



NATIONAL HEALTH AND CLIMATE STRATEGY

Detailed submission form

This form allows you to provide responses to the full set of questions in the Consultation Paper available [here](#).

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Respondent details

What is your name?
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What is your organisation?
ARC Centre of Excellence for Climate Extremes
Have you read and agreed to the Privacy Statement ? (NB we will not be able to use your submission unless you tick this box)
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Questions for feedback from the Consultation Paper

Introduction

1. How could these objectives be improved to better support the vision of the Strategy?
N/A
2. How could these principles be improved to better inform the objectives of the Strategy?
<p>We confine our comments to <i>Principle 5: Evidence-informed policy making</i> and <i>Principle 6: Partnership-based working across all levels of government and beyond</i>. We agree that applying these two principles are essential for developing and delivering an effective National Health and Climate Strategy. We would like to comment further on how these principles can best inform the objectives of the strategy, particularly <i>Objective 3. Adaptation</i>.</p> <p><u>Principle 5: Evidence-informed policy making.</u> <i>“The response to climate change must be based on the best available data, evidence and research – but we must also be willing to take action on a prudent and precautionary basis in the face of uncertainty and incomplete information. Where possible, actions should be prioritised based on the principles of cost-effectiveness analysis, considering where resources can be allocated to maximise population health gains, while also taking account of health inequities and rights-based approaches.”</i></p> <p>Climate science provides vital information which can be used to protect the health and wellbeing of Australians from the effects of climate change as well as contributing to planning and prioritising actions. The ARC Centre of Excellence for Climate Extremes (the Centre) can assist with providing and interpreting climate science information to inform the National Health and Climate Strategy.</p> <p>The Centre is Australia’s leading university climate science centre, which brings together over 100 scientists across five Australian universities. The Centre’s work improves the national capacity to understand the processes underlying climate extremes and how these may change and affect us into the future.</p> <p>We study extreme events such as droughts, heavy rainfall, heatwaves, storms and fire weather and hold valuable perspectives informed by the most recent research in climate science. We recognise the growing risks to all Australians and offer our expertise and support.</p> <p>The complex and changing nature of the climate system can be hard to navigate. With the growing use of climate data to inform the adaptation and mitigation process, the Centre advises that the use and interpretation of climate information should be performed cautiously and undertaken with expert help, to ensure that knowledge is transferred effectively and misinterpretations are avoided.</p> <p>Here, we demonstrate the requirement for expert opinion for <i>‘action on a prudent and precautionary basis in the face of uncertainty and incomplete information’</i>.</p> <p>1. Climate scientists can provide <i>‘the best available data, evidence and research’</i> on climate change. Climate risk is complex and can result from multiple physical processes acting together, making each event unique. Consulting with climate scientists to understand specific climate</p>

risks to health will ensure that the various drivers of climate risk are considered. For example, the 2022 east Australian flooding events resulted from multiple factors including:

1. a combination of meteorological phenomena which brought persistent, heavy rain,
2. sodden catchments that were primed for flooding due to preceding months of heavy rainfall and
3. the interaction of climate drivers including La Niña, the Indian Ocean Dipole and the Southern Annular Mode which promoted wetter weather [1].

Understanding the future risk of high impact events requires understanding how each of these elements will change as well as their interactions. Research into the climate has provided a robust basis for action so far, however further research is needed to improve climate information and reduce uncertainties. As the climate responds to increased warming, it is causing greater impacts than anticipated, and these impacts are emerging at lower amounts of warming than expected [2]. There is still much to be understood amid a continuously changing environment. Research at the Centre is furthering our understanding of the mechanisms causing weather extremes and how these will change in a warming world.

For example, our research on compounding climate hazards, known as compound events, is of particular relevance for understanding climate risk to health [3,4]. This research investigates how multiple elements of weather and climate come together to produce high impact events on socioeconomic or ecological systems. There are several ways compound events arise: they can involve multiple hazards occurring at the same time, a succession of hazards, hazards in multiple connected locations, or simply a more severe event as the result of preconditioning. For example, during the Black Summer Bushfires of 2019-20, numerous bushfires occurred in many different regions within the same emergency services jurisdiction. In addition to nationwide losses exceeding 10 billion dollars [5] there were wide ranging health impacts including eye and throat irritation, headaches, anxiety, respiratory issues, and cardiovascular problems [6].

The impacts of climate change are expected to lead to an increase in prolonged hot and dry compound events across Australia which is likely to exacerbate fire risk. The most intense rainfall extremes are also expected to increase substantially. All of these climate extremes have negative impacts on human health.

2. Taking *'action in the face of uncertainty and incomplete information'*.

Uncertainties are an inherent component of climate risk and must be considered and navigated when using climate data to inform adaptation. Uncertainties arise from natural variability in the climate system and knowledge gaps in our understanding or from limitations in model projections of our future climate. There is considerable uncertainty when quantifying the risk of future climate extremes. For example: it is difficult to robustly predict the magnitude of specific temperature increases in an exact urban location despite knowing, on average, temperatures will increase.

We strongly recommend using multiple lines of evidence to inform adaptation strategies. This may involve beginning with examining historical observations and past trends in extreme events. Climate models can be used to explore future emission scenarios and how these may impact the frequency and intensity of extreme events and the related health impacts. This process has utility when applied on a case-by-case basis, examining each location and their specific climate risks and vulnerabilities. It is important that throughout this process there is transparency around the data used and methodology, as well as how uncertainties are communicated. Information should be communicated in a meaningful way. For example,

describing hazard exposure through ranges such as: severity, likelihood, duration, frequency, and confidence.

3. Applying 'a prudent and precautionary' approach.

There is considerable open-source climate data publicly available for use, purportedly providing meaningful information. However, there is a risk that the numerical precision and certainty around some of the information can provide decision makers with false confidence especially when applied to future climate risk. The misuse of climate information can be detrimental, resulting in investment in maladaptive strategies and failing to implement actions that facilitate better health outcomes for Australians. The Centre advises that expert opinion is used when interpreting climate science and navigating climate information.

Principle 6: Partnership-based working across all levels of government and beyond

“All levels of government need to work closely with each other, as well as with communities, patients, First Nations, not-for-profit organisations, peak bodies, private industry and education and research institutions to craft and implement a holistic and nationally consistent response to climate change.”

The Centre agrees on the importance of 'Principle 6. Partnership-based working across all levels of government and beyond'. The complexities and interconnectedness of climate and public health means adaptation requires cross-disciplinary collaboration. The Centre can provide information on climate extremes, but how these extremes translate into health impacts depends on a range of factors. We recommend that the National Health and Climate Strategy brings together climate scientists with other experts in areas such as health professionals, policy, economics, first nations communities and disaster responders to establish an on-going dialogue across a wide stakeholder base which includes climate scientists. This will ensure that diverse perspectives and knowledge are captured to inform activities under the National Health and Climate Strategy.

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3. Which of the various types of greenhouse gas emissions discussed above should be in scope of the Strategy's emission reduction efforts?
N/A
4. What existing First Nations policies, initiatives, expertise, knowledge and practices should the Strategy align with or draw upon to address climate change and protect First Nations country, culture and wellbeing?
N/A
5. What types of governance forums should be utilised to facilitate co-design of the Strategy with First Nations people to ensure First Nations voices, decision-making and leadership are embedded in the Strategy?
N/A

Proposed Objective 1: Measurement

6. Beyond the schemes already noted above, is your organisation involved in any existing or planned initiatives to measure and report on health system emissions and/or energy use in Australia?
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N/A

7. What additional data and information is required to support targeted emissions reduction efforts within health and aged care?
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N/A

Proposed Objective 2: Mitigation

8. What do you think of these proposed focus areas for emissions reduction? Should anything else be included?
N/A
9. Which specific action areas should be considered relating to the built environment and facilities (including energy and water) , over and above any existing policies or initiatives in this area?
N/A
10. Which specific action areas should be considered relating to travel and transport , over and above any existing policies or initiatives in this area?
N/A
11. Which specific action areas should be considered relating to supply chain , over and above any existing policies or initiatives in this area?
N/A
12. Which specific action areas should be considered relating to medicines and gases , over and above any existing policies or initiatives in this area?
N/A
13. Which specific action areas should be considered relating to waste , over and above any existing policies or initiatives in this area?
N/A
14. Which specific action areas should be considered relating to prevention and optimising models of care , over and above any existing policies or initiatives in this area?
N/A
15. What can be done to involve private providers within the health system in the Strategy's emissions reduction efforts?
N/A
16. Where should the Strategy prioritise its emissions reduction efforts? a. How should the Strategy strike a balance between prioritising emissions reduction areas over which the health system has the most direct control and prioritising the areas where emissions are highest, even if it is harder to reduce emissions in these areas? b. Which of the six sources of emissions discussed above (on pages 13 to 18 of the Consultation Paper) are the highest priorities for action?

N/A

17. What 'quick wins' in relation to emissions reduction should be prioritised for delivery in the twelve months following publication of the Strategy?

N/A

Proposed Objective 3: Adaptation

18. What health impacts, risks and vulnerabilities should be prioritised for adaptation action through the Strategy? What process or methodology should be adopted to prioritise impacts, risks and vulnerabilities for adaptation action?

Q18i. What health impacts, risks and vulnerabilities should be prioritised for adaptation action through the Strategy?

Incorporating the latest scientific understanding of different risks of extremes provides critical insights into prioritising adaptation efforts in the National Health and Climate Strategy. By leveraging this knowledge, we can:

- allocate resources effectively,
- develop targeted interventions and,
- safeguard public health in the face of climate-related challenges.

Below is a selection of research from the Centre that demonstrates our work on key climate risks which impact health.

Heatwaves:

Heatwaves are prolonged periods of extreme temperature which can impact a wide range of sectors including public health. Heatwaves in Australia are becoming more frequent and lasting longer as shown by the Centre's researchers [1]. Heatwaves will continue to increase with climate change and may be 85% more frequent in Australia with global warming of 1.5-2°C [2]. Global warming also makes higher heat extremes possible. Importantly, local scale temperature extremes can increase at a significantly higher rate than the global average temperature increase rate [3].

High temperatures during heatwaves can lead to heat-related illnesses such as heat exhaustion and heatstroke, particularly affecting vulnerable groups including the elderly, children, indigenous populations and individuals with pre-existing health conditions. Moreover, heatwaves can exacerbate respiratory and cardiovascular diseases, trigger dehydration, and increase the risk of heat-related fatalities [4]. In addition to high temperatures, the combination of heat and humidity during heatwaves can further intensify the health risks. High humidity reduces the body's ability to cool itself through perspiration, leading to increased heat stress and discomfort. Research on heat stress and hospital admissions emphasises the need to choose suitable heat stress indices for modelling purposes [5].

Research led by our Centre has shown that high heat stress in urban areas pose a serious threat to human health [6]. Centre research has investigated the impact of urban land cover on thermal comfort, finding that increased grass and tree cover can reduce temperatures by 5°C [7]. Currently there is Centre research assessing the risk of heat stress as a function of socio-economic status and population density in Australia. This will provide insight into the vulnerability of different socio-economic groups and densely populated areas to heat stress in Australia. It is important to note that there is a probability that unknown health impacts may emerge due to increased temperatures. For example, Candida auris is a novel fungal disease which has emerged on three different continents, and generally affects immunosuppressed individuals. It may be the first example of a new fungal disease emerging where amongst other factors, climate change has contributed. [8].

Fire weather:

Fire is a natural part of the Australian climate which can cause injuries, loss of life and other health impacts. Exposure to hazardous pollutants and smoke particles during fire weather can cause respiratory problems, exacerbate existing respiratory conditions, and increase the risk of cardiovascular issues. Moreover, the smoke generated from fires can result in poor air quality, leading to respiratory irritation, eye irritation, and other health concerns for individuals, particularly those with pre-existing respiratory ailments. These impacts from bushfires are expected to increase with climate change (IPCC synthesis report) [9].

In Australia, extreme fire weather days have become more frequent, and the fire season has lengthened since 1950 in various locations. Projections indicate that fire weather events in Australia will continue to increase in intensity, frequency and duration [10]. Several significant fires in southern-eastern Australia, such as those in the Black Saturday bushfires [11,12], the 2003 Canberra bushfires [13], and the 1983 Ash Wednesday bushfires have occurred in recent times resulting in mortalities or increased health burdens [14, 15].

The events have coincided or worsened with the occurrence of strong cold fronts [16,17] passing through the region [18]. Cold fronts, which are associated with low pressure systems, bring significant changes in weather conditions as they move across southern Australia. Before a cold front arrives, hot and dry air from the northern interior is transported over the region due to the movement of air around the low-pressure system. These conditions create favourable environments for the ignition and spread of fires as shown by our centre's research [19]. The winds following the frontal passage predominantly come from the west, pushing the fire-front eastward and putting towns and communities that were previously not in danger at risk.

It is crucial to be aware of the changes in weather conditions and take necessary precautions to ensure safety [12,19]. Adaptation planning and disaster preparedness, in association with health responses, should align to ensure effective response to prevailing weather conditions and potential disasters.

Heavy rainfall and storms:

Heavy rainfall and storms can lead to flooding, which poses immediate risks to human life and safety [20] as well as damage to infrastructure. Documented health effects [Z] from flooding commonly include stress, anxiety and depression, as well as other conditions including dermatitis, increased asthma, arthritis, chest infections and the spread of waterborne diseases.

The east coast floods in 2022 were the costliest in Australia's history totalling \$5.45 billion in insured losses across Queensland and New South Wales [21]. Events like the east coast floods have lasting health effects with disadvantaged populations being particularly vulnerable. Notably, in the 2017 Lismore flood, more than 80% of the residents lived in the lowest socio-economic neighbourhoods [22]. Lismore, additionally, has a history of flooding, highlighting how compounding impacts of multiple disasters require on-going health services support. A compound event is caused by multiple hazards or drivers. In this case, a combination of meteorological phenomena caused persistent, heavy rain to fall on catchments that were already sodden and primed for flooding due to a second consecutive La Niña event. Persistent, stalled weather systems resulted in multiple flooding events exacerbating an already flooded area [23].

Rainfall trends vary across different parts of the country as shown by research undertaken by the centre [24, 25, 26, 27]. As the planet warms, the atmosphere's capacity to hold moisture is expected to increase globally. High intensity rainfall events are likely to increase with climate change, impacting the risk of flash flooding [28] however, rainfall is also expected to become more variable, with more frequent swings from extreme droughts to flooding rains [29].

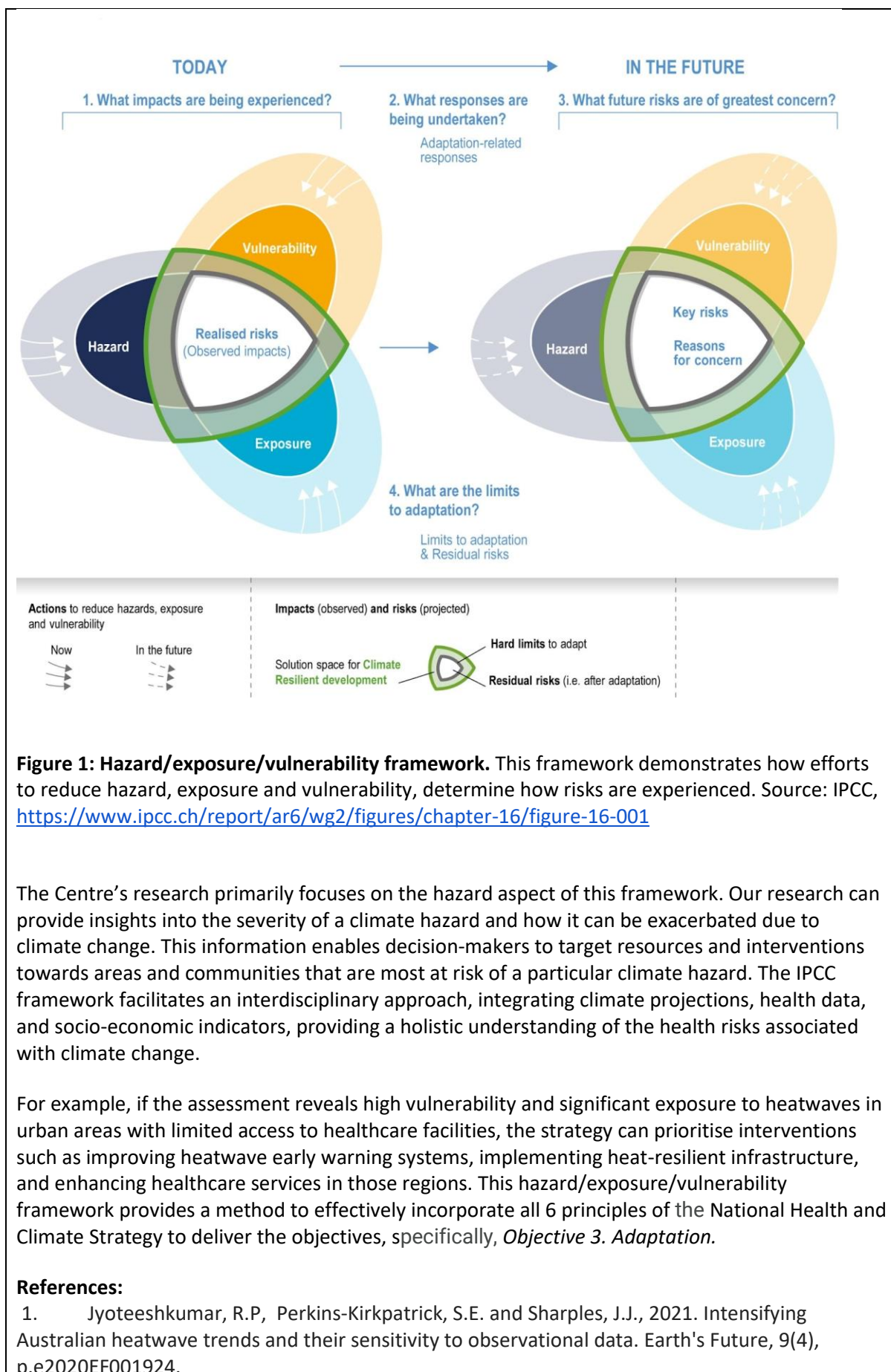
Any level of prediction of future rainfall extremes will be crucial in order to minimise the impacts. However, accurately predicting these extremes over longer timescales can be challenging. For instance, even in the case of the Lismore floods, we were unable to anticipate that the weather system would stall and result in significantly more rainfall than initially anticipated.

Emerging research provides insight into future changes in regional weather systems providing an opportunity for adaptation planning and preparation. In eastern Australia, low-pressure systems extending deep into the atmosphere are projected to occur less frequently but produce more extreme rainfall [30]. In Sydney, short, intense rainfall events have risen by 40% in the last two decades, leading to a higher risk of flash flooding and infrastructure damage [24]. In the north, tropical cyclones are anticipated to occur less often but contribute more strongly to extreme rainfall when they do occur [31]. The significance of location in policy matters is evident, as there is no universally applicable approach. Different regions within a country will exhibit distinct responses, emphasising the need for the National Health and Climate Strategy to account for local variations and circumstances.

18 ii. What process or methodology should be adopted to prioritise impacts, risks and vulnerabilities for adaptation action?

The Centre recommends using the hazard/exposure/vulnerability framework proposed by the Intergovernmental Panel on Climate Change (IPCC) [32]. This framework offers a valuable tool for prioritising health impacts and adaptation action. It encompasses three key components:

1. Hazard: identifying and assessing climate-related hazards such as extreme heat, flooding, or infectious diseases allows for a comprehensive understanding of potential health risks.
2. Exposure: evaluating the exposure of populations to these hazards, considering factors like geographical location, population density, and demographic characteristics, helps identify the most vulnerable groups.
3. Vulnerability: assessing vulnerability by considering socio-economic conditions, healthcare access, and adaptive capacity provides insights into the resilience and adaptive needs of different communities.



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19. Should the Australian government develop a National Health Vulnerability and Adaptation Assessment and National Health Adaptation Plan? If yes:
- a. What are the key considerations in developing a methodology?
 - b. How should their development draw on work already undertaken, for example at the state and territory level, or internationally?
 - c. What are the key areas where a national approach will support local/jurisdictional vulnerability assessment and adaptation planning?

N/A

20. Would there be value in the Australian government promoting a nationally consistent approach to vulnerability assessment and adaptation planning for the health system specifically, for instance by issuing guidance and associated implementation support tools for states, territories and local health systems? If yes, what topics should be covered to promote a nationally consistent approach? What examples of existing guidance (either from states/territories or internationally) should be drawn from?

N/A

21. What immediate high-priority health system adaptation actions are required in the next 12 to 24 months?

N/A

Proposed Objective 4: Health in All Policies

22. What are the key areas in which a Health in All Policies approach might assist in addressing the health and wellbeing impacts of climate change and reducing emissions?
N/A
23. What are the most effective ways to facilitate collaboration and partnerships between stakeholders to maximise the synergies between climate policy and public health policy? What are some successful examples of collaboration in this area?
N/A

Enablers

24. How could these enablers be improved to better inform the objectives of the Strategy?
Should any enablers be added or removed?

N/A

25. For each of these enablers:
a. What is currently working well?
b. What actions should the Strategy consider to support delivery?

The Centre will comment on:

- Enabler 2: Research
- Enabler 4: Collaboration

Enabler 2: Research

a) What is currently working well?

The development of the National Health and Climate Strategy is an instrumental first step in establishing links with health stakeholders and initiating further research. We support the government's fulfilment of their pre-election commitment [1] to setup a National Health and Climate Strategy and Minister Bowen's recognition of the effects of climate change alongside dementia, diabetes, cancer and other common threats, to wellbeing [2]. We agree that '*E2.1. A scan of current research activities pertaining to climate change and health*' is beneficial for the National Health and Climate Strategy to provide a starting point to understand current knowledge and gaps in our understanding.

Supporting Australia's research capacity is critical to understanding how the climate will affect the health sector and Australia's climate resilience. As outlined in the response to Question 2, an interdisciplinary approach is important to ensure that research efforts and findings are directly linked to health outcomes.

b) What actions should the Strategy consider to support delivery?

Additional actions to improve '*Enabler 2: Research*' include:

1. Increasing funding for health-related impacts due to climate change

Investment in climate science research is lacking. This limits Australia's research capacity in fundamental climate science as well as follow on investigations into health-related impact research. Climate researchers are working hard to get better information through various avenues e.g., increased process understanding, climate model development and provision of robust information at the local scale. The Centre recommends increased funding for fundamental climate science focused on the connection between the impacts of climate change and health outcomes.

2. Developing a national strategy for health and climate science research

We advocate for a national health and climate impacts research strategy that brings together existing capabilities across climate science and health and creates a common vision for the key research investigations that will underpin and inform the National Health and Climate Strategy. Greater co-design and knowledge of the requirements of the health sector would help frame applicable research topics. This can provide an evidence-base to inform actions under the National Health and Climate Strategy. This strategy

would be informed by the findings of 'E2.1. A scan of current research activities pertaining to climate change and health'. The national strategy would facilitate further scientific ambition, fund fundamental research and coordinate national research efforts.

Enabler 4: Collaboration

a) What is currently working well?

It is positive to see the Department of Health and Aged Care spearheading the development of the National Health and Climate Strategy. We urge the department to maintain this momentum and increase collaboration and an on-going dialogue between the federal government and health stakeholders.

An environment is emerging where the government is progressively more open to closer ties with academia. We have found, in our dealings with the government, that they are responsive and keen to provide leadership, as evidenced by recent interactions with the department. Public servants were keen to hear about our research and how we could help inform their policy development.

b) What actions should the Strategy consider to support delivery?

1. Recognising the value that climate scientists add to the National Health and Climate Strategy

Climate scientists can provide access to the latest research and guidance around best practice use of climate data. There is significant room for error when incorporating climate science data into the actions. For example, when considering the risk of flooding for a community, it is vital that appropriate metrics such as rainfall data and climate projections are chosen, otherwise an analysis is unlikely to provide useful insights for action.

2. Increasing opportunities for collaboration between health experts and climate scientists

Collaboration opportunities can assist with understanding complex information as well as utilising expertise when to bridge this gap between climate science and health adaptation. The Centre suggests increasing collaborative opportunities to assist with Australia's climate resilience task.

3. Invest in climate science communicators

There is a need for climate science communicators to broker knowledge to health experts. Knowledge Brokers from our Centre, who work to foster greater ties between climate science research and end users, are instrumental in engaging with government, industry and the public. We suggest that the department actively engage with knowledge brokers to facilitate relationships and maintain closer links across stakeholder groups.

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Thank you for taking the time to complete this survey – your feedback is greatly appreciated!

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