energy sources while working toward as close to 0% fossil fuel investment as possible;
    - ii. Immediately freezing any new investment in fossil fuel companies;
    - iii. Divesting from direct ownership and any commingled funds that include fossil fuel public equities and corporate bonds within 5 years;
    - iv. Ending fossil fuels sponsorship;
  - b. Continue monitoring financial institutions, superannuation funds and other organisations and affiliates/associates to ensure they continue to align with AMSA's stance on climate change and health;

- c. Where possible and appropriate, invest in ethical funds that promote health, renewable energy, and sustainable industries and select future vendors in accordance with these attributes.
5. AMSA Executive, AMSA Global Health Management, Medical Societies and Event Teams to:
  - a. Support sustainability efforts of AMSA Executive and encourage medical societies and individuals to divest from fossil fuels where possible as in 4a;
  - b. Continue to run and expand the Code Green campaign to provide accessible education and practical activism opportunities for medical students on the health impacts of climate change;
  - c. Utilise the Code Green platform for active advocacy, promotion and support to key stakeholders around ongoing climate mitigation efforts and urgent adaptation strategies;
  - d. Refer to AMSA Code Green's Sustainable Events Guide to promote sustainable principles and options.
6. Australian medical students and health professionals to:
  - a. Reduce their carbon footprints;
  - b. Work with relevant organisations, such as Doctors for the Environment Australia (DEA), the International Federation of Medical Students' Association (IFMSA), the Climate and Health Alliance (CAHA) and the Australian Medical Association (AMA), to publicly provide a voice for countries/communities vulnerable to and already affected by climate change through meetings with key stakeholders;
  - c. Consider the health impacts of energy sources within the health sector and implement strategies to reduce carbon intensive energy use;
  - d. Consider the waste management in health facilities and support waste minimisation efforts;
  - e. Support and promote projects and targets designed to reduce ecological and carbon footprints of hospitals and medical institutions;
  - f. Advocate for their medical institutions and universities to divest from fossil fuels;
  - g. Educate other students, health staff and patients about the impacts of climate change on human health;
  - h. Advocate for climate change adaptation and mitigation strategies that have public health co-benefits, such as active transport use and the Planetary Health Diet.
7. The International Federation Of Medical Students' Associations (IFMSA) and its constituent National Member Organisations (NMOs) to:



- a. Make advocacy efforts pertaining to climate change and health a high priority within the organisation, and promote this attitude both internally and amongst NMOs;
  - b. Codify advocacy efforts pertaining to climate change and health through the implementation of a recognised body within the organisation that is associated solely with this topic;
  - c. Establish monitoring and evaluation mechanisms to assess the impact of advocacy efforts on climate change and health, and regularly review and update strategies and initiatives based on feedback and evidence, to ensure continuous improvement and effectiveness;
  - d. Engage in advocacy and resource development on climate change and health education for medical students by:
    - i. Collaboratively developing educational resources, training workshops, conferences and webinars with medical student associations, fostering international collaboration to improve global climate action efforts;
    - ii. Promoting the integration of climate change and health into medical school curricula, ensuring that medical students receive comprehensive education on the health implications of climate change and are equipped with the skills to address climate-related health challenges in their future medical practice;
  - e. Encourage research and data collection on the intersection of climate change and health, including supporting medical students' involvement in research projects and providing resources for data collection and analysis;
  - f. Engage in advocacy efforts at international forums, conferences, and summits to ensure that climate change and health remain on the global agenda, including participating in discussions, presenting research findings, and collaborating with other medical student associations to amplify voices and push for meaningful action.
8. All other businesses, companies, organisations and individuals to:
- a. Divest from fossil fuel developments and transition to supporting renewable energy sources;
  - b. Reduce their carbon footprint and implement strategies to reduce carbon-intensive energy use;
  - c. Preferentially invest in ethical funds that promote health, renewable energy, and sustainable industries.

## Background

The Australian Medical Students' Association (AMSA) is the peak representative body of over 17,000 medical students across the country. AMSA believes that the healthcare sector, including key internal and external stakeholders, must be prepared to mitigate and adapt to increasingly critical climate change-related health challenges. The climate crisis deserves a crisis response.

Climate change is widely regarded as the single greatest threat to humanity in the 21st century.[1] The Intergovernmental Panel on Climate Change (IPCC) has determined that a global temperature rise of 1.5 °C from pre-industrial levels would catastrophically cause major climate change-related health impacts and deaths. The global temperature has already risen 1.1 °C.[2] This has unequivocally been proven to be a consequence of human activity raising carbon emissions, disrupting biodiversity and worsening air pollution.

The IPCC's latest Assessment Report 6 (AR6) was published in 2022 and calls for 'deep, rapid and sustained global greenhouse gas emissions reduction' to slow down global temperature increases and related damages from climate change.[3] These damages are more likely to occur abruptly and irreversibly with rising global temperature levels, with examples including more frequent heat waves, heavier rainfall and severe drought.[2] The Paris Agreement is an international legally-binding treaty signed by 196 parties in 2015 to commit to a limit in global temperature increase of 1.5 °C.[4] This correlates to a peak of greenhouse gas emissions by 2025 and their subsequent overall reduction of at least 43% by 2030, before achieving net zero emissions by mid-century.[4] Australia's contribution to this reduction in particular needs to be a reduction of at least 50% from 2005 emissions levels by 2030 in accordance with the Paris Agreement and the Climate Change Authority, achieving net zero emissions by 2045.[5] These figures are reflective of Australia's increased share of carbon emissions relative to the global population. We are not currently meeting this target; in 2023, the urgency of drastic action to uphold this goal is the greatest it has ever been.

Key strategies to reduce climate change progression involve mitigation and adaptation. Mitigation refers to reducing greenhouse gas levels in the atmosphere to limit further climate change, while adaptation highlights changes that can be made in response to a changing climate to reduce negative impacts.[6] Completely preventing climate change is no longer a viable possibility and both reactive and proactive measures are required. Adaptation limits exist, however the IPCC AR6 resolutely recommends 'flexible, multi-sectoral, inclusive, long-term planning and implementation of adaptation actions, with co-benefits to many sectors and systems'.[3] Co-benefits, in this context, are advantageous outcomes in one or more





domains which are causally related to changes made in another. They serve many purposes in climate change and health, often linking interventions in either climate change response or changes to social behaviour and health, which mutually benefit multiple sectors.

Key stakeholders that dominate international and national platforms are important in determining evidence, policy and practice in climate change and health. These stakeholders include the World Health Organisation (WHO), the United Nations Framework on Climate Change (UNFCCC), the IPCC, the Australian Federal and State Governments, the Climate and Health Alliance (CAHA), the Australian Medical Association (AMA) and Doctors' for the Environment Australia (DEA), as well as individual healthcare institutions, colleges, services and practitioners. A further central stakeholder group is First Nations Peoples from around the world who have developed an international consensus on the determinants of planetary health.[7] Underserved communities refer to vulnerable, at-risk groups who are most likely to experience significant adverse effects of climate change, including but not limited to rural and remote communities, Aboriginal and Torres Strait Islander people and emerging climate migrants.

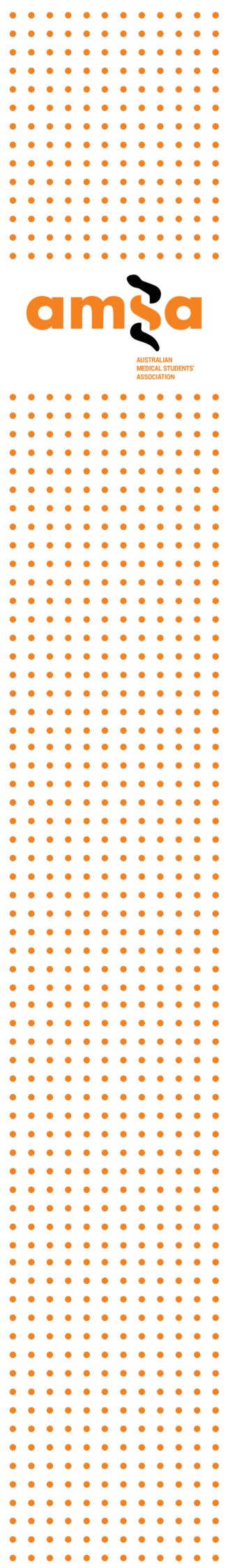
## Health Effects and Response

### Infectious Disease

Infectious diseases are one of the top causes of death and disability worldwide.[8] Climate change influences the incidence, distribution, and intensity of infectious diseases, exacerbating approximately 58% of infectious diseases that humans encounter globally.[8] Factors such as temperature variations, extreme weather events, altered ecosystems, and changing vector habitats all contribute to the spread of infectious diseases, posing new challenges to global health security.[9]

There are four key ways in which climatic hazards interact with pathogens and humans: bringing pathogens closer to people, bringing people closer to pathogens, enhancing pathogens, and weakening the body's ability to cope with pathogens.[8] Reducing greenhouse gas emissions driving climate change is crucial in mitigating these risks to human health.

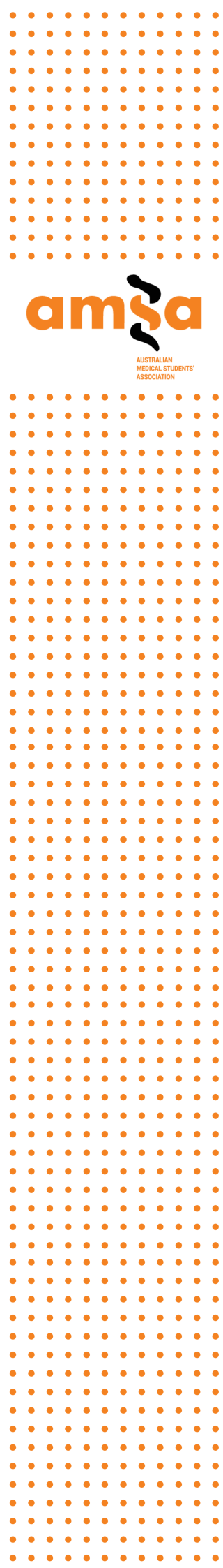
Regarding infrastructure in this area, as of 2023, the Australian government has committed \$3.2 million in the October 2022-23 budget for the preparations to establish an Australian Centre for Disease Control (CDC).[10] Establishing and supporting a CDC is critical for improving preparedness, response capacity, prevention, and communication around health emergencies, including pandemics.[11]



## Co-benefits and infectious diseases

By considering infectious diseases within the co-benefits framework, it becomes possible to design and implement comprehensive strategies that simultaneously address climate change, promote sustainable development, and improve public health outcomes.[12] This integrated approach recognizes the interconnectedness of environmental, social, and health issues and seeks to achieve multiple positive outcomes across different sectors.[13]

- a. **Health co-benefits:** Many actions taken to mitigate or adapt to climate change can have direct positive impacts on infectious diseases. In climate change mitigation, for example, transitioning from fossil fuels to renewable energy both reduces greenhouse gas emissions and improves air quality. In climate change adaptation, for example, improving sanitation and access to clean water can help prevent the spread of waterborne diseases such as cholera and typhoid fever, as well as allowing better management of water resources in climate-related disruptions. Enhancing healthcare systems and promoting hygiene practices can reduce the transmission of infectious diseases, improve overall public health, and increase climate resilience.
- b. **Resilience and disaster risk reduction:** By implementing measures to adapt to climate change, such as strengthening surveillance and response systems, improving vector control strategies, and enhancing healthcare infrastructure, communities can better prepare for and respond to disease outbreaks.
- c. **Ecosystem health:** Protecting and preserving healthy ecosystems is crucial for preventing the emergence and spread of infectious diseases. Biodiversity loss and habitat destruction can disrupt ecological balances, leading to increased interactions between humans, wildlife, and disease vectors. Deforestation in particular is linked to increased incidence of vector-borne diseases such as malaria, as well as contributing to increased climate change via release of store carbon.[14]
- d. **Social equity and infectious diseases:** Addressing the underlying social determinants of health, such as poverty, inequality, and lack of access to healthcare, can contribute to reducing the prevalence and impact of infectious diseases, particularly in underserved populations.[15] Policies and interventions aimed at promoting social equity can improve healthcare access, education, and living conditions, leading to better overall health outcomes, including the prevention and control of infectious diseases.[15] These are crucial components of strategies aiming to both mitigate and adapt to the impacts of climate change on infectious diseases and reduce health inequities.



## Vector-borne diseases

Mosquito-borne diseases, including dengue fever, Zika virus, and malaria, are highly sensitive to climate change.[16] Rising temperatures expand the geographic range of disease vectors, increasing the risk of transmission in previously unaffected regions. For instance, in Australia, climate change has contributed to the expansion of geographic ranges for Aedes mosquitoes, thereby increasing the risk of dengue transmission.[17] Additionally, the number of Ross River virus infections has been linked to variations in rainfall patterns and temperature.[18]

60-75% of human diseases are derived from zoonotic pathogens, and 17% from vectors.[19, 20] Climate change is altering the environmental conditions for these pathogens and their vectors, making the conditions more favourable for replication and adaptation in a human host. Factors such as temperature and rainfall can impact disease epidemiology as temperature influences vector reproduction and rainfall alters habitats which allow vectors, like mosquitoes, to breed.[21] With global heating causing milder winters, earlier springs, and an increase in temperature overall, the transmission season is lengthening which allows vectors more time to reproduce, spread and cause disease.[20, 22] Increased temperatures and rainfall have expanded the geographical range of mosquitoes and as such has contributed to increasing outbreaks of dengue fever and malaria.[23] The emergence of malaria in cooler climates indicates that mosquito habitats are shifting, which suggest adaptation to cope with increased ambient air temperatures.[24]

With the burden of vector-borne disease already heavily impacting communities in tropical and subtropical regions, its climate-driven evolution will claim more than the 700,000 lives already lost annually.[20] It is therefore necessary to understand the impacts climate change has on zoonotic spillover through further surveillance and research.[22] This will assist in the creation of disease outbreak models and identification of priority groups.[22] Mandatory mitigation strategies include improving water, sanitation and hygiene in accordance with the WHO's Global Vector Control Response 2017-2030 which serve as co-benefits.[20] Furthermore, adaptation could see vast improvements in evidence-based guidance, tools, reporting systems, technologies and clinical training in managing future vector-borne infectious disease outbreaks.[20]



## Water-borne diseases

Climate change presents new challenges to public health in managing waterborne diseases. Climate change impacts water availability and quality, increasing the risk of water-borne disease.[25] Flooding events can contaminate water sources, causing outbreaks of diarrheal diseases such as cholera and cryptosporidiosis.[25] Inadequate sanitation and hygiene facilities further exacerbate these risks.

In 2020, 26% of the global population, or 2.0 billion people, did not have access to safe drinking water at home, 46%, or 3.6 billion people, lacked access to proper sanitation facilities for the treatment or safe disposal of waste, and 29% (2.3 billion people) did not have a handwashing facility with soap and water in their homes.[26] The most globally disadvantaged populations are the most likely to lack access to safe drinking water and sanitation, and are also the most vulnerable to an increasing burden of water-borne disease as a result of climate change. This inequity must not increase further.

## Impact mechanisms

Climate change affects the hydrological cycle, resulting in rising temperatures, increased evaporation, and changes in precipitation patterns. Elevated temperatures increase the water-holding capacity of the atmosphere, leading to increased evaporation and atmospheric moisture content. This, in turn, affects the frequency, intensity, duration, and variability of extreme rainfall events.[27]

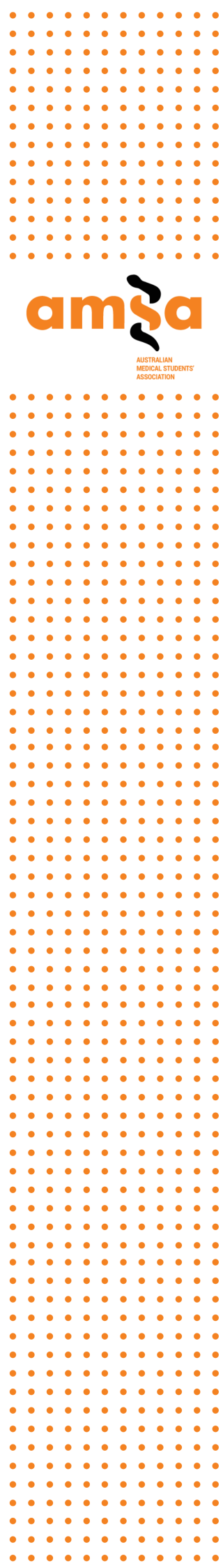
## Too much/Flood events

Heavy rainfall events can mobilise faecal matter from wildlife or domestic animals, overwhelming water treatment plants and causing waterborne outbreaks. Pathogens can be mobilised from pastures and fields, contaminating rivers, lakes, and agricultural lands. Floods and increased water flows can contaminate drinking water supplies and increase the risk of waterborne epidemics.

## Too little/Drought

Drought conditions caused by climate change can lead to restricted or intermittent water availability, also increasing the risk of waterborne diseases. Competition for scarce water resources can result in cross-connections and backflow with sewer lines, contaminating the water distribution system with pathogens. Underserved communities may have to rely on unsafe water sources, leading to higher rates of diarrheal diseases.





## Temperature

Climate change has resulted in increasing land and ocean temperatures, along with more frequent and intense heat waves. Hot weather increases water demand and consumption, and creates favourable conditions for opportunistic pathogens. Bushfires during heat waves can compromise water quality if ash settles on drinking water sources. Elevated ocean temperatures can lead to bacterial blooms in coastal waters.

## Intervention strategies

Early warning systems that monitor meteorological conditions predictive of infectious disease emergence can trigger timely public health responses. Active surveillance, using a One Health approach, across environmental, animal, and human health can provide reliable alerts to relevant authorities and help anticipate disease upsurges. To minimise the burden of waterborne diseases in a changing climate, it is important to interrupt all impact mechanisms in order to prevent cascading risk scenarios.

## Food-borne diseases

Food-borne diseases are a major cause of morbidity and mortality globally, with the WHO describing 31 hazards that cause up to 32 diseases and a global burden of 33 million healthy life years lost every year.[28] This disproportionately affects young children who carry 40% of the global burden.[29] Food-borne diseases are set to increase as global temperatures warm and climate change further evolves with high reliance of food processing, handling and storage on climatic conditions which must maintain a “cold chain” and prevent contamination.[30] The variables which influence climatic conditions and therefore increase the risk of food-borne disease transmission include increased air temperature, water temperature and precipitation as the cold-chain is compromised.[31] An example of this particular challenge is the rising rate of salmonella infections which has been suggested to be strongly associated with temperature increases that enable more rapid replication of the bacterium.[32] The WHO has quantified this relationship as a 5-10% increase in salmonellosis for every 1°C increase in weekly temperatures.[32]

Various methods of mitigating the threat food-borne diseases pose include the WHO's recommendations. These are: to improve health education and promotion for safe food storage and processing; to boost safety and performance assessment of national food control systems; to monitor the burden of food-borne diseases and; to further scientific research to consolidate food safety guidelines.[29]



## Respiratory illness

Climate change can impact the transmission dynamics of respiratory pathogens and exacerbate respiratory conditions. Climate change influences the distribution and transmission of airborne diseases. Changing temperature and precipitation patterns can impact the prevalence and seasonality of respiratory infections, such as COVID-19, influenza and pneumonia.[9] Higher temperatures and increased air pollution levels contribute to the exacerbation of respiratory conditions such as asthma and allergies. Additionally, extreme weather events, like bushfires or dust storms, can worsen air quality and respiratory health.[9]

## Emergent diseases

Climate change poses significant challenges to global health, including the emergence and spread of novel infectious diseases. It is critical to control emergent diseases as the changing climate further increases the risk of future pandemics.[33] This can be worked towards by enhancing surveillance and research, building resilient health systems, and fostering international collaboration and knowledge-sharing to address the complex challenges at the intersection of climate change and emergent diseases.[33]

## Zoonotic Spillover and Climate Change

Climate change alters ecosystems, disrupting natural balances and increasing the risk of zoonotic spillover events, where diseases jump from animals to humans.[33] Changing climatic patterns affects the geographic distribution, behaviour, and interactions of wildlife, leading to increased opportunities for zoonotic transmission.[19] Deforestation, habitat destruction, and encroachment on wildlife habitats driven by climate change contribute to closer contact between humans, livestock, and wildlife, increasing the likelihood of disease transmission.[19] One Health is an internationally recognised framework that dictates an approach to managing the risk and burden of zoonotic infectious diseases through a collaborative, multisectoral and transdisciplinary approach.[34] It promotes and identifies that the unique challenges of zoonotic infectious diseases traverse the interface between humans, environment and animals - meaning experts from human health, environmental management and animal health must collaborate to best manage this public health concern.[34] Despite current research efforts through the *Research for One Health Systems Strengthening Program*, further program development, research, and guidelines in managing zoonotic spillover need to increase across the world to appropriately address this issue.[34]



## **Neglected Tropical Diseases**

Neglected tropical diseases (NTD) affect 1.7 billion people worldwide with 16 countries bearing 80% of this burden, with impoverished communities being impacted the most. Many NTDs are vector-borne diseases which are highly influenced by climatic changes with small fluctuations in temperature, rainfall and humidity greatly increasing the rate of transmission and spread.[19, 35] Climate change is threatening the re-emergence of NTDs globally and changing geography and transmission could see NTDs encroaching on regions which were previously unaffected. Effective surveillance and monitoring of NTD emergence play crucial roles in public health responses, along with cross-sector coordination to manage water, sanitation and hygiene for disease prevention. The Global Institute for Diseases Elimination (GLIDE) works to promote and adopt unique “cross-disease, cross-border, multi-stakeholder, multi-sector approaches” in order to eliminate NTDs. They advocate the WHO’s strategies including reclaiming NTD’s in mainstream health services in appropriate contexts.

## **COVID-19 and Climate Change**

The COVID-19 pandemic, caused by the SARS-CoV-2 virus, highlights the interconnectedness between environmental factors, zoonotic diseases, and climate change.[36] Evidence suggests that the origins of SARS-CoV-2 are zoonotic, with a likely spillover event from wildlife to humans, possibly through an intermediate host.[36] Climate change, alongside other drivers such as deforestation and wildlife trade, plays a role in creating the conditions for zoonotic spillover events, including those that may give rise to future pandemics.[19, 36]

## **Fungal Pathogens**

Previously non-threatening fungi that were unable to withstand the high internal temperature of the human body have begun developing thermotolerance due to the increase in global temperatures and antifungal resistance.[37] Despite posing a growing threat to human health, fungal infections receive very little attention and resources globally.[22, 37, 38] which clouds the exact estimated burden of fungal disease and therefore limits effective action for prevention.[37] The WHO has identified 19 fungi that are the greatest risk to public health compiled into the WHO Fungal Priority Pathogens List.

Environmental disruptions due to climate change such as floods, storms, and hurricanes can disperse and aerosolise fungi or infect via opened wounds, resulting in infections by previously very rare or unknown fungal species.[37] The WHO proposed three primary areas of action, including.[38] strengthening laboratory capacity and surveillance;.[37] sustainable investments in research, development,

and innovation; and.[22] public health interventions. This is further highlighted by the rapid emergence of antifungal resistance and limitations to appropriate diagnostic tools.[37]

### **Other Existing and Potential Pandemics**

Climate change may exacerbate the spread and impact of existing infectious diseases, such as malaria, dengue fever, and Lyme disease, by expanding the geographic range of disease vectors.[39, 40] Climate-related extreme weather events, such as floods and droughts, can disrupt healthcare systems, increase population displacement, and create conditions favourable for disease outbreaks.[25] Emerging diseases, particularly those with zoonotic origins, pose a significant threat to global health security.[40] Climate change further amplifies these risks, necessitating proactive measures to prevent and respond to future pandemics.

Addressing the impact of climate change on infectious diseases is crucial for safeguarding public health. By implementing evidence-based policies and strategies, policymakers can mitigate the risks, build climate-resilient healthcare systems, and protect underserved populations. Important strategies to address the threat of increased infectious disease burden include strengthening surveillance systems, investing in research, improving health infrastructure for essential medicine and vaccine supply and distribution.[40] Collaboration internationally and interdisciplinarily is paramount to identifying and managing emerging risks.

### **Planetary health diet**

Dietary change is a potent strategy to address individual contribution to the climate crisis, and this factor should be reflected in Australian Dietary Guidelines. In 2006 the Food and Agriculture Organisation of the United Nations released the landmark report *Livestock's Long Shadow (LLS)* which detailed the impact of industrial agriculture on key climate indicators. The report shows that livestock are directly responsible for approximately 18% of climate change emissions in CO<sub>2</sub> equivalents—greater than the entire transportation industry of all cars, trucks, planes, and aircraft combined—23% of freshwater use and is the leading cause of biodiversity loss.[41] The LLS report also showed that 900 million people suffer from chronic malnourishment, while 300 million people currently suffer from obesity.[41]

The high carbon emissions of animal based products are well established with beef contributing 99 kg Co<sub>2</sub>/eq per Kg of product, dairy 33 kg Co<sub>2</sub>/eq and lamb 39 kg Co<sub>2</sub>/eq.[42] This is in comparison to plant based alternatives such as tofu at 3.2kg Co<sub>2</sub> /eq and isolated wheat protein at 1.5kg Co<sub>2</sub>/eq.[42] Western nations consume far more environmentally unfriendly foods, with the United States exceeding the

environmentally safe limit of red meat by 638%, eggs by 268% and poultry by 246%.[43] Australians consume similar quantities of these foods as Americans, making these numbers similar in an Australian context.[44] In contrast are the developing nations in Sub Saharan Africa and South-Eas Asia where the average person consumes significantly under the sustainable amount, contributing to malnutrition in these communities.[43]

These facts are clear and supported by widespread scientific consensus across intergovernmental bodies such as the UN, FAO, and IPCC.[41, 42, 45] This has led to an unsustainable food system, characterised by excess consumption in developed western nations with simultaneous malnourishment in the developing world. To address these issues the EAT-Lancet Planetary health diet was developed as a collaboration between leading global experts on food, environmental issues and agriculture, while being published by the Lancet, one of the world's leading journals. The Planetary Health Diet (PHD) is designed to address environmental concerns and ensure sufficient access to an adequate diet globally.[46] The PHD emphasises structural changes in the food system to reduce food waste as an essential step to tackle unnecessary emissions.[45] The PHD also encourages a shift towards a plant predominant diet, with significant reductions in the intake of red/processed meats, dairy and poultry in western nations.[45] Such a shift would have significant and immediate impact on climate emissions, while reducing biodiversity loss and allowing for rewilding of agricultural land to potentially act as a large carbon sink.[41]

These recommendations should therefore be incorporated into the Australian Dietary Guidelines, which already encourage the consumption of plant based foods but whose language could be strengthened.[47] Furthermore, the principles of the PHD should be integrated into hospital catering, medical schools, and other healthcare settings to model an environmentally sustainable and nutritionally healthy diet to the general population.

### Heat-related illness

The 1.1 °C rise of temperature is of major concern as IPCC has concluded that global warming of over 1.5 °C will cause catastrophic health impacts.[1] Heat-related illness is the most apparent due to increased exposure to deadly heat-waves and higher atmospheric temperatures. Higher temperatures can result in increased core body temperature leading to hyperthermia, manifesting as heat stroke and dehydration.[48] In addition, heat exposure will increase risk for health implications as it compromises the body's ability to regulate internal temperature homeostasis.[48] This will lead to kidney disease, episodes of food-borne illnesses, incidents of ischaemic heart disease, decreased mental wellbeing and death.[50]



Heat-related excess deaths in Australian cities are projected to increase by 200-400% during 2031-2080 relative to 1971-2020.[49] Climate change can also be contributed to extreme cold weather events as warm air destabilises the polar vortex that circulates cold air at Earth's poles, releasing cold air at the equator.[48] Extreme cold will cause illness such as cardiovascular stressors and hypothermia.[49] Temperature changes expose people that are particularly vulnerable including homelessness, densely populated cities, socio-economically disadvantaged groups and the elderly.[49] Successful adaptation strategies for extreme heat and cold weather that allow co-benefits of health include urban cooling interventions, green infrastructure, education to reduce heat stress, generator systems for blackouts, improved insulation, planting trees for shade and well resourced primary health care.[48, 49]

### Mental health

Mental health is a growing area of concern amongst both young people and healthcare professionals, with medical students falling neatly at the overlap between these two at-risk groups. In the National Health Survey (NHS) of 2021, 20% of Australians report a mental or behavioural condition, with that number rising to 28% for those aged 15-24, which encapsulates most medical students.<sup>1</sup> The most common of these disorders included ADHD (7%), anxiety (7%), and major depressive disorder (3%).[50] This concerning data is matched in the healthcare profession with the National Mental Health Survey of Doctors and Medical Students reporting that doctors and medical students are more likely to report very high levels of psychological distress 3.4% as compared to the general population level of 0.7%.[51]

In the 2013 National Mental Health Survey, Medical students reported that key drivers of stress were study (58.4%), university workload (50.4%), and interpersonal conflict (35.2%).[51] Recent years have added a new potential stressor to the mental health of medical students, that being the well documented phenomena of climate anxiety. A Lancet study which surveyed over 10,000 young people globally found that 59% reported being either extremely or very worried about the impacts of climate change, and that more than 50% of those surveyed reported feelings of sadness, anxiousness, hopelessness, and guilt.[52] Further research has since linked climate anxiety to the development of disorders such as anxiety and major depressive disorder.[53]

Additionally, the impact of the COVID-19 pandemic has increased the degree of mental stress imposed on medical students and doctors, with a survey of 297 Australian medical students showing that 68% of them reported worsening mental health outcomes since the COVID-19 pandemic.[54] The coalescing of risk factors due to high workloads, climate anxiety, and the COVID-19 pandemic means that



maintaining and restoring the mental health of medical students should be a higher priority than ever.

Finally, the impact of worsening climate manifesting as natural disasters, food insecurity, and worsened health outcomes is predicted to make a significant impact on the mental health of the general population, but will particularly affect underserved communities such as Aboriginal and Torres Strait Islander people and rural communities. Mental health is predicted to worsen in these communities through direct trauma as the result of natural disaster, livelihood impacts through effects of agriculture/forestry, traumatic impacts through natural disasters, and emotional distress regarding the state of the future Aboriginal and Torres Strait Islander people are most likely to experience negative mental health outcomes as a result of climate change, owing to greater vulnerability of these communities to financial stress, increased rurality / dependence on natural resources, pre-existing systemic inequality and the exacerbation of existing socio-economic divides.[55, 56]

### Natural disaster victims

Under climate change projections, exacerbating catastrophic weather events and natural disasters are expected to impose a worsening burden on emergency responders and communities.[57] Natural disasters kill on average 45,000 people per year, globally with drought being the biggest killer.[58] Australia has experienced increasingly multiple large-scale disasters in succession. First with the 2017-19 drought, rural communities suffered directly with financial wellbeing, mental health and employment, specifically due to exacerbating food insecurity.[58] In addition, the 2020 bushfires that were unprecedented in severity, saw large direct and immediate losses of life, injury and land and animal destruction.[59] This leads to increased demand on emergency medical services and healthcare resources.[9] Alarmingly, these bushfires contributed to 715 megatonnes of CO2 emissions, equivalent to around 0.2% of global greenhouse gas emissions that year.[60] The catastrophic 2022 east coast floods saw rainfall records across Queensland and NSW, leading to 20 people dying and an estimated \$2.25 billion in insured losses, making it 'the costliest flood in Australia's history'.[57] Direct health effects from natural disaster victims in addition to the severity of economic cost and environmental stressors due to climate variability is of particular concern to those vulnerable. This includes emergency services, agricultural towns, rural and remote communities, and Aboriginal and Torres Strait Islander people.

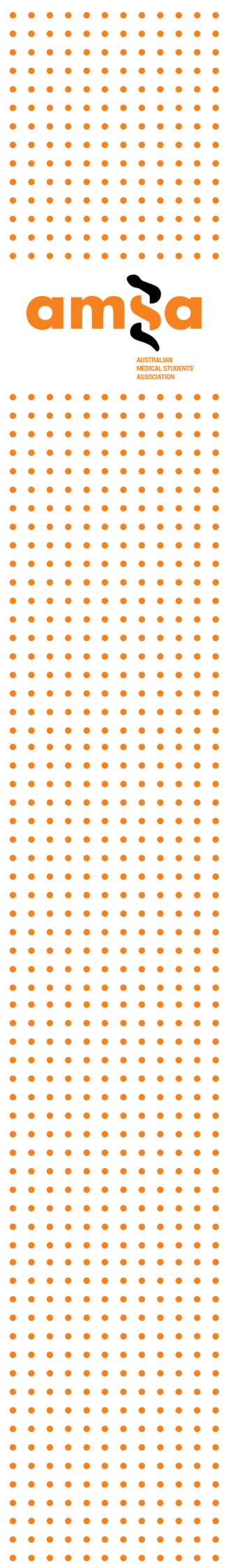
Disaster risk management and adaptation to climate disasters focus on reducing exposure and vulnerability and increasing resilience to potential adverse impacts.[60] Effective strategies include early warning and development of contingency or emergency plans, implementing a National Sustainable Healthcare

Unit specifically targeted at the healthcare emergency services with built in training, and innovations in insurance coverage, improvements in infrastructure and the expansion of social safety nets.[60]

### Pollution-related illness

According to the 2022 report of the Lancet Countdown on health and climate change, exposure to ambient anthropogenic fine particulate PM<sub>2.5</sub> pollution caused 3.3 million deaths in 2020.[9] Out of these deaths, 1.2 million were directly linked to the combustion of fossil fuels. Air pollution increases the risk of various health conditions, including respiratory and cardiovascular diseases, lung cancer, diabetes, neurological disorders, and adverse pregnancy outcomes.[61] Breathing in toxins including carbon monoxide (CO), nitrogen dioxide (NO<sub>2</sub>) and sulphur dioxide (SO<sub>2</sub>), will penetrate deep into the lungs and enter the bloodstream, allowing the particles to cause systemic damages to a variety of organs and body systems.[62] The major sources of air pollution are anthropogenic, and include combustion of fossil fuels for motor vehicles, heat and power generation, industry emissions, transportation and power generation, waste incineration and residential cooking.[63, 64] Alarmingly, the 2019-2020 Australian bushfires (also referred to as Australia's Black Summer) saw a release of particulate matter at concentration four times higher than the WHO guideline value of 20ug/m<sup>3</sup>. [65] In addition to directly causing 450 fatal deaths, hospitalisation and emergency department visits increased, the largest presentation being asthma with a 36% increase in the week beginning 12 January 2020.[66] It is estimated that high to extreme risk of fire will increase by 15-17% by 2050, and by more than 100% by 2100, as of 2020.[66]

There is strong correlation between the occurrence of bushfires and thunderstorm asthma epidemics, recognised globally as a rare phenomenon, producing a rapid surge of acute asthma presentations. The association between bushfire smoke and asthma exacerbations is of particular concern, especially since disease burden is disproportionate with those living low income.[65] Adaptive and mitigation strategies targeted at reducing emissions and combustion of fossil fuels directly co-benefit pollution-related illness.[67] Investment in renewable fuels to reduce carbon pollution from transportation is an effective mitigation strategy, in conjunction with investing in public transport and active transport infrastructure such as cycling paths to reduce car use and promote active living.[67]



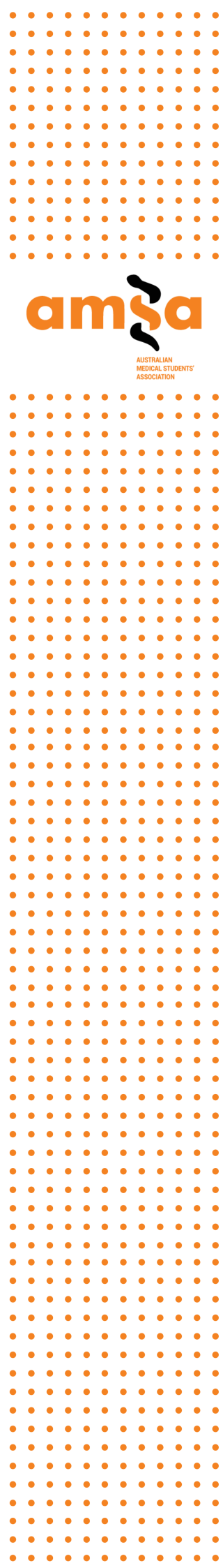
## Underserved communities

The global First Nations' perspective has revolutionised the meaning behind determinants of planetary health.[68] They have highlighted how internationally, Indigenous land rights, generational teachings and the living, interactive elements of our planet such as land, water and air must come together to ensure the wellbeing of the planet and its people.[68] However, our current state is a far cry from this, and western paradigm can only dismantle climate change once it actively involves Indigenous knowledge systems and employs Earth-centric policies.[68] Through failing to integrate the above, underserved communities are disproportionately affected by today's climate crisis and calls for urgent adaptation and mitigation strategies to prevent destruction of their livelihoods.

### **Aboriginal and Torres Strait Islander peoples**

Aboriginal and Torres Strait Islander people are one of Australia's priority groups who are disproportionately impacted by climate change despite minimal contributions to greenhouse emissions. They are vulnerable to climate change due to their close relationship with natural resources, spiritual connection to Country. Many communities also inhabit low-lying coastal and remote areas.[69] Climate change impacts have exacerbated the existing health inequities that have resulted from colonisation and it continues to damage the connections they have to Country. In NSW, a large proportion of Aboriginal and Torres Strait Islander peoples experience a greater number of heat wave events than non-Aboriginal and Torres Strait Islander people. Coupled with poor housing and isolation from health services, a greater number of hotter days has increased the cost and demand for health care through an increase in climate sensitive conditions and infectious disease burden.[70]

Extreme weather events will continue to have direct and indirect health impacts on the community. Cyclones in the Torres Strait are projected to have devastating impacts on hospital infrastructure and emergency service access.[56] The 2017 Floods in Northern NSW have shown that Aboriginal and Torres Strait Islander peoples were four times likely to have flooded homes compared to non-Aboriginal and Torres Strait Islander populations and created despair and social isolation amongst the community.[70] Furthermore, droughts have thought to increase rates of mental health disorders such as substance use and suicide within the community due to displacement from Country.[55] Aboriginal and Torres Strait Islander people have enriched their cultural connections to the ecosystem over millennia. Thus, the loss of biodiversity through the above extreme weather events will create food and freshwater scarcity and compromise access to natural medicines.[69] Furthermore,

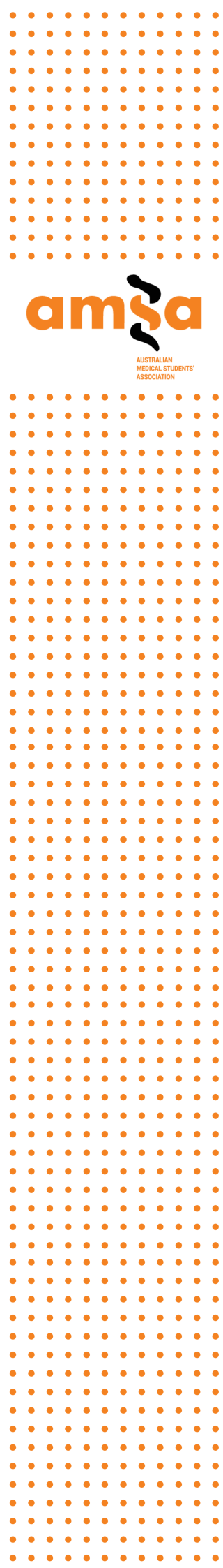


Torres Strait Islander peoples face higher health risks due to higher chronic disease burden and lack of accessible and affordable health care services. In particular, tuberculosis, dengue, Ross River virus, melioidosis, and nontuberculous mycobacterial infection are significant infectious diseases of concern under the changing climate which have been inadequately addressed by the Australian government.[56]

Aboriginal and Torres Strait Islander people have extensive biocultural knowledge, land management and conservative practices which are increasingly being recognised to have multiple socio-economic and health benefits. The 'Caring for Country' activities such as weed/pest management and ecological research run by Aboriginal and Torres Strait Islander rangers have shown several health co-benefits, notably lowering obesity, diabetes and cardiovascular disease rates.[70] For many, adaptation has already occurred within their communities and essentially describes their survival response amongst the dramatic climate shifts in history.[71] It forms the basis of addressing the new challenges of the climate crisis. Torres Strait Regional Authority have led various adaptation and mitigation strategies on the Islands through community heat mapping projects, increased uptake of clean energy technologies and now, with a large focus on coastal adaptation responses and disaster management.[72] However, multiple barriers exist regarding the implementation of adaptation strategies due to the "start/stop" nature of them.[56] Ultimately, Australian government endorsement of community-led initiatives is required, with Aboriginal and Torres Strait Islander people participating equally in the co-design of climate policy.[69]

### **Rural and regional communities**

Rural Australian communities are another significant group at risk of climate stressors as climate change exacerbates the issues associated with natural ageing, physical isolation and unemployment. Droughts, especially, have increased rates of suicide by 15% amongst young rural men between 1997-2007, particularly in NSW.[73] Other volatile climate events have increased burden amongst the rural health workforce as climate change has undermined the benefits of rural living such as peaceful communities and fresh air quality.[75] Additionally, dwindling safe water supplies and rise in natural disasters have had devastating consequences for farmers as it affects their crop production, profitability and future viability. As the Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES) predicts, overall farm profits will fall by 13% by 2050.[75] This has a cascading effect on the tight-knit community networks as lower farming outputs cause greater unemployment, economic demise of regional businesses and displacement of residents causing increased climate migration. There are also threats to the livelihood of workers within the agricultural, fishing and forestry industries as



evidenced by the over-representation in the rise of workers' compensation claims during the heatwaves in South Australia between 2001-2010.[74] Furthermore, access to safe food and water amongst already immunocompromised elderly and pregnant women in rural communities will be at risk as their sources are increasingly exposed to bacterial diseases such as salmonellosis and vector borne diseases due to shifting climates.[74]

Adaptation and mitigation solutions must be developed in consultation with rural communities who have unique insights into their own surrounding environment and networks. Existing adaptation responses have strengthened the resilience of rural businesses and communities.[76] They have focused on improving water efficiency, land management practices and crop selection with mitigation strategies incentivised by the Emission Reduction Fund for farmers.[76] Additionally, rural GPs serve an integral role in healthcare delivery and adaptation strategy development for their community as it provides several health co-benefits.[77] Globally, reducing carbon emissions has shown an increase in crop yield and decrease in premature deaths secondary to air pollution within rural communities.[78]

## Roles in Mitigation and Adaptation

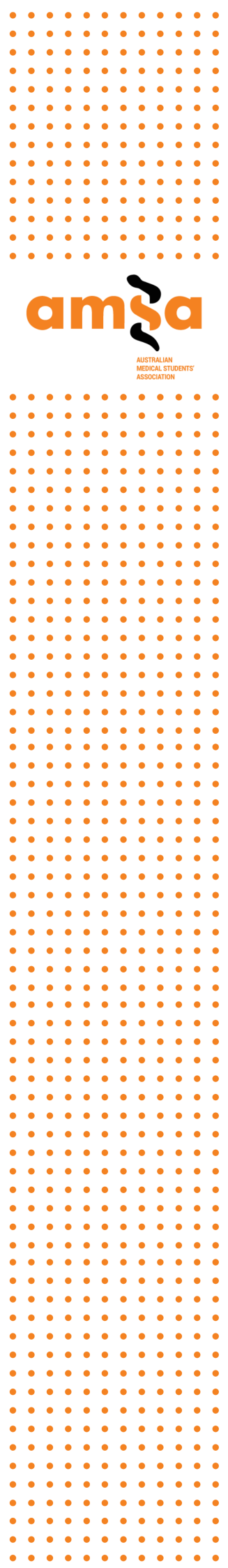
### **Role of Healthcare Professionals**

Viewing climate change as a health issue raises the question of what role healthcare professionals and the system as a whole play in mitigating and adapting to the impacts of climate change. On an individual level, healthcare professionals are currently seen as leaders, educators and advocates for their communities. These roles are vital for the healthcare systems response to climate change.

Practitioners are seen as role models in the community, especially in regards to public health messaging. Studies have shown that preventative health interventions such as smoking cessation and increasing physical activity are received and possibly adopted better by patients when delivered by doctors leading by example.[79, 80] Given their role as leaders and role models within the community, healthcare professionals have the opportunity to demonstrate the changes that need to happen within their communities, making choices such as using sustainable energy within their clinics or utilising sustainable transport methods.[81, 82]

Doctors are also considered a rich and trusted source of health education for the community, addressed as "frontline disseminators of information" on the impacts climate change is currently having and will have on health in future.[83] Efforts to increase the health literacy of the community in regards to the health impacts of climate change can and should begin with doctors. There is evidence showing that





practitioners agree and are driven to educate their patients on this issue.[84] However, studies have highlighted multiple barriers experienced by healthcare professionals in fulfilling this role within their practice, including knowledge gaps, lack of support from organisations and climate change communication not being a priority.[82, 84, 85] In order for climate change to be viewed as a health issue by the public it is vital that these barriers are addressed so that practitioners can fulfil their role as educators.

Lastly, given the vast influence doctors hold within their community and in the political space, they can play a role as advocates for climate action. Studies illustrate that the majority of practitioners agree that they have a responsibility to advocate for stronger commitments to emission reduction goals.[82] To date, doctors have been vital in lobbying for climate action, however, it has been inconsistent with its messaging. Approaching the issue with united messaging can have extensive influential power within the healthcare system, the wider community and the Australian political space.

### **Role of Healthcare Institutions**

Given the trust and respect for healthcare practitioners in their communities, it is vital that the recommendations and education given by these professionals to the public are backed by evidence. Thus, medical schools and colleges play a crucial role in preparing doctors for their role as educators and advocates. Medical curricula need to train doctors on the clinical impact of climate change, but also provide them with the skills as future health system leaders to strategically plan for climate related hazards.[86] Much work is currently underway to improve climate education in medical curricula, with amendments to the Australian Medical Council graduate outcome accreditation standards due in 2023 that will provide a key impetus for medical schools to teach environmentally sustainable healthcare. The MJA-Lancet Countdown report is a yearly publication that tracks climate change indicators relevant to healthcare, and will be updated in 2023 to include a measure of the level of teaching on the health impacts of climate change in Australia.[86] There remains a broad variation in standards of climate teaching across Australian medical schools and it is hoped these updated standards alongside tools such as the MJA-Lancet Countdown indicator will provide a clearer assessment of current practices, and engender more consistent delivery of climate health education.





## Role of Hospitals

Australia's healthcare system contributes to 7% of the country's total carbon footprint with public and private hospitals contributing to almost half of this.[87] Hospitals heavily contribute to waste product and fossil fuel energy use and must be considered key stakeholders when tackling climate change.[87] They have a unique and paradoxical role when it comes to climate change as they are a part of the problem but are also responsible for managing health consequences that arise from it. Only 2.3% of Australian public hospital energy use was sourced from renewables between 2016/17 and 2018/19 with most States lagging behind.[88] Queensland Health's Green Power Purchase in 2018/19 contributed to 75% of Australian public renewable energy.[88] Australia's health care sector must reduce greenhouse gases emissions urgently to 80% by 2030 and net zero emissions by 2040 to meet the Paris Agreement.[89]

Australian hospitals and other health care services are also vulnerable to extreme weather events such as bushfires as seen with over 3000 cardiopulmonary hospital admissions and 417 deaths attributable to smoke across Eastern Australia during the 2019/2020 Summer.[89] Urgent adaptation strategies are required with consideration of local health service vulnerabilities to certain extreme weather events to inform emergency response planning and have adequate workforce and infrastructure.[90]

The idea of a national "sustainable health unit" has arisen recently which is a system that provides high quality and eco-friendly health care to "meet the needs of today, without compromising the needs of tomorrow".[89] It involves consistent measurement of healthcare emissions and nation-wide strategies that are implemented beyond public hospitals to include general practice and private health care sectors. Efforts have been made at individual hospital levels such as Canberra Hospital who are now powered entirely by renewable electricity.[88] However, we must unify all state/territory renewable energy and zero emission targets to create a sustainable health unit which England National Health Service (NHS) have successfully pioneered as they have achieved 26% reduction in greenhouse gases emissions between 1990-2019 despite a 17% increase in their population.[89] Ultimately, there needs to be a 100% transition to renewable energy resources with no new gas installations or else hospitals will continue to rely on co- or tri-electricity generation systems that end up using fossil fuels as demands exponentially rise.[89] Additionally, there are several health co-benefits with Australian hospitals investing into renewable energy sources such as a decreased air pollution, increased physical activity and plant-based diet uptake.[88]



Apart from renewable energy use, Australian hospitals must improve clinical waste management practices, procure external goods and services with a low environmental impact and address inefficiencies such as unnecessary diagnostic testing and interventions that increase hospitals' carbon footprint without improving patient care.[91] Furthermore, sustainability efforts have shown to be effective internationally such as recycling in operating theatres and dialysis, reprocessing single use devices and re-using textiles that can be explored within the Australian hospital sector.[92]

### **Role of Professional Bodies**

Outside of the hospital system, there exists a large network of advocacy groups and professional bodies that strongly support greater action on climate change and health. Important examples as mentioned include DEA, the AMA and CAHA. These organisations are critical in representing the voice of healthcare professionals at a federal and state level, and provide important pressure on policy makers of all varieties. As much research has described, medical practitioners have important roles in patient education and as trusted public messengers.[93] Professional organisations in Australia are thus essential to representing and disseminating these voices. They provide further education to healthcare professionals, whilst similarly advocating and developing policy on behalf of their members.

DEA is the central advocacy body for medical doctors, and has played an important role at multiple levels of the health system. Significant efforts involving doctors and medical students have been made to map opportunities to improve climate training in medical curricula and promote policy changes within medical schools.[94] The production of the Planetary Health Organ System Map by DEA and medical students is an internationally rare and significant resource. DEA also plays an important role in providing advice and appropriate pressure to federal and state ministers. They are crucial in bringing together doctors from across Australia to advocate for climate within hospitals, research programs, clinics and electorates. Another example of an advocacy body is the Climate and Health Alliance - the peak multi-disciplinary body in Australia of all healthcare professionals, ranging from administrators and allied health to doctors.[95] Important members include the Australian College of Nursing, the Royal Australian College of Physicians, AMSA itself, and many more

The response to Climate change by medical institutions requires transdisciplinary collaboration. We are beyond the point of singular disciplines to take on the issue alone. Institutions such as DEA and AMA allow support from multiple sectors to come together in support of public health policies and advocate for change as a whole.[96] However, we now need more than support, instead to create a tangible and funded program of policy and solutions.



## Australia's Response

The Australian Federal Government has a history of woefully falling short of carbon emission reduction targets. Australia is among the nine countries responsible for 90% of global coal production yet still rates very low on the Climate Change Performance Index.[97] Concerningly, there are continued plans to explore fossil fuel sources and increase coal and gas production.[97] The 2022 federal election saw Australia's CPI ranking move up from last to 55th and since then, the Climate Change Bill (2022) was passed.[97] The bill outlines carbon emission reduction goals in line with the Paris Agreement. However, coal and gas production is set to increase by 5% by 2030 which is incompatible with limiting global warming to 1.5 °C and incompatible with the Paris Agreement.[97] Furthermore, Australia has still not joined important groups such as the Global Methane Pledge or Powering Past Coal Alliance.[97]

## **Interacting Internationally**

Australia's international responses to climate change have been shaped by various factors, including policy decisions, commitments, and engagement with global climate initiatives. In summary:

### **1. Nationally Determined Contributions (NDCs) and Emissions Reduction**

#### **Targets:**

Australia has made commitments under the Paris Agreement to reduce greenhouse gas emissions. As of its latest NDC submission in 2022, Australia aims to reduce emissions by 43% below 2005 levels by 2030 and to reach Net Zero emission by 2050.[98, 99] However, concerns have been raised that these targets are not sufficient to meet the goals of the Paris Agreement and we are still set to surpass 1.5°C of global warming.

### **2. International Climate Change Strategy:**

The Australian Government has developed an International Climate Change Strategy that outlines its approach to international engagement on climate change. The strategy focuses on partnerships, technology innovation, and climate finance to support emissions reduction and resilience-building efforts in developing countries.[100] It emphasises the integration of climate change adaptation and disaster resilience, as well as increased engagement with the private sector to find solutions. Australia will implement targeted climate change programs that support the transition to lower-emission and more climate-resilient communities, promoting sustainable development outcomes.



The Climate Change Action Strategy outlines Australia's commitment to addressing climate change in the Pacific region. Specifically, the Australian government has pledged \$500 million from 2020-2025 to enhance Pacific climate change and disaster resilience, surpassing the previous commitment of \$300 million over four years. The strategy aligns with the goals of the Paris Agreement, focusing on socially inclusive and gender-responsive sustainable development in the region.[101]

### 3. Engagement in Global Climate Initiatives:

Australia has participated in various international climate initiatives to address climate change. It is a member of the United Nations Framework Convention on Climate Change (UNFCCC) and actively engages in the Conference of the Parties (COP) meetings. Australia has also participated in initiatives like the G20 and the Major Economies Forum on Energy and Climate.[102]

Australia is also involved in international partnerships and global initiatives related to plastic pollution, climate and clean air, global environment funding, hydrogen and fuel cells, clean energy innovation, and renewable energy promotion. The country is a member of the UN Environment Programme New Plastics Economy Global Commitment, the Climate and Clean Air Coalition, the Global Environment Facility, the International Partnership for Hydrogen and Fuel Cells in the Economy, Mission Innovation, the International Renewable Energy Agency, and the International Solar Alliance.[103]

### 4. International Climate Finance:

Australia provides climate-related financial support to developing countries through bilateral and multilateral channels. The Australian Government has committed \$2 billion in climate finance from 2020 to 2025. This includes at least \$700 million for renewable energy and climate resilience in the Pacific, as well as partnerships in Southeast Asia, such as the \$200 million Australia-Indonesia Climate and Infrastructure Partnership. In 2021-22, Australia delivered \$640 million in climate finance, based on OECD climate finance accounting guidelines.[104]

There is also the Australian Climate Finance Partnership, a collaboration between the Australian government, multilateral development banks, and the private sector.[105] It aims to mobilise finance from various sources to support climate adaptation and mitigation efforts in developing countries. This involves leveraging public and private sector resources to address climate change challenges and promote sustainable development in vulnerable regions, increasing climate resilience in these areas.

## 5. Challenges and Criticisms:

Australia's international responses to climate change have faced criticism for not being aligned with the urgency of the climate crisis.[106] International concern about Australia's climate action revolves around the perceived insufficiency of its emissions reduction targets, reliance on carryover credits, lack of a strong policy framework, continued reliance on fossil fuels, and the impact on vulnerable nations.[97] These concerns have led to increased pressure on Australia to strengthen its climate action and align its targets with the goals of the Paris Agreement.[107] Australia's reputation as a responsible global citizen and its diplomatic relations with other nations are at stake, particularly with countries that prioritise climate action.

These concerns include the following challenges and criticisms:

- a. **Insufficient Targets:** Australia's targets are not ambitious enough to adequately address the climate crisis.[108] The commitment to reduce emissions by 43% below 2005 levels by 2030 is seen as falling short of the level of action required to limit global warming to well below 2°C, as outlined in the Paris Agreement.[97]
- b. **Reliance on Carryover Credits:** Australia has been criticised for relying on carryover credits to meet its emissions reduction targets, undermining the integrity of the Paris Agreement.[109]
- c. **Lack of Strong Policy Framework:** political inconsistency has eroded confidence in Australia's commitment to tackling climate change effectively.[110]
- d. **Continued Reliance on Fossil Fuels:** Australia's economy heavily relies on fossil fuel exports, particularly coal and natural gas.[110] This reliance raises concerns about our commitment to transitioning to a low-carbon economy.[111] Australia has faced calls to phase out coal-fired power plants and accelerate the adoption of renewable energy sources to align with the global shift towards decarbonisation. Nonetheless, new fossil fuel projects are still being approved in 2023.[112]
- e. **Impact on Pacific Island Nations:** Some Pacific Island nations have expressed frustration with Australia's perceived lack of urgency in addressing the climate crisis.[113] These nations are particularly vulnerable to the impacts of climate change, such as rising sea levels and extreme weather events.[114]
- f. **International Pressure:** Australia's climate policies have faced increasing pressure on the international stage. Various countries, including the United Kingdom, European Union members, and Pacific Island nations, have urged



Australia to strengthen its climate action and adopt more ambitious emissions reduction targets.[115] There have been calls for Australia to align its targets with the goal of limiting global warming to 1.5°C and to commit to a faster transition away from fossil fuels.[106] In recent international climate conferences, Australia's climate policies have been subject to scrutiny and criticism from other nations.[116, 117] This has resulted in a growing expectation for Australia to enhance its efforts in combating climate change, in line with the global consensus on the urgency of the issue.

Australia must align its international responses with the latest scientific knowledge and global climate goals, while addressing the urgent need to mitigate further climate change. Australia must support vulnerable countries to adapt to the changing climate, including building climate resilience and disaster management plans.

Serious future concerns also include climate migration. In 2022, 53% of internal displacements—forced movement within the borders of one's own country—were attributable to climate disasters, totaling 32.6 million displaced people.[118] This was the highest figure in a decade. As the changing climate grows more extreme, the risk of displacement will continue to increase along with it. As certain regions become uninhabitable, internally displaced peoples (IDPs) risk becoming climate refugees, needing to cross borders and seek asylum in other countries. Pacific Island nations in particular face very high risks of displacement due to climate disasters.[119] As a leading regional polluter, Australia has a moral and ethical responsibility to assist Pacific Islanders with climate mitigation, adaptation, resilience, and refuge. This means taking significant action both at home, regionally and globally against climate change, as well as to improve Australian migration and refugee policies to be accessible and hospitable for future climate migration and climate refugees.





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