



HEALTHY ENVIRONMENTS AND LIVES CONFERENCE

HEAL 2021

17-18 November 2021

Abstracts

(parallel sessions)



Presentation type: oral

Theme: Clean Energy Solutions

Clean Energy for Healthy Environments and Lives in Central Australia and South India: The CE4HEAL project

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Abstract

CONTEXT: Australia and India have huge potential to generate affordable clean electricity from solar energy systems. However, the economic, environmental and health benefits from a transition to renewable energy are not fully appreciated. Most rural households in India use solid fuels; many Aboriginal and remote communities in Australia rely on polluting and expensive diesel for energy generation.

AIMS: This two-year project funded by the Australian Department of Foreign Affairs and Trade (DFAT) International Climate Change Engagement Program aims to: (1) Collect, synthesise and communicate examples of good practice in clean energy projects in rural and remote communities; (2) identify barriers and enablers for increased adoption of clean domestic energy solutions; (3) communicate their health, environmental, and economic benefits in rural/remote South India and Central Australia; and (4) enhance bilateral collaboration on clean energy solutions.

METHODS: We will carry out a range of engagement activities (surveys, interviews, focus group discussions, school art competitions) in targeted areas in rural/remote South India and Central Australia. This will involve co-design and dissemination of culturally appropriate and creative promotional materials, including co-production of videos on the benefits of clean household energy, as well as international exchanges to promote research and development and business opportunities.

OUTCOMES: Specific outputs of the project will include public lectures, webinars, factsheets, infographics, newsletters, videos, blogs, and artwork by Aboriginal or other local artists promoting clean energy solutions for better health. We will also produce technical publications on the benefits of domestic solar energy use, policy briefings on barriers and enablers for their adoption in rural/remote areas, and examples of successful implementation that can strengthen health equity. A key outcome will be the increased adoption of domestic solar systems and reduced solid/fossil fuel dependency in rural and remote communities in South India and Central Australia.

IMPACT: Strengthened bilateral relationships between Australia and India, and enhanced cooperation on cleaner, more efficient and healthier domestic energy solutions in rural and remote communities. This will result in reduced energy poverty, particularly for Aboriginal communities and rural villages, good practice sharing between communities in Australia and India, reduced greenhouse gas emissions from domestic energy generation in remote communities, and improved population health and planetary health equity.



Presentation type: oral

Theme: Aboriginal and Torres Strait Islander Knowledges and Knowledge Translation for building resilience to environmental change

Houses that Harm

Simon Quilty¹, Norman Frank Jupurrurla

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Abstract

The north of Australia has been increasingly suffering the impacts of climate change in the form of extreme heat for the past decade. Remote Indigenous housing standards and energy security are colliding with this new heat, and there are urgent implications for human health that are only one summer away. Here we will explore potential solutions and barriers that Mr. Frank Jupurrurla has experienced in attempting to institute adaptive infrastructure to his own house in Village Camp, Tennant Creek, and through this lens demonstrate what urgently needs to be done. And it's not what you might think.



Presentation type: oral

Theme: Food, soil and water safety and security in a changing environment

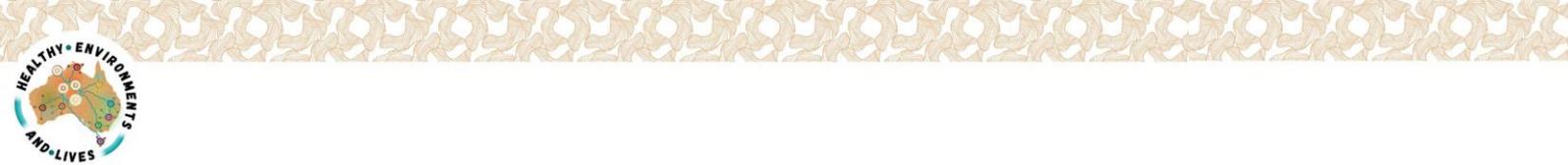
Generation Z and food preferences

Dora Marinova¹, Diana Bogueva¹

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Abstract

Generation Z (Gen Z) is the largest population cohort that has lived on this planet globally and in Australia. Born between 1995 and 2010, Gen Z is shaped very differently from any previous generations through high connectivity, intuitive engagement with technology and focus on solutions. It is also highly engaged with social and climate change issues while also displaying higher rates of anxiety and depression, partly linked to the environmental problems and climate emergency they are inheriting. This conference paper investigates Gen Z's food preferences within a planetary health framework. It uses data from a 2021 survey in Sydney, Australia which explores Gen Z's attitudes towards meat consumption. More than a third of the participants (38%) believe that livestock production and animal-based food consumption are having a very significant contribution for the deteriorating well-being of the planet. However, the majority of Gen Z has low awareness and understanding of the impacts of our food systems. These findings are consistent with other Gen Z studies across the world. A large section of Gen Z (41%) recognises the potential cultured meat has to become a viable nutritional source but more transparency about commercial interests and potential future impacts is needed. Gen Z is also identified as healthy eating trendsetters with preferences for fresh and wholesome foods, which makes them also turn their sight toward plant-based diets. Transitioning to better food systems requires a dietary shift and Gen Z is well-positioned to be an active part in this transformation, particularly if given the right information and the opportunity to solve associated problems. There is no doubt that Gen Z will be a disruptor generation with a profound impact on the food systems and the food industry globally and in Australia as well as on other issues related to climate change and environmental care.



Presentation type: oral

Theme: Rural and remote health

Drought-related Stress Among Farmers During the Millennium Drought

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Abstract

Drought is a threat to public health in many places around the world. Our study investigated general and drought-related stress experienced by farmers at both the personal and community levels, and whether socio-demographic and community factors influence this stress. We conducted multivariate analysis of data from the Australian Rural Mental Health Study (ARMHS), a longitudinal cohort study (2007–2013) in non-metropolitan New South Wales (NSW). The study population included 664 ARMHS participants (at baseline) who identified as living or working on a farm. The main outcome measures were personal drought-related stress (PDS), community drought-related stress (CDS), and general psychological distress (K10 score). We found that farmers who were under 35, both lived and worked on a farm, experienced greater financial hardship, and were in outer regional, remote or very remote NSW reported PDS particularly frequently. Mild wet weather during the prior 12 months reduced PDS and CDS but increased general psychological distress. Moderate or extreme wet weather did not affect PDS or general distress, but moderate wet weather was associated with increased CDS. Drought-related stress and general psychological distress were influenced by different socio-demographic and community factors. We concluded that farmers in NSW experience significant stress about the effects of drought on themselves, their families, and their communities. Farmers who are younger, live and work on a farm, experience financial hardship, or are isolated are at particular risk of drought-related stress. Funding aimed at supporting farmers during drought must target these vulnerable populations, to ensure help is provided where it is needed most, and to enhance opportunities for successful adaptation.



Presentation type: oral

Theme: Urban health, built environment and nature based solutions

Restoring health-promoting microbial biodiversity – a role for biodiverse plant-soil systems

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Abstract

Maintaining a healthy immune system has never been more important, with globally escalating rates of allergies, auto-immune, and chronic inflammatory diseases, and in the face of novel viruses such as COVID-19. Evidence is growing of a critical role for exposure to natural microbial diversity in building immune fitness, supplementing our human microbiome, and enhancing resistance to both infectious and non-infectious diseases. The human microbiome plays an active role in defending against pathogenic organisms, while human and environmental microbiomes can trigger immune-signaling pathways (particularly via the gut) with potential to impact the whole body – activating either defensive inflammation or tolerance of normally harmless agents. The human microbiome is intimately linked to our health and establishes from an early age, strongly influenced by environmental sources. Soils are of particular interest as a rich source of microbial diversity, and natural biodiversity in soils often associates with the biodiversity of aboveground ecosystems. This talk will introduce emerging evidence of health-promoting microbial diversity with a focus on biodiverse plant-soil systems. Works include a spatial epidemiology study spanning regional Australia that links ambient exposure to microbially diverse soils with a reduced risk of infectious and parasitic disease; field-scale microbiome work suggesting that opportunistic and potentially pathogenic bacteria in soils may be suppressed under ecosystem restoration; and a pioneering mouse-model study that found the gut microbiome could be influenced by trace-level exposures to biodiverse soil dust with potential to result in benefits for mental health. Restoring accessible green space in our urban centres can support multiple pathways of health protection, however optimal health benefits may not be achieved if important, yet understudied, health-promoting pathways are overlooked in new urban green space design.



Presentation type: e-poster

Theme: At-risk populations, early life effects and life-course solutions

“Cyclone Babies”: Maternal Accounts of Pregnancy During Severe Cyclone Events in Queensland, Australia: Preliminary Findings.

Cynthia Parayiwa¹, Alison Behie¹

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Abstract

Climate change is increasing the frequency and intensity of tropical cyclones while population growth and ongoing coastal settlement is increasing human impact. Prenatal stress during an extreme weather event can negatively impact maternal mental health and have immediate and long-term impacts on her child. The aim of this study was to explore the experiences of women pregnant during cyclones in Queensland, Australia. Participants meeting these criteria completed an online questionnaire and could volunteer to participate in more detailed semi-structured interviews conducted from June to July 2020. Twelve women were interviewed, and transcripts were examined using thematic analysis. Here we present preliminary findings on elements of their experiences that contributed to their perceived stress. Experiences were spread across three main themes: (1) "Drivers of risk perception" describing factors that contributed to the risk a mother perceived she was in, (2) "Awareness and evaluation of cyclone risk communication" describing a mother's positive and negative experiences of navigating both formal and informal cyclone communication, and (3) "Maternal appraisal of the overall event" describing personal reflections on the experience. Although interviewed mothers identified multiple areas as amplifying their perceived levels of stress, they also shared areas that contributed to increasing resilience originating primarily from past experiences and their support networks. Pregnant women are already identified as a priority group in Australia's risk management guidelines. However, more work is needed to understand what individual factors can increase or mitigate the levels of stress experienced during severe weather events by this group. This study will provide insight into maternal vulnerability and resilience factors to inform the ongoing work of disaster researchers and risk management personnel.



Presentation type: e-poster

Theme: Biosecurity, COVID-19 and emerging Infections in the context of environmental change

COVID-19 and Climate Change – Present Discourse and Future Pathways

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Abstract

The COVID-19 pandemic has dominated public discourse, to some extent crowding out other important issues such as climate change, and fundamentally reshaping our views of the future. Across four studies, we investigated (1) whether framing climate change in direct relation to COVID-19 affects people's climate-change concerns and migration support, and (2) whether people prefer a conservative "back to normal" recovery pathway that foregrounds economic factors, or a sustainable and progressive "build back better" approach that seeks to address global problems such as inequality and climate change. Re (1), we found that portraying climate change as a concern that needs to take a "back seat" while focus lies on economic recovery decreased mitigation support (and to a lesser extent climate-change concerns) in a representative sample of US participants. An intervention combining inoculation and refutation treatments was only able to partially offset this negative impact. Re (2), we found that a representative sample of UK and US residents prefer a progressive future to a return to normal, while underestimating how much others want the progressive scenarios and overestimating how much others want a return to normal. This highlights the importance of message framing and the publicizing of public opinion for genuine and evidence-based public discourse on future pathways.



Presentation type: e-poster

Theme: Bushfires, air pollution and other extreme events and their impact on physical, mental, and community health

Perceptions versus behaviour: an early exploration of types of preparedness measures related to disaster and extreme events

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Abstract

Preparedness plays a key role in the capacity of individuals, households and businesses to respond effectively to a disaster or extreme event. To understand and effectively utilise knowledge related to preparedness in order to maximise impact, it is important to appreciate that preparedness can be gauged in different ways, each offering a related, yet distinct, perspective. We explored two different preparedness measures, a perceptions perspective (i.e. self-rating how prepared you feel) and a more formal preparedness index of behaviours, and compared responses on these across two key groups: those who had experienced a disaster/extreme event within the previous 12 months, and those who had not. Data were collected via the 2020 Queensland Fire and Emergency Services Community Insights Survey. The online survey received responses from 2,100 adults located throughout Queensland, providing a sample weighted to reflect the population in terms of region, age and gender. The preparedness index within the survey was based upon the number of activities an individual had completed to prepare their household for an emergency or disaster event, such as having developed a fire plan for their property. We found that those who had experienced an actual disaster/extreme event in the preceding year scored significantly higher than those who had no such experience on the more formal preparedness index measure. This disparity was not apparent, however, on perceived preparedness ratings which did not differ between the same groups. The findings suggest a dissociation between perception measures versus more formal indices, and the need to appreciate this separation when considering the formulation of evidence-based preparedness strategy and policy for individuals and communities.



Presentation type: e-poster

Theme: Bushfires, air pollution and other extreme events and their impact on physical, mental, and community health

Heat-related illness among small-scale farmers in Vietnam and associated factors

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Abstract

OBJECTIVE: This study aims to examine the prevalence of heat-related illness (HRI) and its associated factors among small-scale farmers in Central Vietnam.

METHODS: A cross-sectional study was conducted with 379 farmers from August-September 2021 in Hatinh province, Vietnam. A survey using a structured questionnaire was implemented to collect demographic information, farming activities, the level of heat exposure, and participants' health issues over the previous harvest season (August 2021). Multivariate logistic regression was used to identify risk factors for self-reported HRI symptoms.

RESULTS: 83.9% of farmers experienced at least one HRI symptom, and 56.2% had two or more HRI symptoms during the last month. Factors significantly associated with two or more HRI symptoms were age, farming tasks, having cardiovascular disease, and the number of hours working in the heat. Farmers working 4 hours or more between 8 am-4 pm were 2.3 times more likely to experience HRI symptoms than those working less than two hours. A higher risk of HRI symptoms was also associated with the heavy working task (OR=2.29, 95% CI: 1.35-3.88) and having cardiovascular diseases (OR= 3.23, 95% CI: 1.87-5.59). In contrast, a lower risk of HRI was found in the older group (60 years old and above) compared with farmers under 60. (OR=0.52, 95% CI=0.3-0.86).

CONCLUSIONS: Working in the hot weather is a significant occupational health risk for small-scale farmers in Vietnam. Changing the working schedule and arranging the work appropriately should be considered in HRI prevention strategies, especially for farmers with chronic conditions such as cardiovascular diseases.



Presentation type: e-poster

Theme: Bushfires, air pollution and other extreme events and their impact on physical, mental, and community health

Short-term Health Impacts of the 2019–20 Australian Bushfires

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¹Australian Institute of Health and Welfare

Abstract

In 2019–20, Australia experienced its worst bushfire season on record. With climate change predicted to increase the frequency and severity of bushfires, there has been increasing interest in the health impacts of bushfire events. Bushfires and associated impacts such as smoke pollution, can affect large parts of the population and a range of aspects of health such as respiratory, cardiovascular and mental health. Because of the duration of impact of the 2019–20 bushfire season, analysis of the health impacts of these kinds of fire events is of considerable interest. In 2020, the Australian Institute of Health and Welfare analysed a range of data sources to assess the short-term impacts of the 2019–20 bushfires, including NSW emergency department presentations, visits to GPs, bushfire-specific mental health MBS services and respiratory medication sales and dispensing. During periods of poor air quality, there were distinct increases in emergency department presentations for respiratory conditions and in sales of prescription and other medication for the relief of respiratory symptoms. A recent 2021 data update complemented these data by analysing data on hospitalisations, emergency department presentations and MBS mental health data for all jurisdictions, as well physical activity tracking (Strava) data in the Australian Capital Territory. The results of these analyses will be discussed. Understanding the likely health impact of natural disasters offers the potential to better prepare for events that may occur in the future. Data may assist communities and local government, as well as state and federal governments with disaster preparedness, response and resilience. There is scope to examine the medium and long-term effects of the bushfires on health, and to investigate topics such as perinatal health or vulnerable populations as well as to explore options to analyse or publish data at finer spatial and temporal scales.



Presentation type: e-poster

Theme: Bushfires, air pollution and other extreme events and their impact on physical, mental, and community health

Mental health, exposure severity and resilience-building after the 2019-20 Black Summer Bushfires

Timothy Heffernan¹, Emily Macleod¹, Lisa Greenwood¹, Iain Walker¹, Samantha Stanley¹, Rachael M Rodney², Jo Lane³, Olivia Evans¹, Stewart Sutherland⁴, Julia Reynolds¹, Nagesh Pai⁵, Emily Lancsar³, Tim Kurz⁶, Tegan Cruwys¹, Bruce Christensen¹, and Alison Calear³

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Abstract

The 2019-20 Black Summer Bushfires were the most severe and prolonged bushfires in Australia's recorded history. Health and wellbeing impacts of bushfire can vary widely, with some people and communities demonstrating relative resilience, recovery, and even growth, while others experience significant emotional distress and health and wellbeing impacts that extend many years beyond the fires. To examine the impacts of the 2019-20 bushfires on health and wellbeing for individuals across Australia, and factors affecting resilience and growth, we conducted an online, nation-wide survey measuring mental health and wellbeing, resilience, and coping behaviours (N = 3094 adults). Noting the expanse, duration, and intensity of the 2019-20 fires, a scale of bushfire exposure is used to categorise (High, Medium or Low) and to evaluate diverse experiences of bushfire severity. Mental health outcomes of bushfire and non-bushfire-affected Australians are described across each of the three categories, with outcomes including anxiety, depression, PTSD, stress, and wellbeing. As bushfires pose an ongoing threat, there is urgent need to identify Australian-specific factors that promote coping and resilience and reduce the recovery timescale from bushfire. These findings can inform ways to support vulnerable individuals most at risk of poor long-term mental health. The research can further inform ongoing collaborative research with bushfire-affected communities to identify practical strategies to support wellbeing needs and to promote resilience and recovery in bushfire-affected areas.



Presentation type: e-poster

Theme: Bushfires, air pollution and other extreme events and their impact on physical, mental, and community health

Physical and Mental Health Effects of Bushfire and Smoke in the Australian Capital Territory

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Abstract

The 2019–20 bushfire season in south-eastern Australia was one of the most severe in recorded history. Bushfire smoke-related air pollution reached hazardous levels in major metropolitan areas, including the Australian Capital Territory (ACT), for prolonged periods of time. Bushfire smoke directly challenges human health through effects on respiratory and cardiac function, but can also indirectly affect health, wellbeing and quality of life. Few studies have examined the specific health effects of bushfire smoke, separate from direct effects of fire, and looked beyond physical health symptoms to consider effects on mental health and lifestyle in Australian communities. This paper describes an assessment of the health impacts of this prolonged exposure to hazardous levels of bushfire smoke in the ACT and surrounding area during the 2019–20 bushfire season. An online survey captured information on demographics, health (physical and mental health, sleep) and medical advice seeking from 2,084 adult participants. Almost all participants (97%) experienced at least one physical health symptom that they attributed to smoke, most commonly eye or throat irritation, and cough. Over half of responders self-reported symptoms of anxiety and/or feeling depressed and approximately half reported poorer sleep. Women reported all symptoms more frequently than men. Participants with existing medical conditions or poorer self-rated health, parents and those directly affected by fire (in either current or previous seasons) experienced poorer physical, mental health and/or sleep symptoms. Approximately 17% of people sought advice from a medical health practitioner, most commonly a general practitioner. This study demonstrated that prolonged exposure to bushfire smoke can have substantial effects on health. Holistic approaches to understanding, preventing and mitigating the effects of smoke, not just on physical health but on mental health, and the intersection of these, are important.



Presentation type: e-poster

Theme: Bushfires, air pollution and other extreme events and their impact on physical, mental, and community health

How effectively do heatwave definitions capture mental health outcomes? A population-based longitudinal investigation from rural Australia

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Abstract

Heatwaves are a common natural hazard in Australia. While the association between heatwaves and decreased mental health is recognised, little is known about the differences in mental health impacts of heatwaves for different demographics. Using longitudinal dataset from the Australian Rural Mental Health Study, this study investigates relationships between heatwave exposure, individual characteristics, and mental health of people from rural/regional New South Wales, Australia. The mental health effects of heatwaves were found to differ considerably according to heatwave definitions, marital status, and employment status. Specifically, the measure of heatwaves that bases on daily maximum temperatures did not detect negative effects of heatwaves on mental health, while the measure that bases on both maximum and minimum temperatures to account for the excess heat (the heat is not sufficiently discharged overnight due to unusually high overnight temperature) confirmed a significant relationship between heatwaves and mental health. In other words, the maximum temperature was not important on its own, but there were negative mental health effects where the temperature did not cool down overnight. This sensitivity of the results to different heatwave definitions is important to recognise and consider when using results from empirical studies to inform funding and policy decisions aimed at improving mental health and climate resilience.



Presentation type: e-poster

Theme: Bushfires, air pollution and other extreme events and their impact on physical, mental, and community health

We know drought affects mental health but the devil is in the details

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Abstract

It is widely recognised that living through a drought period negatively affects mental health. However, little is known about (i) whether longer drought duration has greater negative effects on mental health, especially when the drought lasts for years and (ii) how long poor mental health persists after a drought has ended. This study uses longitudinal data from the Australian Rural Mental Health Study to investigate the effects of drought on mental health, and how these effects change with continued exposure to drought conditions. A nonlinear (inverted U-shape) relationship between drought exposure and mental health was found where drought exposure initially led to increased psychological distress, and subsequently, after 2.5-3 years of drought exposure, distress begins to decrease. This finding is maintained after controlling for demographic, social, and environmental factors. We also found that while psychological distress decreases in the later stages of drought, factors such as life satisfaction decreased as drought persisted. This is important as it highlights the need for sustained support to mitigate the long-term effects of drought on mental health that persist after the drought has apparently finished.



Presentation type: e-poster

Theme: Bushfires, air pollution and other extreme events and their impact on physical, mental, and community health

Psychometric Evaluation and Revision of the Solastalgia Subscale from the Environmental Distress Scale (EDS)

Bruce Christensen¹, Conal Monaghan, Samantha K. Stanley, Iain Walker, Stewart Sutherland, Julia Reynolds, Zoe Leviston, Alison L. Calear, Olivia Evans, Lisa-Marie Greenwood, Tim Heffernan, Tim Kurz, Jo Lane, Emily Macleod, Rachael M. Rodney

¹Australian National University, 0200

Abstract

The COVID-19 pandemic has dominated public Solastalgia refers to the negative emotional experience caused by witnessing degradation and loss to one's home environment. The 9-item Solastalgia subscale, from the Emotional Distress Scale, has been used to measure this construct. However, examination of its psychometric properties has been limited. Here, using a large adult sample (N=2084) from the Australian Capital Territory and surrounding areas of New South Wales surveyed soon after the 2019/20 Australian bushfires, we apply exploratory and confirmatory factor analyses to confirm the scale's unidimensionality. Further analyses, derived from Item Response Theory, highlighted the poor psychometric performance and redundant content of specific items. Consequently, a short-form scale, consisting of five items, is recommended. The short-form scale is also unidimensional and yielded excellent model fit in both initial (e.g., CFI = .999) and cross-validation (e.g., CFI = .998) samples. It also manifested strong correlations with its parent scale ($r = .97$) and internal consistencies across both samples (Sample 1 $\alpha = .88$; Sample 2 $\alpha = .88$). Using further data collected throughout Australia (N = 1740), we show that the pattern of associations between demographic, health, life satisfaction, climate emotion, nature connectedness variables and both the parent and short-form scales were very similar. Finally, multi-group confirmatory factor analysis demonstrated comparable construct architecture (i.e., configural, metric, and strict invariance) across validation samples, gender categories, and age. These findings suggest that the short-form scale can also facilitate meaningful comparisons between samples and demographic groups. As individuals and communities increasingly confront and cope with climate change and its consequences, the assessment and monitoring of mental health variables is crucial. This study introduces an economical (5-item) and psychometrically sound measure of solastalgia – the Brief Solastalgia Scale.



Presentation type: e-poster

Theme: Bushfires, air pollution and other extreme events and their impact on physical, mental, and community health

Housing and Health Trajectories Post Natural Disaster Events

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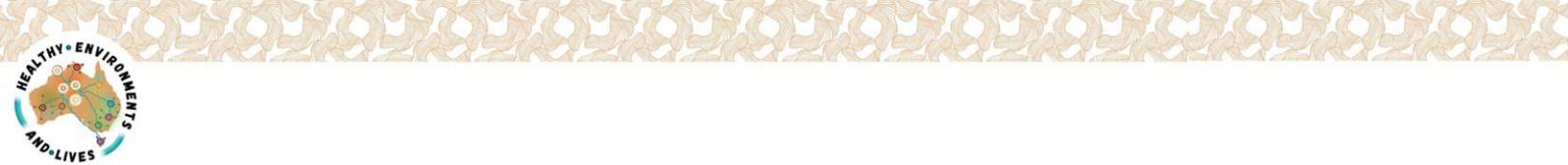
Abstract

INTRODUCTION: Extreme weather disasters have profound health consequences and can result in damage to people's homes destabilising their recovery from the event. We assess the effect of these disasters on housing over time and how this impacts on mental health.

METHODS: Using the Household, Income and Labour Dynamics survey in Australia, we describe people's housing circumstances following a flood, bushfire or cyclone. We use dynamic modelling of trajectories to describe their housing tenure, stability and mental health before and after experiencing an extreme weather event.

RESULTS: Two thousand and three respondents were exposed to natural disasters that damaged or destroyed their homes. The groups most at risk include older people (greater than 40 years), people located in regional or remote regions, people residing in socioeconomically disadvantaged areas, people who identify as Aboriginal and Torres Strait Islander, people in households with low incomes, and people with long-term health conditions. Around 30% of people who experienced an event moved house subsequently, compared to an average mobility rate of 18% among people unaffected. Mental health was observed to decrease significantly in the year of the event (SF-36: -1.09, 95%CI -2.01, -0.18; Kessler:1.46, 95%CI 0.74, 2.18) but to have improved one-year post-disaster to a level insignificantly different from pre-disaster. However, those who relocated had decreased mental health over time, compared to relatively stable mental health among those who remained in their homes.

CONCLUSIONS: Natural disasters impact most on socio-economically vulnerable groups. The protective potential of assistance with housing following disasters warrants more research attention.



Presentation type: e-poster

Theme: Bushfires, air pollution and other extreme events and their impact on physical, mental, and community health

Drought, wellbeing and adaptive capacity in drought- affected New South Wales (NSW)

Emma Austin¹, Tonelle Handley², Anthony Kiem¹, Jane Rich³, David Perkins², Brian Kelly⁴

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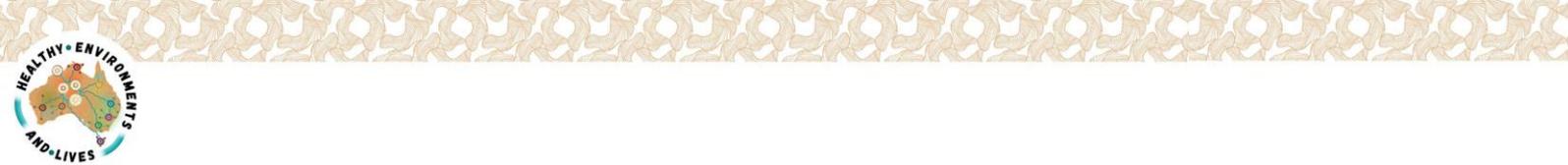
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Abstract

Individual and community adaptive capacity is important when responding to the impacts of drought. However, little is known about the relationship between wellbeing and adaptive capacity, and whether increased wellbeing can lead to improved adaptive capacity (or vice versa). Our study explored the relationship between drought, wellbeing and adaptive capacity to provide insights that will inform actions to enhance adaptive capacity, and hence increase opportunities for effective drought adaptation. The theory of salutogenesis and the associated sense of coherence (SOC) are used to measure adaptive capacity and to explain why some individuals remain well and adapt to adversity while others do not. The study population (n = 163), comprised of rural residents in drought-affected New South Wales (NSW), completed an online survey during November 2018 to January 2019. Linear regression was used to model the relationships between SOC, sociodemographic factors, drought and wellbeing. Findings demonstrate that SOC is strongly correlated with wellbeing. Drought condition did not influence adaptive capacity, although adaptive capacity and drought-related stress were only weakly correlated. Increased wellbeing was found to be associated with stronger adaptive capacity and therefore, an individuals' capacity to cope with adversity, such as drought. Efforts to increase the wellbeing of drought-affected rural residents could increase adaptive capacity, resulting in more opportunities for successful adaptation to drought.



Presentation type: e-poster

Theme: Bushfires, air pollution and other extreme events and their impact on physical, mental, and community health

How effectively do drought indices capture health outcomes in rural Australia?

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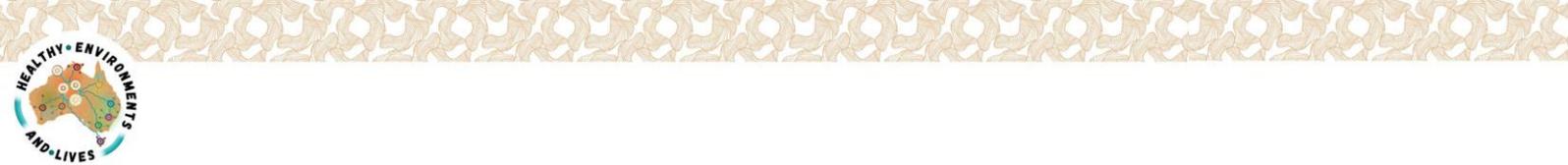
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Abstract

Understanding the relationship between drought and wellbeing is important. This study tests whether the relationship between drought and wellbeing changes if different drought indices were used. A thorough understanding of the relationship between drought and wellbeing must consider the (i) duration, frequency, and magnitude of drought; (ii) different types of drought; and (iii) the individual context of specific locations, communities, and sectors. For this reason, we used a variety of drought types, drought indices, and time windows to identify the thresholds for wet and dry epochs that enhance and suppress impacts to wellbeing. Our findings demonstrate that the relationship between drought indices and wellbeing outcomes differs temporally, spatially, and according to drought type. The relationship is also impacted by drought index and time window. This is significant, because it is typical for empirical drought studies to arbitrarily select which drought index to use. However, our findings highlight the need to objectively choose drought indices for individual contexts. Using the most appropriate drought indices will improve the usefulness of policy interventions and community-based programs aimed at supporting people affected by drought. Future research that investigates the relationship between drought indices and wellbeing should also consider the moderating sociodemographic factors of age, remoteness, and financial position. For funding, community programs, and interventions to result in successful adaptation, it is essential to critically choose which drought index, time window, and wellbeing outcome to use in empirical studies. The uncertainties associated with these relationships must be accounted for, and it must also be realized that results will differ on the basis of these decisions.



Presentation type: e-poster

Theme: Bushfires, air pollution and other extreme events and their impact on physical, mental, and community health

Use of asthma and antihistamine medicines is associated with exposure to smoking, not ambient air pollutants in a wastewater-based epidemiology study

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Abstract

BACKGROUND: Air pollution and first and second hand exposure to tobacco smoking have been reported to trigger asthma and allergic diseases. In this study, we assessed the association in the population between use of asthma and allergy medications and the ambient level of air pollutants (PM_{2.5}, PM₁₀, SO₂, NO₂, CO, and O₃) and population measures of tobacco smoking in wastewater.

METHODS: Daily wastewater samples were collected from a wastewater treatment plant serving a population of around 500,000 people in Guangzhou between November 2017 and October 2018. We measured biomarkers of the use of asthma and antihistamine medicines and exposure to tobacco smoke. Corresponding daily concentrations of air pollutants were obtained from the nearest air quality monitoring stations. Time-series linear regression with a natural cubic spline function was used to assess association between air pollutants, smoking exposure and the use of medicines.

FINDINGS: As expected there was a significantly higher use of antihistamine medicines in spring and in autumn, associated with peak pollen levels. There was no significant association between biomarkers of salbutamol and antihistamine use in wastewater and ambient air pollutant levels. There were significant positive associations between biomarkers of tobacco smoke exposure and salbutamol and antihistamines use. An increase in nicotine biomarker equivalent to smoking of 1 cigarette/person/day was associated with an increase of about 29 (95%CI: 17-42) µg/person/day of salbutamol, 1.3 (95%CI: 1.1-1.4) µg/person/day of cetirizine and 2.1 (95%CI: 1.9-2.5) µg/person/day of fexofenadine load in wastewater.



Presentation type: e-poster

Theme: Data and decision support systems for environmental health applications

Impact of environmental factors on prominent diseases prevalent in New South Wales, Australia.

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Abstract

Distinct case studies and analysis of environmental issues as well as diseases affecting humans have been done in various parts of the world. The results of all such expositions have provided varying explanations and interpretations. A unique subset of such published revelations happens to be causal studies that infer towards the impact of certain environmental factors on incidence frequencies of some diseases that afflict humans. Occurrence of such frequencies in a periodic manner generate interesting time series that could be utilized to develop future forecast predictions known as projections. Such an exercise establishing causality and generating projections for future public health service planning requirements of the state of New South Wales (NSW), based on the effect of environmental variables on the health of its residents, is assessed and presented as a contribution in this paper.



Presentation type: e-poster

Theme: Data and decision support systems for environmental health applications

Average Ambient UVB and Osteoporosis in the Participants of the UK Biobank

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Abstract

Osteoporosis is a progressive bone disease characterised by low bone density and micro-architectural deterioration of bone tissue. Consequences include fractures and falls, which are associated with morbidity, mortality, and high economic costs. Vitamin D is important for bone health, and humans synthesise it through exposure to solar irradiation. Studies have shown the beneficial effect of long-term solar ultraviolet B exposure, although evidence regarding long term solar UVB exposure for weighing risks against the benefits is limited. This study addresses the hypothesis that increased average ambient UVB exposure across a lifetime might have a beneficial effect on preventing osteoporosis in later life. The study applied a cross-sectional method utilising baseline measures from the United Kingdom Biobank cohort. The final sample included 186,844 (37%) participants aged 40-69 years at recruitment during 2006 to 2010 with heel sonography measurements and had UVB data. We followed the World Health Organization criteria to define the outcome variable osteoporosis, where osteoporosis was determined by a T score of heel -2.5 Standard Deviation or below. The average ambient UVB was estimated by taking the weighted average of the ambient UVB at birthplace and place of baseline residence of the participants. Covariates such as age, sex, body mass index, ethnicity, smoking, alcohol intake frequency, use of sunscreen, intake of oily fish and vitamin D supplement, number of days/weeks of moderate and vigorous physical activity as well as outdoor activities in summer and winter and socio-economic deprivation were included. Descriptive and logistic regression analyses were performed to estimate odds ratios for the associations between exposure and outcome while adjusting for possible confounders. No association was found between lifetime average ambient UVB and osteoporosis. The novel part of this study is satellite-derived UVB measures as a proxy for vitamin D status.



Presentation type: e-poster

Theme: Rural and remote health

Difference in prevalence of depression and anxiety among young rural and urban Australians: A systematic review and meta-analysis.

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Abstract

BACKGROUND AND AIMS: In Australia, depression and anxiety are major public health concerns because of their onset during adolescence. While rural areas experience overall lower health outcomes, it is unclear if there is a variation specifically in depression and anxiety prevalence between rural and urban Australia among the young people. This paper aims to compare the pooled estimate of prevalence for depression and anxiety between urban and rural studies in the age group of 10-24 years.

METHODS: A systematic literature search of five databases was performed. Studies published between January 2000 to December 2020 were included. Meta-analysis was used to synthesize data. The prevalence of depression and anxiety comparison between rural and urban Australia was estimated by heterogeneity test using I² statistic. To assess publication bias, both funnel plots and Egger's tests were also adopted.

RESULTS: The analysis used 9 studies with a total of 6624 participants. (25-2833 per study). The pooled prevalence of depression and anxiety for urban areas was 26.2% and of rural areas was 19.9%. Subgroup comparison between urban and rural areas gave a heterogeneity I² score of 96.9%.

CONCLUSIONS AND SIGNIFICANCE/IMPACT: This review and analysis identified higher prevalence of depression and anxiety in urban areas compared to rural areas. Despite urban areas having better health outcomes, rural areas seemingly have lower prevalence rates. However, this calls for further research on healthcare access, mental health literacy and help-seeking attitude among the rural population of Australia. This research identifies the gap between mental healthcare access and the high mental healthcare expenditure driven by stigma and mental health illiteracy especially in rural areas, which could also contribute to reporting lower prevalence of mental health conditions. No study in Australia performed a systematic review in this topic for the age group.



Presentation type: e-poster

Theme: Science communication, citizen science, and risk perception

Extending Conservation Engagement Through Collaboration Between Art and Science

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Abstract

This paper explores how environmental engagement with endangered species can be extended if science and the arts collaborate. It uses the case study between Malaysian sun bear expert Dr Wong Siew Te and Australian Doctor of Creative Arts, Dr Sarah Pye to illustrate. Much of what we know about the conservation of sun bears is thanks to Malaysian ecologist Dr Wong Siew who began studying them as a master's student in the 1990s. He is now CEO and Founder of the Bornean Sun Bear Conservation Centre in Sabah, Malaysia. This facility is on the cutting edge of sun bear research, welfare, education and rehabilitation. Dr Wong has been able to communicate his groundbreaking work more effectively through interdisciplinary collaboration. Dr Sarah Pye's wrote the narrative biography of Dr Wong, *Saving Sun Bears*, which was published in 2020. It was written as part of her Doctor of Creative Arts as a means of engaging non-specialist audiences in conservation. Dr Pye is now writing the *Wildlife Wong* series of books for young readers about different rainforest species which engage them in narrative, informational text and science experiments. She has developed accompanying workshops and an online kids' club which further extend conservation engagement and align with the Australian curriculum. Such communication tactics have the capacity to broaden conservation reach and positively impact motivation to preserve endangered species for subsequent generations.



Presentation type: e-poster

Theme: Science communication, citizen science, and risk perception

Integrating Citizen Science and Mosquito Monitoring to Improve Public Health

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Abstract

Mosquito-borne diseases have been increasing in several countries globally. As there is no vaccine for most of these diseases, managing mosquito populations is still the most effective way to prevent them. Mozzie Monitors is a citizen science mosquito monitoring program launched in 2018 at the University of South Australia aiming to increase knowledge about mosquito community composition across the country and raise awareness of mosquito-borne diseases risks amongst the participants. Also, as a citizen science initiative, Mozzie Monitors aims to increase connectivity and facilitate discussions between the broad community and researchers in the field. The program has been running for three years and has effectively engaged the public in data collection. Citizen scientists have collected mosquitoes of ecological and medical importance from their backyards using a mosquito trap and sending images of their catch for identification. Participants reported being motivated to participate in citizen science and help their communities to prevent mosquito-borne diseases risks; they also showed increased knowledge about mosquitoes in their local areas after participating in the trials. Early in 2021, we organised the Mozzie Month intervention, a six-week trial to upscale the local interventions to national implementation. Different states simultaneously collected 1025 mosquitoes of eight species, including vector mosquitoes. Mozzie Monitors is growing and exploring opportunities to upscale methods and geographic coverage of this citizen science engagement. There is also a network of participants in the iNaturalist platform, sharing geotagged observations of mosquitoes. This method has provided real-time information regarding the diversity and distribution of the reported species, whereas the trap-system has yielded mainly data of diversity and abundance. The use of low-cost technology has allowed remote participation in all methods tested.



Presentation type: e-poster

Theme: Urban health, built environment and nature based solutions

The Potential of Outdoor Environments to Supply Beneficial Butyrate-Producing Bacteria to Humans

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Abstract

Butyrate is an important mediator of human health and disease. The mechanisms of action of butyrate are becoming increasingly well-known. Many commensal bacteria that inhabit the human gut can synthesise butyrate, which is then absorbed into the human host. Simultaneously, several immune- and inflammatory-mediated diseases are being linked to insufficient exposure to beneficial microbes from our environment, including butyrate-producing bacteria. However, the role of outdoor environmental exposure to butyrate-producing bacteria remains poorly understood. Here we review the literature on the human exposure pathways to butyrate-producing bacteria, with a particular focus on outdoor environmental sources (e.g. associated with plants, plant-based residues, and soil), and the health implications of exposure to them. Emerging evidence suggests that environmental butyrate-producers may help supplement the human gut microbiota and represent an important component of the Biodiversity and Old Friends hypotheses. Improving our understanding of potential sources, precursors, and exposure pathways of environmental butyrate-producers that influence the gut microbiota and butyrate production offers promise to advance multiple disciplines of health and environmental science. We outline research priorities to address knowledge gaps in the outdoor environment-butyrates-health nexus and build knowledge of the potential pathways to help optimise exposure to human-beneficial butyrate-producing bacteria from the outdoor environment during childhood and adulthood.



Presentation type: e-poster

Theme: Urban health, built environment and nature based solutions

Influence of outdoor temperatures indoor and occupants' health in residential houses in Vietnam

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Abstract

The relationship between indoor and outdoor temperature has received more attention from researchers around the world because they not only directly affect building electricity energy consumption but also negatively effect on occupants' health. In this study, temperatures outdoor and indoor of 20 residential houses in Hanoi were simultaneously and continuously measured for 1 year (May 2019 to April 2020) by temperature sensors Maxim Integrated DS1921 Hygrochron iButton to determine their trends. Furthermore, this study initially evaluated the influence of outdoor temperatures and other factors, such as building types, seasons, air conditioner using on indoor temperatures, In addition, we also investigated the impacts of indoor temperatures on the occupants' health. Annual mean indoor and outdoor temperatures were 28.5 ± 3.9 °C and 28.0 ± 4.6 °C, respectively; while mean indoor and outdoor temperatures in summer were 31.2 ± 1.9 °C and 30.9 ± 2.9 °C, respectively, and in winter were 21.8 ± 2.3 °C and 21.1 ± 3.3 °C. Mean temperature indoor air-conditioned houses (30.4 ± 1.9 °C) were significantly lower than those in ventilated houses only (31.8 ± 2.0 °C) ($p < 0.05$). High summer indoor temperatures have influenced occupants' health. Most of them felt more sweat, hot, tired and some felt dizzy during the hot temperature days.