

## Preparing rural health services for climate change

**Rachael Purcell, Joe McGirr<sup>1</sup>**

<sup>1</sup>School of Medicine, University of Notre Dame Australia, NSW

### Introduction

With increases in global temperature being predicted, the health impacts of climate change and extreme weather events will become an ever-increasing burden on the health care system. The past three decades have been the warmest since 1850, and there has been a 0.85 increase in global temperatures between 1880 and 2012. There is evidence that these changes are a result of greenhouse gas emissions from human activities<sup>1</sup>. There are many predictions on the impact of global warming in Australia, including increases in indirect processes such as exposure to vector-borne and tropical diseases, and air pollutants<sup>2</sup>. There will be increases in the frequency of droughts and high fire danger, tropical cyclones and wet season rainfall<sup>3</sup>. Food and water security will decline, and agricultural viability will be threatened with subsequent flow-on effects on farming communities and mental health<sup>4</sup>.

Rural Australians already experience poor health outcomes in comparison to those in metropolitan areas<sup>2,5</sup>. This inequality, compounded by barriers to accessing health care in rural areas increases rural populations' vulnerability to the health impacts of climate change and extreme weather events. Extreme weather events and their follow-on impact on agricultural viability and mental health will pose a particular challenge to rural health services<sup>4</sup>.

There have been calls for an integrated assessment of the impacts of climate change in rural Australia<sup>6</sup> and community-based research involving rural stakeholders to develop adaptive strategies for climate change<sup>7</sup>. Rural health services, their clinicians and managers will have a key role in building rural health service capacity to cope with additional pressures that the health impacts of climate change. Investigating the role of health services in the broader public health response to climate change is a research priority identified in the National Climate Change Adaptation Research Plan<sup>8</sup>.

This study, building on previous work with rural GPs, examined rural Health Service Manager (HSM) attitudes and recommendations towards climate change and its impact on health in the rural south west of NSW. HSMs and GPs play a crucial role in the delivery of rural health care, and also hold a respected role within their local community. This warrants an investigation of their knowledge and perceptions on climate change and extreme weather, and a discussion on the role for clinicians and health managers working together to strengthen the rural health service response to the health impacts of climate change.

### Methods

In 2011, a quantitative, descriptive survey was distributed to GPs in the Murrumbidgee Medicare Local encompassing an area of South West New South Wales (NSW) including includes townships classified as Rural Remote Metropolitan Areas (RRMA) 3-7. Participants were recruited using electronic newsletter, emails and mail out of the survey; educational meetings; and follow up phone calls or visits to practice managers. Ethics approval was granted by Monash University Human Research Ethics Committee. The findings of this survey were published in the Australian Journal of Rural Health in December 2013<sup>9</sup>.

In 2015, a modified version of the original survey was distributed to Health Service Managers in the Murrumbidgee Local Health District which covers a similar region in South West NSW also encompassing townships of RRMA 3-7. Recruitment was via email and management meetings. Ethics approval was granted by The University of Notre Dame Australia (Notre Dame) and the Greater Western Human Research Ethics Committees. Data analysis was conducted using statistical analysis program R Commander. Statistical significance was accepted at  $P < 0.05$ .

## Results

From the two surveys there were 111 respondents meeting the inclusion criteria, 68 GPs and GP registrars (a response rate of 27%), and 43 HSMs (a response rate of 53%). Of the respondents, 52% were female. Table 1 outlines the response rate according to RRMA classification.

Table 1 Distribution of participants based on RRMA Classification

RRMA Classification	% (n)
3	33 (37)
4	17 (19)
5	31 (34)
6	6 (7)
7	13 (14)
Total	100 (111)

A majority of both GPs and HSMs agreed that climate change has substantial public health implications (77%, n=86) and that reducing carbon emissions has health co-benefits (77%, n=86).

A smaller proportion agreed that global temperatures have increased (68%, n=76) and that this was due to greenhouse gas emissions (68%, n=76). Table 2 outlines the responses of GPs compared with HSMs. A significant number of HSMs thought that reducing carbon emissions has health co-benefits in comparison to GPs ( $p < 0.001$ ).

Table 2 Perceptions on climate science

	Agree or strongly agree % (n)*	
	GPs	HSMs
Climate change has substantial public health implications	76 (52)	83 (34)
Current global temperatures are higher than they were in pre-industrial times	71 (48)	65 (28)
Greenhouse gas emissions from human activities are mostly responsible for global warming over the past 50 years	66 (45)	72 (31)
Reducing carbon emissions has many health co-benefits	74 (50)	88 (36)

\* Percentages calculated according to grouping

Across both groups of participants, a smaller proportion of those working in RRMA 5-7 had confidence in their health services' ability to respond to an extreme weather event in comparison to participants working in RRMA 3-4. For GP participants a significantly lower proportion working in RRMA 5-7 did not think that their health service had the capacity to provide an initial response to an extreme weather event ( $p=0.01$ ). This was also a significantly different perspective in comparison to the response of HSM participants working in RRMA 5-7 when asked about health service capacity to provide an initial response to an extreme weather event ( $p < 0.05$ )(figure 1). Additionally, a significantly lower proportion of HSM participants working in RRMA 5-7 did not think that their health service had the capacity to provide a response to an extreme weather event during the first 3 months ( $p < 0.01$ )(table 3).

Figure 1 RRMA 5-7 participants perceptions on rural health service capacity to respond to an extreme weather event: "definitely or somewhat able" (%)

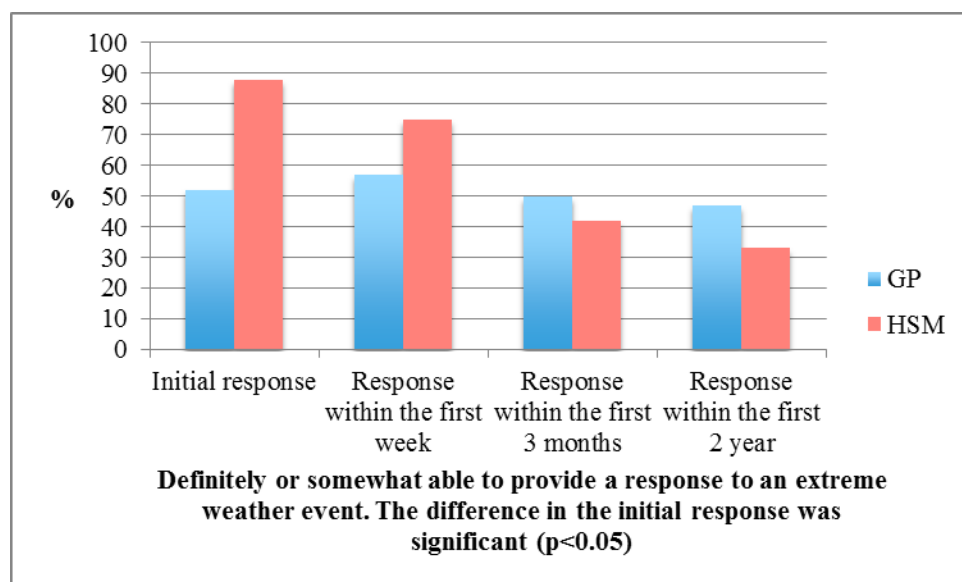


Table 3 Rural GP and HSM perceptions on local health service capacity to respond to an extreme weather event. 'If an extreme weather event or natural disaster occurred in your area, how likely is it that the health service in your area would cope providing adequate support and services?'

RRMA	GPs	HSMs
Health service definitely or somewhat able to provide an initial emergency response to an extreme weather event %(n)		
RRMA 3 & 4	81 (29)	100 (19)
RRMA 5, 6 & 7	52 (15)	88 (21)
Health service definitely or somewhat able to provide services within the first week, in response to an extreme weather event %(n)		
RRMA 3 & 4	72 (26)	100 (19)
RRMA 5, 6 & 7	57 (16)	75 (18)
Health service definitely or somewhat able to provide services for 3 months following an extreme event %(n)		
RRMA 3 & 4	64 (23)	84 (16)
RRMA 5, 6 & 7	50 (14)	42 (10)
Health service definitely or somewhat able to provide services for 2 years following an extreme event %(n)		
RRMA 3 & 4	56 (20)	58 (11)
RRMA 5, 6 & 7	47 (13)	33 (8)

Locally based seminars or a rural health focused conference were rated by 71% of HSMs as their first or second preferred methods for professional development in relation to extreme weather and climate change. Similarly, GPs indicated that a locally based seminar was their preferred mode of delivery, with 71% preferencing it as their first or second preference. A rural health conference was the first or second preference of 52%.

## Discussion

There is limited knowledge of the perceptions of rural GPs and health service managers on the health impacts of climate change. Additionally, there is limited national and international literature which assesses the perceptions of both clinicians and managers in an attempt to build an integrated regional framework for responding to climate change in rural communities. This research extends our knowledge of their assessment and recommendations and provides a basis upon which adaptation strategies may be developed.

Similar to studies on other health professionals<sup>10,11</sup> and lay people<sup>12</sup>, close to one third of respondents to both surveys did not agree with statements on climate science. A smaller proportion were skeptical of the impact of climate change on health. There is disparity between between HSMs and GPs on the health co-benefits of reducing carbon emissions (table 2), although this might be due to the time between the separate surveys. It is well documented in the literature<sup>12,14</sup> that recognising these health co-benefits plays an important role in an integrated approach to climate change mitigation. Rural GPs<sup>15,16</sup> and HSMs<sup>17</sup> have an integral role in the planning and delivery of healthcare in rural areas and are important stakeholders in the development of adaptation strategies for climate change in rural communities. The impact of this level of uncertainty should be taken into account during the development of such strategies.

Health service preparedness for extreme weather events has been identified as an area of uncertainty, particularly in communities with populations of less than 10 000 (figure 2). First recognised in a survey of GPs<sup>9</sup>, this sentiment of uncertainty has been echoed in the responses of HSMs within the same region (table 3). Strategies to improve and strengthen health service capacity for responding to such events are needed in both the immediate and longer-term response. The significant difference in the views of GPs and HSMs in smaller rural communities in the capacity of the health service to provide a response to an extreme weather event (figure 1) may indicate a lack of communication between managers and clinicians, or a difference in understanding of the health service response. More investigation into this difference in perspective is needed to enable a collaborative response to improving health service capacity.

The partial alignment of responses of GP and HSM participants suggests that there is an underlying issue with health service preparedness. Given that health managers and clinicians both have integral roles in rural health services, this partial alignment provides a good basis for collaboration in planning adaptation strategies for health services in rural areas. However there is also clearly a need to better define the issue and the reason for the differing perceptions. As indicated by both groups of participants, locally based seminars were a preferred forum for professional development and education on extreme weather and climate change. These seminars may also provide valuable opportunities for collaboration and a platform for the development of regional cooperation.

Limitations of these studies include the possibility of selection bias through participant self-administration of the survey. There is also the limitation of the surveys being taken three years apart. There is limited capacity to generalise the findings of the study due to the defined geographical region of recruitment in South West NSW. Valuable information may be solicited from the expansion of the data collection area or inclusion of communities in other states.

## Conclusion

The preparedness of rural communities and health services for the health impacts of climate change hinges on input from those delivering healthcare in these areas, both clinicians and managers. Amongst GPs and HSMs there is a degree of uncertainty regarding climate science.

Clinicians and managers working in smaller regional centres had variable levels of confidence in the capacity of their health service to provide an adequate response after an extreme weather event.

Further research should build on the findings of these studies, involving interagency consultation on building rural health service capacity in response to climate change.

## Recommendations

1. Rural GPs and Health Service Managers are important stakeholders in the development of adaptation strategies for climate change in rural areas. More work is needed to clarify the capacity of rural health services to respond to extreme weather events, both in the immediate and longer term; and to communicate this to all stakeholders.
2. Locally based seminars or rural health focused conferences are a preferred mode of delivery for education on climate change and health.

## References

1. IPCC, 2014: Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]. IPCC, Geneva, Switzerland
2. Costello A, Abbas M, Allen A et al. Managing the health effects of climate change. *The Lancet* 2009; 373: 1693–1733.
3. CSIRO. Climate change: science and solutions for Australia. Edited by Cleugh, H et al. 2011.
4. Morrissey S, Reser J. Natural disasters, climate change and mental health considerations for rural Australia. *Australian Journal of Rural Health* 2007; 15: 120–125.
5. Blashki G. Climate change and the rural health workforce. *Australian Journal of Rural Health* 2008; 16: 1.
6. Bi P, Parton K. Effect of climate change on Australian rural and remote regions: what do we know and what do we need to know? *Australian Journal of Rural Health* 2008; 16: 2–4.
7. Bell E. Climate change and health research: has it served rural communities? *Rural and Remote Health* 2013; 13:2343. (Online). Available: <http://www.rrh.org.au>
8. Hanna E, Bi P, Dwyer S, Morris P, McKeller R, Stadler F. National Climate Change Adaptation Research Plan: Human Health Update Report 2012, National Climate Change Adaptation Research Facility, Gold Coast pp.54. ISBN: 978-1-921609-79-4.
9. Purcell, R & McGirr, J. Preparing rural general practitioners and health services for climate change and extreme weather. *Australian Journal of Rural Health* 2014; 22:8-14.
10. Polivka B, Chaudry R, Crawford J. Public health nurses' knowledge and attitudes regarding climate change. *Environmental Health Perspectives* 2012; 120: 321–325.
11. Villella C. Climate Change: What do doctors think? What can doctors do? An international survey of general practitioners. [MPH thesis]. Melbourne, Vic. University of Melbourne. 2011.
12. Akerlof K, DeBono R, Berry P et al. Public perceptions of climate change as a human health risk: surveys of the United States, Canada and Malta. *International Journal of Environmental Research and Public Health* 2010; 7:2559–2606.
13. WHO. Health co-benefits of climate change mitigation – Transport Sector. *Health in the Green Economy*. 2011.
14. WHO. Health co-benefits of climate change mitigation – Housing Sector. *Health in the Green Economy*. 2011.
15. Blashki G, McMichael T, Karoly DJ. Climate change and primary health care. *Aust Fam Physician* 2007;36(12):986-9.
16. Bell E, Towle N. Climate change and primary health care: towards better regional health impact and risk assessments. 11th National Rural Health Conference, 13–16 March, 2011. Perth, WA.
17. National Rural Health Alliance. Position Paper: Supporting rural health service managers in rural and remote Australia. 2004

## Presenters

**Dr Rachael Purcell** is a medical resident in Victoria. She is passionate about the health issues facing rural and regional Australians. She holds MBBS and BMedSc (hons) degrees from Monash University and a Masters of Public Health from the University of Queensland. She is a member of the John Flynn Placement Program National Parking Panel and has been a delegate to the United Nations Framework Convention for Climate Change 19th Conference of the Parties and the 63rd Session of

World Health Organisation Regional Committee for the Western Pacific. Her research interests include the health impacts of climate change for rural communities and health services, factors influencing medical students' intentions to practice rurally, and the development of neonatal incubators for use in resource-poor settings.

**Associate Professor Joe McGirr** is Associate Dean Rural of the University of Notre Dame Australia School of Medicine Sydney. He lives in Wagga Wagga with his family and is passionate about improving health services in rural and regional areas. He has worked in clinical medicine and senior health administration in south west rural and regional NSW for more than twenty years. He originally practised clinically as a specialist in Emergency Medicine before making a career in health administration, becoming Chief Executive Officer of the Greater Murray Area Health Service and then Director of Clinical Operations for the Greater Southern Area Health Service. He is a fellow of both the Australasian College for Emergency Medicine and the Royal Australasian College of Medical Administrators. He has worked closely with patients, communities and clinicians on a range of issues affecting health services. He played a critical role in the establishment one of the first rural clinical schools in Australia in Wagga Wagga. Currently his research interests include climate change, health services and rural medical workforce and he oversees medical school campuses in Wagga Wagga, Lithgow and Ballarat.