



The Hotspots Initiative: Place-based, cross-sector collaborations responding to the health impacts of heatwaves

Evaluation Report

October 2020



The Climate Change Exchange, RMIT University

For The Lord Mayors Charitable Foundation

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Suggested citation:

Bosomworth, K., Moloney, S. & Gooder, H., (2020) *The Hotspots Initiative – Place-based, cross-sector collaborations responding to the health impacts of heatwaves: Evaluation Report*, RMIT University for the Lord Mayor’s Charitable Foundation.

1. Background to the Hotspots Initiative

The Lord Mayor's Charitable Foundation (LMCF) recognises that climate change is increasing the incidence of extreme heat events in our city and disproportionately affecting the health of people who are disadvantaged or socially marginalised. Community-based and social service organisations work closely with those most vulnerable to these impacts. However, these organisations are not specifically resourced to plan for and respond to extreme weather events, particularly heat. To help address this gap, LMCF launched the Hotspots Initiative in October 2018, following consultation with Emergency Management Victoria (EMV), Victorian Council of Social Services (VCOSS), and the Department of Health and Human Services (DHHS).

The Initiative supports place-based collaborations between health, social service and environmental organisations, with local government and emergency services in areas of Melbourne with high levels of socio-economic disadvantage, and higher temperatures during heatwaves (based on the Monash Heat Vulnerability Index).

Hotspots commenced in the 2018-2019 summer with two pilot projects by community health organisation *IPC Health* in Brimbank and *enliven* Primary Care Partnership (PCP) in Dandenong. These two projects focused on identifying and reaching community members most vulnerable during extreme heat events (e.g. very young children and older people) through broad community and cross-sector engagement and identifying the capacity building needs of relevant government services and community-based organisations. Working through their networks both *IPC Health* and *enliven* sought not only to have partner organisations understand and help communicate heat health messages, they also sought feedback on the usefulness of these messages and worked to co-design other local activities.

A third Hotspots pilot commenced in the 2019-2020 summer led by *cohealth*. This pilot had a very clearly defined geographic and context focus: public housing estates in the City of Melbourne. *cohealth's* reputation as a trusted organisation within these estates allowed them to conduct interviews directly with community members.

Collectively, the experiences of *IPC Health*, *enliven*, and *cohealth* provide rich insights into two key questions:

- What makes different outreach activities useful in helping understand and address the needs of those most vulnerable to the health impacts of heatwaves?
- What can the Hotspots pilots tell us about the components of an effective response to reducing heat vulnerability in low income communities using a cross-sector collaborative approach?

This evaluation report first summarises key information regarding each pilot project before presenting the evaluation method and findings and lessons from each of the pilots structured around those two questions. The report concludes with recommendations for the future of the Hotspots Initiative based on those insights.

1.1 The Hotspots pilots

Hotspots Brimbank

Project Lead: *IPC Health*

Project Partners: Brimbank City Council (environment and sustainability, libraries and community centres, aged, youth and family services, customer services, health and social policy teams, community care, communications, and emergency management), *cohealth*, HealthWest PCP, Victoria Police, Ambulance Victoria, and Australian Red Cross.

Project aims:

- Increase community awareness in order to reduce impact of heatwaves on the community's wellbeing
- Develop relevant information materials and resources specifically for Brimbank, co-designed with cultural and linguistically diverse communities (CALD) (and other targeted community groups) and agencies
- Strengthen collaboration of agencies and the local community to respond to heatwaves and enable resilience to the effects of heatwaves across the community

Activity focus: The first phase of this project (*Keep Cool in Summer* campaign) in the 2018-2019 summer involved surveys and discussions with communities to understand their experiences and needs, as well as interviews with staff and organisations that engage with, or provide support to, vulnerable community groups in Brimbank. This work found that community members tended to contact (or were contacted by) family and friends first. Moreover, most of the organisations interviewed had limited appreciation of how they might support people's health during heat events. Based on these insights, *IPC Health* developed a range of cross-sector collaborations. In 2019-2020, working through local government and non-government service providers, *IPC Health* worked to understand and support those services' heat health messaging, and through those networks identify and reach members of the community who experience heatwave vulnerability. For example, the *Keep Cool* youth project in partnership with Brimbank City Council Youth Services and the CroakeyGo event (<https://www.croakey.org/what-can-we-learn-from-one-communitys-efforts-to-address-heatwavehealth/>).

Target communities/reached communities: Individuals over the age of 65; parents of young children; young children and children of primary school age; CALD communities, newly arrived, and low income households; working through an array of cross-sector collaborations.

Challenges:

- Trying to engage partners and stakeholders 'too early', before there was any heat felt by people. Despite efforts to engage various stakeholders before and after summer, the team gained little engagement until the weather started to really warm up; and
- Before the CroakeyGo event the team struggled to get engagement from stakeholders from wider parts of the health and heat 'system'. While they had strong and ongoing support from the environment and health teams in Council, it was not until CroakeyGo brought publicity to the issue that other important and influential parts of Council recognised their role in the issues (e.g. emergency management and infrastructure management).

Key achievements:

- CroakeyGo. The publicity and interest generated through the CroakeyGo event saw the other parts of Council including emergency management and infrastructure management, really

begin to engage with the team and the issue of heat stress and vulnerability. The event also created smaller networks among stakeholders such as The Smith Family and Jemena Electricity, wherein these organisations started to ask what role they could play in addressing the identified issues. The event also raised broader attention through the Twitter feed, where organisations outside *IPC Health's* catchment reached out to understand more.

Hotspots Dandenong

Project Lead: *enliven* (Primary Care Partnership)

Project Partners: City of Greater Dandenong (sustainability unit, public health, environmental health and community care unit), Southern Migrant and Refugee Resource Centre, and Bolton Clarke aged care, and South East Councils Climate Change Association (SECCCA).

Activity focus: *enliven* developed an effective cross-sector collaboration with an emphasis on aged settlement services and cultural and language specific programs. They heavily influenced the involvement and focus of multiple local government departments on this issue. Through 2018-2019 and 2019-2020 *enliven* adopted a health literacy approach to co-design, with their collaborators, information and strategies targeting a number of vulnerable CALD groups. They worked with and through service provider partners and local government services that could reach those community members who experience heatwave vulnerability. *enliven* were able to align their public engagement with the City of Greater Dandenong's (CGD) work in developing its Climate Change Strategy.

Target communities/reached communities: seniors, families with young children, CALD communities, newly arrived, low income households.

Challenges:

- The tight time frame for developing the 2018-2019 summer initiative. With notification of the funding in mid-December there was minimal time to prepare and schedule sessions before staff took leave for Christmas with many not back until the last week of January when the heat wave period was underway;
- Lack of timely access to relevant data to target engagement with CALD communities. It had been intended to focus on three priority CALD communities but as Ambulance and Hospital Emergency Department data was not able to be accessed to specifically identify those communities with higher use of services for heat related illness during heat wave periods, the focus was broadened to CALD communities generally;
- Provision of affordable cooling neck scarves. Sourcing consumables such as cooling neck scarves from China (considerably cheaper [US 69 cents each] than ordering from Australian suppliers [\$7-\$10 each]) relied on trust or paying heavily for a sample item (\$30). The Chinese New Year period also which delayed response times;
- Communicating heat health messages through general practitioners (GPs). The challenge of access to GPs to ensure the resources and messages were available to their patients was partially overcome by attendance and the provision of resources at a Primary Health Network education session for practice managers and nurses;
- Gaining evaluation feedback after the heatwave period was challenging as the people who heard the heatwave message did not always attend the next meeting; and
- The siloed nature of many of the organisations and across the 'health and community services system' with whom and in which Primary Care Partnerships (PCPs) must work means PCPs are

often the ones brokering arrangements between the different yet important stakeholders. This takes time and resources.

Key achievements:

- *enliven* as a Primary Care Partnership has established relationships with agencies so could commence work quickly in time for heat wave period;
- A collaborative approach between partners opened up networks for information distribution in a very short time and provided new networks for the Council sustainability unit and *enliven*. This enabled an opportunity to work together and disseminate each other's messages;
- Brought together council business units that don't normally work together e.g. community services, emergency management and sustainability departments. This coincided with commencement of work on Council's Climate Change Strategy so the project aligned with Council strategies and gave an opportunity to engage with diverse communities on both issues. Linking heat, housing, energy and health as interrelated factors;
- Action research – due to the flexibility of the LMCF funding, *enliven* were able to grasp opportunities as they arose e.g. heat health discussion with people at immunisation sessions, and working with CALD groups in general rather than a targeted approach when data was not available to prioritise particular communities as intended. Feedback from participants was also able to guide modifications to sessions;
- Opportunities for funding and exposure to data, resources and contacts previously unknown. Accessing and building networks across diverse providers and learning amongst local Hotspots team and service providers;
- Increased heatwave awareness and preparedness; and
- Leveraging new funding (E.g. DELWP 3CA funds) from this project to extend the work from one Local Government Area to three Local Government Areas.

Hotspots Public Housing Inner Melbourne

Project Lead: *cohealth*

Project Partners: City of Melbourne, Salvation Army, Ambulance Victoria, Victoria Police, Unison Housing, Carlton Office of Housing, and Royal District Nurses Services' Homeless People's Program.

Activity focus: Deep community engagement with City of Melbourne high-rise public housing residents regarding their experiences of heatwaves. This was based on advice from partner agencies regarding project design and each agency's participation. The Project Lead (PL) then engaged with residents to understand and provide advice on mitigating the potential heat impacts on their health.

Target communities/reached communities: public housing residents aged 55 and over, CALD communities (40% of residents across the three estates have CALD backgrounds, with Kensington estate as high as 50%).

Challenges:

- Adapting to the different 'cultures' driven by the nature of the housing management at each building. One building is managed by the department, another is part run by Unison Housing, and the third is run by half government and half Salvation Army. The sense is that the residents in housing run by the Salvation Army feel supported and heard, whereas those in housing run by the department feel unheard and that no-one cares; their issues get lost in

the bureaucracy. Engaging these people in the project was more challenging because they felt there was no point because “no-one listens or cares anyway”. In contrast, many of the residents in the other buildings feel that if they raise issues they are heard and their issues are often acted upon; and

- The relatively mild summer of 2019-2020 saw a lot of people forgetting how the 2009 heatwave had impacted them.

Key achievements:

- The tailoring of activities to those different contexts and needs. Because of the project’s inherent flexibility, *cohealth* were able to approach each context based on their knowledge of the buildings’ cultures and their existing networks with residents. Just before COVID hit, there were plans for getting together residents from each of the three buildings to share their stories and ideas, to form a ‘community committee’ and even perhaps develop an action plan. Supporting the workers within each building, who already do a good job with limited resources. These people will be key contacts in any further developments.

2. Evaluation purpose and approach

LMCF were seeking to evaluate Hotspots in order to consider what factors and components would enable an effective cross-sector collaboration to address heat vulnerability at the local level. A literature review conducted in parallel with this evaluation indicates that while there is worldwide experimentation with different types of place-based heat health outreach programs and services, the effectiveness or usefulness of these different outreach programs has not been explored (Gooder *et. al.*, 2020). As also suggested by that review, due to the necessarily place-based nature of heat health programs, evaluations would benefit from being learning based, formative and developmental, with a view to understanding how individual and community experiences and associated senses of wellbeing are impacted during heatwaves. This understanding of the need for the Hotspots projects to be **tailored to place and context** informed the approach to this evaluation.

2.1 Purpose and scope

The purpose of this evaluation was to inform further development of Hotspots projects and the Initiative more widely. It sought to do this by addressing two central questions and associated sub-questions:

1. What makes different outreach activities useful in helping understand and address the needs of those most vulnerable to the health impacts of heatwaves?
 - what leads to behaviour change?
 - how effective were heat health alerts?
 - what inconsistencies in heat health messaging exist – how does this affect people’s responsiveness to these messages?
2. What can the Hotspots Initiative tell us about the components of an effective response to reducing heat vulnerability in low income communities using a cross-sector collaborative approach?
 - how do you define heat vulnerability for people in everyday life?
 - how effective are local level networks in getting the right information to the right people and influencing change on a community level (i.e. reducing poor health outcomes)?
 - how to do local level collaborations tie in with State Government focus and initiatives?

The report is structured around these two questions.

The scope of this evaluation focused on Hotspots activities during the summers of 2018-2019 and 2019-2020. Data collection was undertaken by the three Hotspots project teams, including insights from participants in the Hotspots projects. RMIT co-developed the evaluation framework with the Hotspots teams. Findings from its application are presented in this report.

2.2 Evaluation approach

To address its purpose and the two central evaluation questions, this evaluation sought to capture and analyse insights and lessons from project participants and teams regarding developing and enacting the Hotspots projects (process data), as well as people’s stories and experiences of heat, including how their current circumstances influence those understandings and experiences (outcome data). The evaluation sought to capture this data through a structured diary approach.

2.2.1 A structured diary approach

Capturing Hotspots project team member reflections was considered a critical part of the learning process. The Hotspots project teams are experts in their fields, many with a long-standing connection and understanding of the everyday challenges the project participants face. This knowledge regarding the fundamental drivers of disadvantage and vulnerabilities is highly relevant to understanding the implications of hazard events such as heatwaves. Through their relationships with individual community members and other service providers, the knowledge of the Hotspots team members is considered central to each project's efficacy (as well as the efficacy of the Initiative overall), and important to capture in this evaluation. Because of time and resource limitations, the evaluation and data collection drew heavily on Hotspots team members' experiences and perspectives.

An online structured diary (DeLonghis *et al.*, 1992) designed by the RMIT team was able to help capture project team reflections and insights. The diary/survey enabled team members to make notes on their reflections as often as they liked. Each 'diary' was only able to be seen by the author and the RMIT researchers, with all entries de-identified. Participation was entirely voluntary, all the information was anonymous, and people were able to stop participating at any point in time. Team members also had the right to request that anything they had written be removed. Where participant and other service delivery personnel perspectives and stories were sought and provided, *ethical issues of voluntary participation, informed consent, and anonymity were addressed* through the standard professional practices of the Hotspots team.

The structured diary/survey included prompting questions, with no requirement to address all or any of these. Contributors were able to write whatever they wished.

Structured diary questions:

- Today's date.
- Please describe your experience today. You are welcome to write anything you feel is important to share. For example:
 - What did you observe?
 - What struck you?
 - What was rewarding?
 - What was challenging?
 - What could the Hotspots Initiative learn from this observation?
- Who did you connect with today? It could have been individuals or groups.
 - Why these people or groups?
 - How did you connect with them?
- What other State Government focus or initiatives were occurring at the same time?
 - Was there something you observed that might have had an impact on the project, the process, or people's experiences – of heatwaves and of Hotspots activities? Could you describe it please?

Hotspots team members' structured diary entries not only sought to capture their own reflections but also the stories and perspectives of community members to whom the program was targeted, along with perspectives of other agencies the Hotspots teams sought to collaborate with. For example, team members wrote about participant reflections and insights about their experiences of heatwaves and any messaging about heatwaves. The bulk of these stories come from *cohealth* because of their project's focus on the communities in Inner Melbourne's public housing. These stories are a valuable source of information regarding, not only people's experiences engaging with the Hotspots work, but

also insights into participant needs and issues in dealing with extreme heat. Project participant stories and reflections also help address the ‘attribution’ challenge facing evaluations of projects such as Hotspots. It can be difficult to separate the effects of initiatives such as the Hotspots projects from other activities and factors that are going on in people’s lives and more widely in various government and community service programs. Gathering data on the various influences on peoples’ lived experiences is one way to address this challenge.

Diverse methods were used to capture peoples’ stories, later recorded anonymously in the online diaries. These methods included directly calling residents or sitting in the foyers of public housing buildings to discuss anything people wished to. Other stories were gathered from people participating in an activity in which Hotspots teams collaborated with other service providers and local governments. Similarly, the perspectives and stories from other service-delivery agencies shared with the Hotspots teams, were also considered potentially useful data sources for the evaluation. While direct input from these organisations was not sought, Hotspots team members did take note of their engagement with these organisations and documented reflections and suggestions from these other service-delivery agencies in the online structured diaries. As outlined above, no names or personally identifying features of project participants were collected during this process.

2.2.2. Reflections on the findings

Due to the COVID-19 and Melbourne lockdowns, we did not conduct the planned final workshop using an Appreciative Inquiry (AI) method (i.e. a collaborative, strengths-based approach to change in organisations). Instead, the Hotspots teams were asked for their feedback on a draft version of this report with follow-up discussions with each team leader. An AI workshop may yet be held later in the year to help inform next steps for the project.

2.2.3 Limitations

The range of data was limited by typical time and resource constraints. While the structured diaries provided a very rich source of data, entering data into the diaries created additional workload for Hotspots team members. For the program to develop a deep understanding of the heat health challenges facing individuals, the use of trained social researchers or, some professional development activities in social research for willing Hotspots team members may be warranted.

3. Findings

The Hotspots team contributed a total of 89 structured diary entries, with most of those entries capturing more than one client or participant's story. The findings presented here draw directly from those diary entries, as well as meetings and discussions with the Hotspots teams throughout and at the conclusion of the pilots. Direct quotes or comments from the structured diaries are italicised, contained in quotation marks (when in the main text), and referenced as DE (Diary Entry) with an accompanying number. The number indicates a specific diary entry. Some diary entries discuss multiple individuals and interactions, containing references to more than one person or case. All diary entries are de-identified.

It should be noted that a formal heatwave declaration only occurred during the 2018-19 summer and *not* the 2019-2020 summer. This also meant that no heat health alerts were broadcast during the summer of 2019-2020. This does not underplay the fact that some very hot days in the 2019-20 summer impacted many of the people with whom the Hotspots project seeks to work. However, it did mean that the evaluation was unable to ascertain the impact of such declarations for those people nor the Hotspots pilot projects. Therefore, the evaluation is unable to make any comment on the efficacy of such alerts nor their contribution to heat health activities. Nonetheless, diary entries by and discussions with the Hotspots team members provided solid insights into the evaluation's two central questions:

1. What makes different outreach activities useful in helping understand and address the needs of those most vulnerable to the health impacts of heatwaves?
 - what leads to behaviour change?
 - how effective were heat health alerts?
 - what inconsistencies in heat health messaging exist – how does this affect people's responsiveness to these messages?
2. What can the Hotspots projects tell us about the components of an effective response to reducing heat vulnerability in low income communities using a cross-sector collaborative approach?
 - how do you define heat vulnerability for people in everyday life?
 - how effective are local level networks in getting the right information to the right people and influencing change on a community level (i.e. reducing poor health outcomes)?
 - how to do local level collaborations of tie in with State Government focus and initiatives?

These insights are discussed below.

3.1 What makes different outreach activities useful in helping understand and address the needs of those most vulnerable to the health impacts of heatwaves?

To address this first question, the evaluation sought to capture peoples' stories about their lived experiences of heat events and their engagement with the Hotspots project. In doing so, this work sought also to gain insights into how heat vulnerability for people in everyday life might be defined and what might influence people adopting 'heat health' actions. It also sought to appreciate the efficacy of the project activities, as well as the efficacy of other stakeholders' activities (such as State Government heat health alerts). The diary entries provided insights into factors influencing or mediating people's experiences of heatwaves.

Overall, the findings suggest that what makes different outreach activities useful is when they:

- are context-specific, informed by an understanding that people’s lived experiences of heat are diverse and this is for multiple reasons
- help remove or alleviate the need for people to have to ‘choose’ between options that each bring different risks (e.g. personal safety, thermal comfort, or financial impacts)
- support the diverse ‘cooling strategies’ that people already use
- help understand and engage with the systemic drivers of heat vulnerabilities, in particular sub-standard housing and housing services, as well as access to health care; and
- provide heat health information in diverse and context-specific ways

These findings are discussed below.

3.1.1 Lived experiences of heat are different for multiple reasons

The IPCC defines risk as being driven by the hazard (heat), a person’s exposure to that hazard, and socio-political drivers or systemic factors that create vulnerabilities including limited or no access to good housing, health services, etc. (IPCC, 2012). For many of the Hotspots participants their ability (adaptive capacity or resilience) to decrease their risk is often limited to reducing exposure to heat. Limiting heat exposure through actions such as taking cold showers or closing blinds, are often the only options available to most of these people.

The Hotspots team members’ observations make it clear that most of the people with whom they engaged find it challenging to deal with heat. For example:

Mental health affected as resident cannot go outside, cannot sleep in unit when hot. [DE21]

He gets anxiety thinking about it [heat] and works himself up about it. He is on medication for his anxiety also. [DE25]

One resident spoke of feeling like he and his wife were trapped as they could not go anywhere during hot days and had to stay in the unit in front of the fan. He said it can sometimes send him crazy. [DE26]

She said it is like she’s inside an oven and the walls are very hot. She doesn’t sleep well during the night because the walls get so hot. She is a healthy person but mentioned during hot days it really slows her down and makes her feel weak. [DE29]

When asked if he has any other ideas of how others in the building can reduce impacts of heat, he said “go live elsewhere”. [DE43]

There were a few, who have lived in hotter places, who suggested that they fare quite well in and even enjoy the heat:

Several residents surveyed today advised they are not affected by heat in their units as they grew up in, or are from, hot parts of the country/world and are used to it and love it. For e.g. one resident advised she grew up in the Israeli desert for the first 30 years and moved to Africa for another 20 and enjoys the very hot days. [DE22]

Surveyed three residents who advised they are from hot areas in Australia, so they love the heat and were not bothered by extreme heat while living in their units. It was noted they also seemed to be healthy and active. [DE21]

Nonetheless, the bulk of the diary entries regarding peoples’ lived experiences described negative experiences and impacts. Moreover, several structured diaries conveyed peoples’ worries and concerns about how they may cope during future heat events:

Another resident spoke of suffering through temperatures of 43-46 degrees and that they could not handle it. ... he worries about summer approaching and that he does not want to go through that again. [DE26]

She now suffers from anxiety thinking about summer around August/September. [DE22]

He does worry and think about future summers and if he will be ok in the heat as he is getting older however has not spoken to anyone about this. [DE39]

Resident remembers the time when the weather was unbearable, he was living here at the high-rise and felt like there was no escape from it and felt very lethargic. When he thinks of this memory it causes him stress about future summers and hot days and he wonders constantly during summer when the next heat wave will be. [DE39]

He does have worries regarding future extreme heat if he is to stay living here at the high-rise. He has plans of buying a caravan and setting it up in a caravan park in the country. [DE43]

One expressed concern regarding heat impacts on others, which in turn, caused them distress:

He mentioned he has witnessed a neighbour lose consciousness due to high temperatures a few years ago which was quite traumatising for him. [DE25]

‘Choosing’ between risks

The structured diary reports also suggest that for some people it is not just a matter of managing the heat but of being forced to choose between risks associated with different cooling ‘options’:

...it was so hot one year during a heatwave, he slept outside on the grass in the estate. He did mention he was worried for his safety. However, his unit was like an oven and he was going crazy not being able to sleep. [DE14]

This resident also spoke of the 2009 heatwaves and that he ended up sleeping on the tiles outside in the corridor as it was so unbearable in his unit. He mentioned he had seen another resident do this in the past. [DE25]

Accessing the provided ‘cool rooms’ may involve taking a different safety risk because non-residents, potentially drug-affected, also access this space:

... he did speak of experiences of sharing this space with people he did not feel safe around. Apparently, people from the neighbourhood make their way into the building via access from other residents and he believes they are under the influence of drugs. In these cases, he has gone back up to his unit and suffered in the heat. He gets worried when he knows there is a hot day approaching because he wonders if the cool room space will be available and safe for him. [DE24]

*he resorted to coming down to the cool room and sleeping on the floor with a blanket and pillow. [****** the word ‘resorted’ suggests a less than preferred option] [DE27]*

Financial costs of keeping cool

Another major influence on people’s ability to stay cool was financial. For example, one resident described that

He does not have a fan in his unit. He did mention that it would cost too much to run as he just received an electricity bill for \$100 ... so he is now hesitant to use power. [DE41]

The biggest issue regarding cooling strategies and costs was associated with air-conditioners. For those people who have air-conditioners, some use them and “love them” [DE37], and some of the air-conditioners can’t cope with extreme heat (*or high humidity) and stop working [DE 27, 36, 37].

One resident remembers multiple times when temperatures reached over 38 degrees, during these times he uses his air-conditioner as he starts to feel sick with respiratory issues. He recalls one time temperatures reached 45 degrees outside, he insisted it was more like 50 plus inside his unit and felt like a “concrete oven”. This day his air-con unit

broke down and he resorted to coming down to the cool room and sleeping on the floor with a blanket and pillow. [DE27]

One DE [7] suggested that they were surprised that “the majority of surveyed residents today advised they are willing to pay for air-con units if government approved installation”. For other residents, the costs of running an air-conditioner can be prohibitive and worrisome [DE 20, 26, 33, 36, 60]. As DE72 stated, “for many, keeping their homes cool and being able to afford power is a real issue and one that is causing stress as the cost continues to increase”.

He was very sick from a car accident 15 years ago and he does not handle the heat at all especially now he is older. ... he heard that he could apply for and get support from [X] Housing to buy and install air-con. He is much happier now as it works very well. However, one of his bills last year came in at \$500 and although he did manage to pay it, the running cost of the air-con unit has been on his mind this summer and has created a stressful next few months. [DE23]

One resident mentioned the Ministry of housing should supply the most disadvantaged and older residents living at the estate ... with air conditioning and give financial support for running costs. [DE25]

He worries about the cost of running this [air-conditioning] unit as he finds it very expensive. Although he prepares for this by putting extra away for his bill leading up to summer. [DE35]

Spoke to daughter of 78 yr old resident battling cancer and who lives on the 11th floor. She advised he struggles in the heat however it does not seem to make him any sicker than he already is. She noted he has a fan, although he will not use it as he believes it raises the cost of his energy bill significantly. She worries about him sitting in his unit all day during extreme heat however said he is stubborn and will not come to her house to stay. All she can do is check on him during these days. She also visits him 3 times a week and cooks his meals. [DE36]

While the provision of fans and air-conditioning helps address the immediate impacts of heatwaves, it is clear more work is needed to address the systemic drivers of vulnerabilities. The financial costs of running an air-conditioner might see this risk management action make some people (more) vulnerable to other impacts, such as food or housing insecurity. In addition, poor housing design and construction (e.g. lack of insulation) may make the air-conditioners less efficient and even more expensive to run.

These insights indicate an important role for an initiative such as Hotspots in helping people appreciate what they can do ‘immediately’ to reduce heatwave impacts, while also working to advocate and support more systemic actions to address the causes of peoples’ vulnerabilities.

Variety of ‘cooling strategies’

Many of the strategies or actions residents use to keep cool or manage heat are likely to be well-known, while others are perhaps less typical. They are all arguably indicators of the limited capacities many disadvantaged people have in reducing their vulnerabilities to heat. Preparatory actions included:

- checking news or weather channels (7 references);
- doing grocery shopping in the morning or later in the evening (3 references);
 - planning meals and what is in the fridge (2 references);
- making sure not to have any appointments or engagements on hot days (4 references).

Closing all blinds and windows during the day and opening them at night was the most common action people said they took to try and stay a little cooler *during* a hot day (21 references), often used in conjunction with other actions.

She keeps her blinds closed and opens her windows at night however she does not think it makes a significant amount of difference. [DE36]

Using fans (19 references) and drinking water (18 references) were the next most common strategies, with one resident putting ice in front of the fan to have the cool air blowing on them [DE 34]. Some of the other cooling practices Hotspots participants used during heat events include:

- having cold showers or regularly putting their head under a cold shower (9 references);
- a cold towel and spray bottle (1 reference);
- using air-conditioners (noting issues raised above, and in some cases, sharing use of air-conditioner: “she has 2 friends who are residents in the building whom she invites over to stay during the day and night on very hot days”. [DE 24];
- visiting or staying with family on hot days (1 reference);
- having their feet in cold water (1 reference);
- avoid cooking in their units (2 references);
- avoid going outside/stay inside during the heat (3 references) – even though many indicated that the units are exceptionally hot (most common);
- go to the local pool (3 references);
- going to the beach “he only needs to jump on one tram so it’s very accessible” (1 reference).

Some the residents explicitly mentioned using facilities such as libraries (4 references) and the cool or community rooms (5 references). In understanding this, it is important to note that one housing provider only kept their cool room open until 9:30pm and that there are other risks associated with these communal spaces discussed in a previous sub-section (see Choosing between risks).

Two of the residents come down to the cool room to sit during hot days just to feel some cool air and escape from their units. They all advised other residents living in the building to do the same things they do. [DE35]

Using his aircon however he only got the aircon this summer, prior to this he would come down to the library and stay for hours. [DE39]

She does sometimes come down to the library and community rooms however it’s quite noisy down there. [DE41]

Some had contingency plans in case of power outages:

they also had a strategy for if the power went off and that was to have a cool shower or go somewhere such as the shopping centre or a friend’s that had air conditioning working. [DE17]

Other less typical actions included visiting hospitals, clubrooms, or the casino [DE34], or undertaking make-shift modifications to their housing:

They go to the Italian clubrooms and hang out there for the day when it is hot as they have a great aircon system, or he will go to the pools for the day. [DE25]

He has put up styrofoam on his windows to help reduce the heat, plus he closes his blinds. He feels this works great. [DE26]

She went to the Children’s Hospital to stay as they have a nice area with couches and it’s clean and cool. Resident does this often. She also goes to the Peter Mac hospital on Mondays with her friend who has cancer and she stays there all day if it’s too hot outside. [DE41]

It was evident across the diary entries that housing design and quality as well as the presence of cooling appliances influences vulnerability to heat events and constrains people's risk mitigation options.

Climate change

It seems very few residents connected heat with climate change, with only two mentioning it as a potential cause of increasing heat events [DE 47]. One resident discussed his experience of living at the high-rise a few years ago during a heatwave, and DE23 noted that:

Just recently, a few weeks ago there were 2 hot days in a row. He mentioned he does not have a fan or air-con and he does not sleep well when building heats up and feels like a zombie the next day. He also mentioned he feels stress and very nervous about the future living here in Australia due to climate change and all the fires happening now. [DE23]

This suggests that while the Hotspots Initiative is informed by an understanding of an increasing frequency and intensity of heatwaves due to climate change and expanding urbanisation, it would be best to focus on supporting and informing people on how to manage heatwaves. However, in doing so, it should also continue to gather peoples' stories about heatwave impacts and preparedness, and the challenges they face in dealing with these. These insights will not only help inform the project's information and methods, but build the evidentiary basis for climate change adaptation and mitigation action.

3.1.2 Systemic drivers of vulnerabilities

As highlighted earlier, risk is understood as being driven by the hazard (heat), a person's exposure to that hazard, and socio-political drivers or systemic structures that create vulnerabilities (e.g. limited or no access to good housing, health services, etc.) (IPCC, 2012). There are very often limited strategies individuals can take to reduce their risks other than reducing their exposure to heat, and even then, their options with this might also be limited. This is because of systemic factors that do not support their long-term resilience or reduction of vulnerabilities. Without addressing these structural drivers of vulnerabilities, the risk of heat stress across many disadvantaged groups will only increase. Insights from the Hotspots project teams have highlighted some very important systemic drivers of the vulnerabilities of these communities and people to heat (and to other issues, including climate change and pandemics). Addressing such systemic drivers requires change across a range of policies and practices. Indeed, one diary entry suggested that the Hotspots Initiative might move beyond just information provision to supporting community action [DE31], including:

How do we move from interested stakeholders, to stakeholders taking action to raise awareness within their own reach? We believe the community needs practical things to do – energy saving training sessions could be a possibility. [DE31]

Examples of identified systemic drivers of vulnerability are outlined here using quotes from the Hotspots teams' structured diaries.

Building design, quality and maintenance

Issues regarding the sub-standard nature of housing contributing to heat impacts were consistently identified. Twenty of the 89 diary entries explicitly mentioned how poor building materials and design negatively exacerbated peoples' experiences of heat. The specific issues included poor insulation, building positioning (facing sun and upper levels getting hotter), the building materials themselves (often concrete), and a lack of ventilation in much of the housing. For example:

Another resident has memories of when he lived in a 40-foot container in Bendigo and that temperatures there were 40 plus but 50 in the container. He can compare these temperatures to living here at the high-rise, the concrete walls get so hot you must stay in the middle of the room as the heat radiating off them was too much to bear. [DE27]

Resident claims building materials and structure as the problem stating concrete walls hold all the heat in and that even when it cools down outside it's still hot in the building for days after due to the concrete. [DE39]

The location of units and housing influences the impacts of heat on the building and thereby, the residents' experiences. For example, those on upper levels or west facing units in public housing towers feel the heat more than those on lower and east facing levels:

I was able to gather that his apartment is on the first floor, in an area of the building that is in the shade the majority of the day, so he is protected. [DE8]

Resident stated he does have memories of extreme heat and being very uncomfortable. However ... he lives on the south end of this building and it is not bad at all. He believes his location prevents him from having any issues related to heat [DE30].

There were many more mentions of these units being hot than the converse:

Two of the residents today mentioned that they are located on the top floor and get sun all day and that gets extremely hot in their units however happy as its "better than nothing". [DE1].

He mentioned he does have trouble breathing in his unit when it gets to 35-40 degrees [DE24]

Five residents described how terrible the heat is in their units on hot days, especially if it is hot for 2 days in a row. [DE25]

Residents believe they could have put the corridor on the northside to prevent all units from heating up. Also, they mentioned the materials used in the building, all concrete, not enough insulation in the building and on the roofs. One resident who lives on the top floor facing north and is on a corner mentioned he gets heat from two of the walls and from the roof due to the [lack of] insulation issue. [DE27]

It is clear from the diaries that sub-standard housing is a primary driver of peoples' vulnerabilities to heatwaves. While the Hotspots projects can advise people about trying to reduce heatwave impacts, it crucially, can gather evidence of drivers of vulnerabilities to heat (and other impacts). In doing so, the Hotspots Initiative can play a very important role in gathering evidence to inform action and advocacy to address those fundamental drivers.

"No-one cares"

Another strong theme emerging from the data was peoples' sense of marginalisation. Worse, many said that housing services and other service providers did little to help them, so they felt no one cared about them. One Hotspots team member commented that residents "*feel the department does not listen to their voices*", these experiences leaving them "*very discouraged*". Another team member reflected that:

all residents are dealing silently with the extreme heat conditions they are experiencing in their units whilst living here at the high-rise and do not have faith in the system to help them change this. Something the Hotspots program can learn is that people living here need empowerment [DE33].

Hotspots team members noted that many people referred to previous experiences with services when describing why they do not feel heard or cared about by Housing or others [DE 22, 24, 25, 26, 33, 39]. They “*didn’t think anyone genuinely wanted to help*” [DE 11, 26].¹ One resident expressed concern that if they did complain they would be evicted (the Hotspots team member advised them that this is not true) [DE7].

6 residents mentioned they do not bother speaking to Housing or [the Hotspots team’s organisation] regarding the issue as they “don’t care” and “they don’t do anything anyways”. [DE15]

when asked if he can think of anything that would help to reduce these feelings, he felt there is nothing he can do and that no one cares. [DE26]

He has had numerous dealings with Housing as he has lived in his unit for 2 years and what struck me was that he mentioned “I have given up and don’t bother now”. [DE37]

He has been living at this estate for 11 years and applied to move to another apartment the week he moved in as it felt like a he was living in a little cave. There is a big tree blocking his light through his lounge room window, he has units on either side of him so he gets no natural light and it is depressing, so he feels they do not care about his mental health as he is still living in the unit. [DE39]

These findings suggest that projects such as Hotspots can play an important role in supporting people to express their concerns and needs – to support their voices. Once again, in doing so, Hotspots is gathering evidence of what is needed to help improve community resilience.

Pre-existing illnesses/ill health

Many of the residents have pre-existing illnesses and health problems, with a significant proportion of residents being elderly and several residents managing multiple health challenges. The Hotspots teams’ diary entries highlighted the challenges such residents already face in dealing with these illnesses. Existing health challenges included chronic back pain [DE 21, 33]; asthma [DE 22, 27]; diabetes; rheumatoid arthritis [DE 22, 27]; depression [DE27]; anxiety; high blood pressure; cancer; and combinations of these [DE39]. Many of these health issues are either exacerbated by the heat or the medications people use to manage their illness are impacted by heat or stress. For example:

.... she suffers from difficulty breathing on hot days. ...she struggles at the best of times however during hot weather it is exceptionally worse. ... Within the first month [of living in high-rise complex] she experienced high temperatures causing hospitalisation. Resident suffers from asthma and rheumatoid arthritis. She now suffers from anxiety thinking about summer around August/September. [DE27]

He spoke of a possible link to his recent change of brand of medication and dosage as he believes he does suffer from depression and he has changed dosage recently and this could be due to his worry thinking of upcoming summer and living here at the high-rise. [DE27]

The resident suffered from diabetes and advised his blood sugar rises when it gets too hot. When he mentioned this to Unison housing, they organised for an air-con unit to be installed into his unit at no cost to him. [DE35]

Some residents are dealing with multiple illnesses and challenges:

He suffers significantly during summer as he has several illnesses including diabetes, high blood pressure, partial blindness, polymyositis He worries about his future living at the

¹ Remembering that one Diary Entry (DE) often contains notes and comments from and about multiple individuals.

high-rise during summer He mentioned he struggled for many years and was living in his car before he moved into the estate, so he tries to focus on these points. [DE37]

Implications for these residents extend beyond the significant risks to their health, to include financial impacts.

He's was/is having radiation therapy and said his body temperature is a lot higher at the time which also made sleeping at night much worse. He ended up booking into a motel. Resident mentioned he does this when the weather is too hot to handle. [DE43]

While the Hotspots Initiative is not able to provide specific health advice to people experiencing complex health challenges, it may be able to connect people to appropriate health advice. This would create an opportunity for the project teams to connect with relevant health services.

These insights provide further evidence of the value of the Hotspots Initiative beyond just 'heatwave management' advice. It is building a body of evidence to inform further actions and advocacy.

Compounding events

Compound (multiple, concurrent or sequential) events can amplify overall risk and/or cause cascading impacts (IPCC 2019). During this evaluation, the communities and individuals with whom the Hotspots teams work, and the Hotspots teams themselves, faced the compounding event of heat and bushfire smoke. An example of the impact of these compounding events was noted in one structured diary entry:

She has recently applied to have an air-conditioning unit installed in her unit as she does not think she can cope any longer with this weather and mentioned that due to air quality with the fires, she has experience trouble breathing so does not like opening her windows. [DE33]

During the write-up of the evaluation (outside of the evaluation period) these people (and the research team) also faced the COVID-19 pandemic. This evaluation was conducted immediately prior to the pandemic. We would argue that many of the issues identified through the Hotspots project and this evaluation will also be crucial factors in the impacts and recovery of those communities to COVID.

3.1.3 Provision of specific heatwave information and options

Many of the diary entries indicated that the flyers and other information provided by the Hotspots teams was widely available to many people [DE 19, 24, 39]. Hotspots team members were able to share information and advice with people about the range of actions and services that could help improve their heat safety.

Majority of residents surveyed today not aware of heat education such as closing blinds before the sun rises to keep units cool, community cool room downstairs open 24/7 during heat waves however most residents did mention they drink plenty of water, stay indoors and in front of fan. [DE21]

[I asked] "how do you make it through these hot days and nights??" to which he replied "you just do it, what else can you do?" which was alarming to me. I let him know that if it gets too much to bear next time to come down to the office and talk to the cohealth staff as we can see if he can get any assistance from different agencies. [DE35]

Hotspots team members also suggested that simple messages, repeated often by trusted people were effective; with local champions at every level and in every community is critical to success. [DE 51, 49]. Overall, the structured diaries suggest that the Hotspots Initiative was effective in

providing relevant information directly to potentially impacted community members. Given the limited number of hot days however, it was not possible to ascertain the extent to which that information was acted upon. The diaries do indicate that the 'most effective' activity is face-to-face discussions with Hotspots team members.

Community engagement by the Hotspots teams also identify some simple, practical actions that can help support the awareness raising function of the projects. One diary entry highlighted that community members suggested that councils provide signage on relevant buildings where individuals are welcome to stay indoors during hot days [DE12]. Another suggestion was to create holiday show bags which would include the *Keep Cool in Summer* campaign postcards, extra leisure passes, and myki passes [DE12].

3.2 What can the Hotspots projects tell us about the components of an effective response to reducing heat vulnerability in low income communities using a cross-sector collaborative approach?

To address this second question, the evaluation sought to understand the successes, issues and challenges for the Hotspots projects. In exploring these issues, the evaluation sought to identify what the project teams learned, what can be built upon, and what needs improvement. In particular, it sought to gain insights into how effective local level networks are in getting the right information to the right people and influencing change on a community level (i.e. reducing poor health outcomes), as well as how local level collaborations tie in with State Government focus and initiatives.

Overall, the findings suggest that the components of an effective response to reducing heat vulnerability in low income communities using a cross-sector collaborative approach would involve two key things:

- Maintaining the flexibility in project and activity delivery, enabling projects to provide context, place-specific outreach, including working through and building upon local networks; and
- Supporting the sharing of experiences and learning among the Hotspots teams and their local level networks.

These findings are discussed below.

3.2.1 Project flexibility enabled engagement and outreach

The Hotspots Initiative enabled the Hotspots teams to be creative and flexible in the activities they generated and within which they participated. For example, *cohealth* holds a bi-weekly community lunch and through this was able to discuss with residents, heat issues and their preparedness. This flexibility clearly enables the different Hotspots teams to ‘tap into’ or develop connections across their different networks. In turn, by enabling their participation in diverse activities connected with other service providers and local government events it helps extend the Initiative’s reach to diverse individuals and groups. These activities included having a wide membership of the Hotspot project working groups, holding service provider forums, initiating activities such as the CroakeyGo Walk, and participating in a variety of other service provider activities. Several of the Hotspots teams simply spent time at various community and social housing to talk with residents.

Being on-the-ground locally based service providers, the Hotspots teams are clearly very well-placed to access existing and extensive networks among various service providers and groups. As the diary entries expressed, collaborating with relevant service providers greatly contributes to the Hotspots Initiative; the knowledge and experiences of these other organisations helps inform the project’s activities:

Meeting [with the library coordinator] created great outcomes and talking points in collectively working together – organising and providing resources to the library (water bottles, paint and templates; to engage interaction and awareness within families when attending the reading sessions). [DE9]

It was really great to be able to bring local service providers together to highlight what they can do to support vulnerable communities to stay cool and plan ahead. This activity was one of the key recommendations coming out of last summer’s consultation with service providers. [DE58]

The Smith Family supports a network of playgroups and playgroup facilitators. It was really great that they were able to share contact information for active groups in the X areas of

Sunshine. They also agreed to actively promote and share resources about the project via their newsletters. [DE59]

Equally, the Hotspots teams are able to help other service providers build their understanding of heatwave vulnerabilities and what roles they might play in helping to address them. The Hotspots teams have clearly been extremely busy connecting, building and maintaining their networks. As *enliven's* 2019 Evaluation Report states, the "collaborative approach between partners opened up networks for information distribution in very short time and provided new networks for Council sustainability unit and *enliven*".

The diversity of organisations and groups engaged shows the creativity and strategic thinking of the teams, and of the potential of this project to support the sharing of information and knowledge through these existing networks. The following is a small representation of kinds of groups engaged:

- Local governments – community engagement and emergency management departments, youth services, early years networks, community care, libraries etc.
- CALD communities
- Migrant and refugee centres
- Youth Climate Action workshops
- Seniors festival, multicultural showcase
- Seniors clubs, including their leadership groups and planned activity groups
- Different women's associations
- Neighbourhood houses and community centres, including their planned activity groups and playgroups
- Community leaders from refugee and asylum seeker backgrounds
- Social justice coalitions working on issues such as homelessness
- Art galleries
- Victoria Police
- Water Authorities
- Department of Justice
- Other Hotspots teams
- Hospitals
- VCOSS
- The Smith Family
- Universities with campuses in their areas

One diary entry, referring to connecting with local government 'planned activity group sessions', exemplifies the potentiality of working through community service organisations' existing, extensive networks, noting they are:

going to be one of the primary ways in which to engage elderly groups. Through these sessions we will be able to provide some basic tips around planning ahead & keeping cool. We'll also be able to learn about their experiences during summer and how they adapt and manage to inform future engagement activities. [DE60]

As is the nature of networks, some of the contacts made by the Hotspots teams provided them connections to other networks, further extending the project's outreach. For example, one team presented to the Vietnamese Women's Association playgroup which came about through recommendations from the Smith Family.

Crucial to accessing or enabling of these networks were formal connection points or spaces, such as the Hotspots project working groups. Project working or steering groups that consist of

representatives of multiple services providers, including local government and emergency services, provided a solid basis for consistent and efficient promotion of heatwave awareness and preparedness. For example, through the local council representative on a project steering committee, one Hotspots team member attended the Council's Youth Climate Action workshop aimed at understanding young peoples' perspectives on current issues. Through this the Hotspots team were able to present the *Keep Cool in Summer* campaign with the aim to recruit young people to be part of the project team. Perhaps equally importantly, these working/steering groups have enabled co-learning among the participating members and organisations.

A Service Providers Forum/Network, such as that run by Brimbank City Council, also appears to have provided similarly mutual learning and strategic coordination of activities. As one of the diary entries stated, the network *"is a great medium for info sharing as it also involves local settlement services who are often engaging with our target cohorts and can be a great partner for us"* [DE66].

For example:

According to the Victoria Policy (VicPol) representative, prior to attending the Forum, this topic [of heatwaves] was not a particular priority nor well understood by many officers. After attending the forum, the VicPol rep (a sergeant) has indicated that they now have a different view of the issue and would be encouraging all officers in the Brimbank area to consider how heat impacts on health and the flow on impacts on community movements' and interactions which may result in their [VicPol] attendance. [DE63].

During our meeting [with a local youth drug & alcohol service] we were able to map out the different community touch points where the engagement and outreach team would be able to develop content and, in many instances, deliver services in such a way that accounts for heat related stresses. [DE71]

Today we met with 5 young people who have agreed to be part of the Keep Cool in Summer youth project team to develop youth-led awareness raising activities. This is a project we're implementing with the support of Brimbank City Council Youth Services Team.... we started a brainstorming session to try and answer specifically the who & where as it relates to vulnerable young people ... It was really exciting to hear about the possibilities for engagement and supporting youth-led ideas to raise awareness. [DE84]

A Hotspots team was invited to have a table at the City of Greater Dandenong's (CGD) Seniors' Festival month. Attended by seniors and their service providers such as Residential Care facilities and the Planned Activity group, the team was able to talk to them about their preparedness for summer as mentioned by DE17.

There were several opportunities for outreach through a range of events hosted by different service providers. The Hotspots team worked with and through these service providers to engage with a wider population. The outreach events mentioned and/or attended by Hotspots teams across all three locations included:

- Attended the picnic in the playground for children's week at Sunvale Community Park at Sunshine. About 60 + families with young children at the event. It was a multicultural event with a wide range of free activities, fruits, water bottles and hygiene packs given out by the program holding the event [DE6].
- The South East Multicultural Seniors Forum had over 100 seniors club leaders in attendance, with speeches by politicians, presentations, and choral events and dancing. The Hotspots team was invited to share a table at the event by the Southern Migrant and Refugee Centre where they were able to share Heat Health information with those at the forum [DE9].

- The South East Seniors Clubs Leadership Group – 24 people. This group is facilitated bi-monthly by Southern Migrant and Refugee Centre made up of Senior Citizens Centre Presidents and Secretaries/Committee from Greater Dandenong and Casey municipalities. Many remembered the 5 key heat health messages from a February presentation and as requested had relayed them to fellow club members and family and friends. They also shared tips for keeping cool and had increased awareness of the Nurse on Call service. Importantly, this DE noted that the group appreciate getting resources in their first language. *“One group invited us to attend their club meeting to share the message with the members”* [DE15].
- The Evergreens Seniors Club – 80 people. The invitation came from President to present to the club members after seeing the presentation at the Seniors Club Leadership Group meeting [DE19].
- Attendance at a ‘Healthy Living’ lunch run by Unison Housing [DE37].
- Joined a Vietnamese group who meet at the estate every 2 weeks for lunch. The Hotspots team member organised a Vietnamese interpreter to help with the survey/questions for the residents [DE34].
- The CroakeyGo Walk was incredibly powerful in sharing the message about heatwave safety and preparedness ... [DE31].
- Presentations at Planned Activity Groups (for the elderly) at different Community Centres.
- Various Women’s Associations and their facilitated playgroups – *“Working with the women’s association and the group lead, we were able to share some tips around planning ahead and keeping cool as it related to children and parents”* [DE64].
- Interfaith groups – *“One of our strategies is to try and activate buildings that can provide cool spaces for vulnerable community members to access in addition to the libraries, shopping centres and shopping plazas.... Many of the interfaith reps I spoke to during the meeting and afterwards were interested in the project but did not say more. This may be due to the fact that they do not necessarily see this as their role or that there may be some logistical limitations that make this difficult”* [DE65].
- My Community Voice network – a meeting of community leaders from refugee and asylum seeker backgrounds held bi-monthly to share information on local issues, programs and provide opportunities for advocacy [DE75].

Working with others also provides various types of project efficiencies and consistencies in the messages that communities hear.

Brimbank CC communications team is working with IPC Health Communication team to share alerts about heat wave health. This has been difficult in the past but has been very rewarding. Our CEO has made a shared statement for publication via Start media in conjunction with Brimbank City Council. [DE31]

By utilising their existing networks, and building upon them it is evident that the community service organisations provide extensive impact and value-for-money in delivering the Hotspots project.

3.2.2 Learning among Hotspots teams and service providers

Through developing and extending their networks with various service providers in their communities, the Hotspots teams facilitated learning among a wide array of organisations and individuals. There were several examples identified where interactions led to a deeper understanding of the root causes of peoples’ vulnerabilities to heatwaves:

The involvement from the different service providers [at the Service Providers Network] provided a great insight into the factors influencing heatwaves to these groups. [DE10]

Learning about Greening the West was important. Understanding and addressing how cities and neighbourhoods can be re-designed to make us healthier is the focus of Greening the West. How environments can be reimagined and re-purposed has been a topic of discussion amongst many of the groups I engage with. Knowing about this project will provide me with confidence to talk to groups about their individual contributions as it relates to the big picture initiatives underway. [DE47]

In other cases, the connections enabled residents to learn from those within the project teams' networks:

We had a councillor come to talk to residents about any issues they may have living here in Carlton. This was very beneficial as the councillor had vast knowledge of climate change ... One particular resident was very motivated from these new ideas and mentioned this to me, along with possible ideas of requesting energy companies to sponsor the use of solar panels on the high-rise; giving residents free power at certain times and also putting energy back into the grid. [DE4]

In other cases, the networks created or utilised by the Hotspots teams enabled the project to engage with harder to reach groups:

It was great to be able to link into language supported group such as this one. Working with the women's association and the group lead, we were able to share some tips around planning ahead and keeping cool as it related to children and parents. [DE64]

Discussions with other service providers seem to have confirmed the need for the project:

A strong need for awareness raising at a community level as emergency services call outs for a range of issues do increase during extreme heat events. [DE64]

Also important for learning amongst Hotspots team members, were opportunities to connect with others also working on climate change and heat related issues for example the VCOSS Climate of Fairness Forum held in late 2019:

Considering this is the first time for me and the organisation (IPC Health) to be working in the space of heatwave health, it was really good to be able to see and hear about all the different projects and methods for action underway. I definitely walked away from the forum thinking about all the different elements we can weave into discussions around addressing vulnerability during our steering group meetings and when talking with community. VCOSS did a great job of bringing everyone together and showcasing community interventions. [DE56]

Sessions delivered earlier in the campaign to various seniors and play groups, which often consisted of people from various countries of origin, had prepared me well to facilitate this conversation with the group. I was able to draw on examples, anecdotes to illustrate main points and to better connect with group members. [DE57]

Having an overarching Hotspots 'project' was significant in that it catalysed and enabled connections and knowledge sharing among the Hotspots teams and with other service providers. This also enabled teams to take up a range of opportunities to extend the reach of the Hotspots work. This collaborative and flexible approach to project delivery allowed for more strategic engagement aimed at improving community resilience to heat events.

3.3 Challenges and opportunities

There were some practical challenges and identified opportunities for improving the Hotspots projects.

3.3.1 Challenges

There were three key challenges identified through project teams and diary entries:

- Language barriers and the need to provide resources and information in multiple languages;
- The timing in delivering key messages prior to summer as this made it challenging to engage people in heat related issues when it might be wet and cold outside; and
- Maintaining voluntary Steering Committee commitment.

One challenge identified by the Hotspots team participants in gathering and appreciating peoples' stories, lay in language barriers. If the Hotspots team member did not speak a language also spoken by the community member, it was challenging for them to interpret the speakers' intent. This suggests that the Hotspots project and its evaluation would be better supported by working with community leaders and interpreters. Several diary entries also indicated that delivering the program only in English is likely a project limitation [DE 8, 41]. Another entry indicated one way such a challenge might be surmounted; one Hotspots team member worked with the facilitator of the planned activity group experienced in engaging with a particular cultural group, enabling the project team to translate and facilitate a discussion with community members:

The language barrier experienced by this group would ordinarily make it difficult for them to access services. It was great to be able to provide some critical information to support their decision making and to highlight some simple strategies for staying cool in summer ... the group leader said she was surprised at how much the group engaged with the topic and it had highlighted for her how vulnerable they are as group and that more planning ahead of summer is required to ensure group members are supported and are not at risk. [DE69]

Engaging people in discussions of heatwaves when the weather on the day of the interaction was mild, even though *"they politely listened to the message and approximately 20 took resources"* [DE16].

Like many projects there were some challenges in maintaining consistent involvement of Steering Committee members. Hotspots project Steering Committees seek to involve multiple other service providers. However, the availability, interest, and repeat attendance of these organisations' representatives seems to be a challenge:

It was challenging to provide context for new meeting members to participate fully. Their attendance signifies their interests in the project and the messages, but they are having a difficult time understanding how they can contribute. The chair had to almost form links and connections with the participants which eventuated in agreement to work offline to follow up these cross-partnership opportunities. [DE31]

These are specific lessons upon which continuation of the Hotspots Initiative can build. There are also likely to be insights from other community engagement and development programs that could help strengthen the Initiative.

3.3.2 Opportunities

The Hotspots project teams identified several opportunities to consider for a future Hotspots Initiative:

- Broadening the scope of targeted groups;
- Providing more sophisticated and tailored messaging to account for different circumstances and experiences;
- Building an evidence base by collecting data on heat related illnesses which would make more visible the health risks, demonstrate impact of initiatives, and inform the design of interventions; and
- Adopt a whole of government supported approach to managing heat related health risks through a place-based approach.

In broadening the scope of targeted groups there is also an opportunity to reflect on the multiple categories that contribute to vulnerability:

We need to clarify our understanding/meaning of vulnerable community groups. [For example] Community members impacted by disabilities were not initially a target group we set out to engage but organisations who engage with them on a regular basis are making us aware that there is a need. [DE46]

Others suggested a continued focus on CALD communities by tailoring messages for different cultural groups and populations particularly given that heat is experienced differently [DE51]. Yet others highlighted a need to consider more sophisticated information that could help people stay cool without causing them financial distress:

Our messages may not resonate because for example staying cool could mean needing to use more electricity than what the individual can afford so we need to be aware of which key message to promote and to whom. [DE51]

Finally, such a program requires a whole-of-government approach. Such approaches are often mentioned but rarely enabled. PCPs are ideal organisations to facilitate such an approach. They are trusted and viewed as neutral. Moreover, because they are situated in and have worked for many years 'in place', they know the stakeholders and communities. They can quickly draw upon, and reach, many people through their extensive networks.

4. Conclusions regarding the Hotspots pilots

Internationally, heat related initiatives are necessarily diverse in design, scope, and reach, to address different contextual and structural factors. These include individual and community needs, organisational capacities, and associated goals for interventions. While this means it is difficult to infer which activities may be more effective than others, there is much that can be learned from the insights provided by the Hotspots teams, which this evaluation sought to highlight.

The following summarises key conclusions about the Hotspots pilots drawn from the above findings.

4.1 Delivers targeted information for 'at risk' communities

This evaluation suggests that the Hotspots Initiative is delivering useful, targeted and practical information that can help people manage heatwave impacts. The importance of tailoring information to different lived experiences and needs was highlighted.

This issue highlights that generic broadscale messaging, based on an assumed, singular definition of heat vulnerability is unlikely to be effective. The capacity to communicate through trusted organisations and community groups ‘in place’ was an important feature of the Hotspots Initiative. Project teams were able to identify opportunities to work with key stakeholders and organisations within their local networks, enabling the projects to reach more ‘at risk’ people; including those not initially identified nor targeted.

Perhaps unsurprisingly, the evaluation indicated there are limitations in trying to share heat health issues solely in English. However, it also found that such ‘barriers’ can be overcome through collaborations with community leaders and other service providers that can adapt messages in different languages. Hotspots teams suggested people with disabilities or diverse genders, would also need to be considered in the Initiative’s next phase.

Recognising people’s different lived experiences of heat, saw the project teams suggest that there needs to be a better understanding of particular cohorts and their vulnerabilities to heat. They suggested that the next phase of Hotspots projects should focus on these identified groups. For example, people with disabilities were identified as those who would potentially benefit from different forms of outreach drawing on a deeper understanding of their lived experience. So too those experiencing homelessness:

Many had noted that the issues of extreme heat should be front of mind when planning for and supporting those affected by homelessness during summer. [DE76]

A continued focus on CALD communities is warranted, with particular attention paid to working with community leaders and other programs that work in different languages. Overall, the evaluation suggests that outreach activities are useful where they are targeted to specific local contexts and even individuals. This was effectively supported by the Initiative’s enabling the teams to work flexibly and adaptively.

4.2 Provides insights into systemic drivers of heat vulnerabilities

Equally as important as information and support to vulnerable communities, is the role the Hotspots Initiative plays in deepening our understanding of the many factors influencing different people’s vulnerabilities to events such as heatwaves. Hotspots identified actions to help address immediate and acute impacts of heatwaves, while also building a body of evidence that can inform wider advocacy actions targeted at addressing the more systemic drivers of vulnerabilities, such as sub-standard housing. Insights from this project underscore that reducing exposure to heat, such as through cool rooms or short term solutions, will not reduce ongoing risks and vulnerabilities.

Much more systemic work is required to reduce the vulnerabilities of communities and individuals with whom the Hotspots teams identified and engaged through their outreach.

Three systemic drivers of peoples’ vulnerabilities to heat were identified:

1. The poor quality of public and community housing;
2. Existing health issues that often require specialised support and advice; and
3. A sense of disempowerment and that ‘no-one cares’, despite having raised concerns or needs in many different forums particularly around housing issues.

Further work is needed to address these systemic drivers of vulnerabilities so that people are not debilitated by heat but rather can live well during heatwave events and other implications of climate change. The long-term trends around climate change are that we will experience more frequent and sustained periods of extreme heat. Efforts to build such adaptive capacities will therefore have to

engage with and address the chronic or systemic drivers of vulnerabilities highlighted by the Hotspots Initiative.

4.3 Supports effective local scale place-based collaborations

While the overall outcomes of these projects were focused on the health and wellbeing of those experiencing disadvantage, the projects have also generated a number of co-benefits including:

- Strengthening local-level collaborations between multiple service providers and organisations from both government and the community sector; and
- Increasing the capacity of community health and social service organisations, and the communities they work with, in terms of understanding the health inequities exacerbated by heat, and linking heat, health and housing issues.

A high level of complementarity with other community outreach programs was identified. As were multiple benefits from closer collaborations with other community service organisations and programs, including extending the Initiative’s outreach (see Section 3.2.2 above).

It is evident that the Hotspots teams efficient and creative use of their existing networks is extending their projects’ outreach quite effectively, linking heat, health and housing in particular. There would be value in helping the teams to strategically map their shared and individual networks for this advocacy and outreach to be even more influential (and help reduce some workload for the teams). Some examples include:

- help tenants understand their rights [DE 25, 26, 37] regarding housing, and health. DE55 stated that “*Justice Connect [department of justice] is keen to develop messages that reach those who are impacted by homelessness and those living with a disability. There are opportunities to discuss further and to support the development of ideas.*”
- the ‘You Foods team’ that meet every week to, “*create recipes made from discarded or unused food items donated by restaurants, stores and families. The aim is to reduce waste and demonstrate ways in which people can extend the life of edible goods they purchase*”. They were really receptive to the idea of exploring opportunities to tap into what they doing to create recipe ideas for families during summer [DE57].
- Victoria Police and their program ‘coffee with a cop’ to engage with local residents around issues of concern. One Sergeant agreed to distribute materials re-*Keep Cool* at the various sessions [DE63].
- The Smith Family CfC
 - playgroups and the Milestone program give talks i.e. maternal health nurse [DE83]
 - Saver Plus program with low income families to provide information on how to save power while trying to stay cool i.e. air conditioning and practical advice
 - work with students in primary schools’ educational programs and in high schools, running mentoring programs. There may be an opportunity to work together here.
- Other local government programs [DE83]. For example:
 - Brimbank City Council have a Dynamic Young Citizens program – focused on grade 5 and 6 students
 - Brimbank City Council Community Grants program presents an opportunity to build capacity through a grant to inform community groups on heat health, heatwaves, fire safety and climate change.

- Neighbour Day Grants – ‘Getting to know your neighbour’ continuing from 2015 – for community and community groups to apply. This is a good opportunity to share any brochures/information from the group, out with the grant information pack.
- Uniting Housing is applying for a grant from the State Government to run workshops for the Sudanese community in the western suburbs – 100 home visits/6 public workshops around energy literacy. There is an opportunity to engage with this work and train community leaders to further share information with their community.
- Neighbourhood Houses could also be potential partners [DE86]. e.g. the Kororoit Creek Neighbourhood House is focused on exploring renewable energy with communities. Such organisations could provide a template for additional engagement and capacity building activities:

The opportunity to work with Uniting Housing to expand their program in the Brimbank area is exciting and would be beneficial for many of the individuals and groups we spoke to thus far. For many, keeping their homes cool and being able to afford power is a real issue and one that is causing stress as the cost continues to increase. Uniting's program supports those impacted by financial hardship, supports eligible clients to make home improvements and also provides examples of emergency efficient appliances that consumers can purchase with confidence. Uniting does not currently offer these programs in the Brimbank area and is keen to work with IPC Health to facilitate engagement with community. [DE72]

Two diary entries indicated that young people, and the services that support them, are keen to be involved in a project such as Hotspots as a way of helping youth to stay cool but also engaging young people as advocates and even team members:

Young people care and they are interested in creating healthier environments for all. Young people are fed up by the lack of appropriate action to mitigate the effects of changes in our climate and the impacts on health. Young people have smart solutions and are willing to give up modern comforts if it means survival! Willing to join project team. [DE48]

Brimbank Youth Services is keen to explore ways in which they can better reach young people. I was able to share insights from the Service provider forum which highlighted a lack of youth friendly spaces and a "move on" culture towards young people who gather in large groups. BYS acknowledged these sentiments and is aware of these and other issues which make it difficult for young people during extreme heat events. It was agreed that BYS would tap into its existing comms channels to share information, would also support the establishment of a youth project team to pilot awareness raising activities and also look at tapping into their holiday show bag program to facilitate access and opportunities to stay cool. [DE64]

It is evident that a collaboration with Brimbank Youth Services for example, could provide an excellent pilot of such work. There are likely to be other Youth Services groups with whom Hotspots teams might connect. There may be value in exploring connections with a relevant ‘Youth Services’ network.

The Hotspots Initiative also helped to leverage further funding from State government to support community and health service organisations better adapt to climate change for example through *enliven's* 3CA grant funded by DELWP.

5. Recommendations for future direction

The Hotspots Initiative is raising awareness around heat related risks and impacts among members of the vulnerable communities and associated service delivery organisations with whom the different Hotspots organisations work. More broadly however, there is the beginnings of a climate change and community resilience learning network emerging among members of the community services and health sector with lessons being shared across a number of initiatives, including Hotspots. There is a real opportunity to build on this existing momentum and awareness raising, to continue supporting learning and advocacy amongst a wider network of organisations.

Building upon the insights from the pilot Hotspots projects, the following recommendations can be made in response to the two central questions which were the focus of this evaluation.

- What makes different outreach activities useful in helping understand and address the needs of those most vulnerable to the health impacts of heatwaves?
- What are the components of an effective response to reducing heat vulnerability in low income communities using a cross-sector collaborative approach?

Recommendations:

1. **A Comprehensive and Integrated Community Resilience Program:** Broaden the scope of Hotspots to include a more comprehensive program with opportunities for integration with other resilience initiatives (i.e. don't 'just' focus on heat health). The Initiative's place-based collaborative model could inform broader community development work aimed at building community resilience;
2. **Coordinating Group:** Establish and maintain a 'core group' responsible for oversight and guidance to inform the program, support and enable Hotspots teams to be 'core groups' or 'nodes' in extreme event planning, preparedness, response, and recovery;
3. **Community of Practice:** Establish and maintain a community of practice/network focusing on community resilience and climate change among community service and health organisations (CSHOs);
4. **Continue and Expand:** Support the existing projects to be year-round and expand to further identified Hotspots;
5. **Evidence Base and Research:** Build the evidence base to raise awareness of heat related health risks, support research and gather consistent and regularly updated data to inform future work. This could include heat-related hospital admissions data and research that can identify where in the system key leverage points might be found and targeted, social and public housing upgrades/maintenance data, other data associated with heat events such as rates of family violence etc.
6. **Monitor, Evaluate, Learn:** Establish and maintain a monitoring and an annual evaluation program; and
7. **Strengthen Advocacy:** Continue advocacy for systemic changes by drawing upon the collective insights of PCPs and the CSHOs (i.e. enabled by a coordinating group), particularly around social and public housing and the need to involve and engage housing providers and managers.

These recommended components are detailed below.

5.1 A comprehensive and integrated community resilience program

Hotspots should be developed as a *program* that seeks to inform, support, and connect a range of existing community engagement and development projects.

Extending the 'place-based' approach of Hotspots to related community resilience concerns would potentially enable a more integrated program of work. This would allow the 'summer' component of the program to be more responsive in the lead up to heat events.

Hotspots has revealed some of the more systemic challenges facing disadvantaged communities in preparing for and responding to heat events particularly around housing provision and quality. An initiative such as this one could play an important role in building advocacy around these issues while also providing advice for vulnerable and disadvantaged peoples in how to deal with heat, including their rights regarding accessing relevant support. This immediate support could be enabled through on-site visits from project team members and other activities defined by each community service and health organisation (CSHO). The wider advocacy work might be supported through working with councils on their health and wellbeing plans and contributions or submissions to the state's Adaptation Action Plan for the health sector.

Perhaps more importantly, the Hotspots Initiative could provide a model for place-based community resilience planning; where broader resilience could help communities better deal with bushfires, pandemics, and general wellbeing. Importantly, resilience is more than just emergency management and response; it is a question of justice. There were some suggestions that such a program might be enabled through partnerships with local governments who have the position and authority to make decisions from a strategic, systemic level. They make decisions about key areas that impact peoples' vulnerabilities and resilience, such as housing, access to healthcare, emergency management, open and green space, etc., and are able to bring those policy areas together.

Community resilience would also require the commitment and support of state agencies and authorities. To do this effectively taking a systems approach would be necessary which would help identify key leverage points, clarify responsibilities for those leverage points, and thereby guide a strategic program of collaboration and action. A systems perspective would enable actions that address the local and immediate issues while also consolidating insights and addressing systemic issues. Conceived as a holistic approach to community resilience, such a program could be instrumental in addressing a range of issues and services that reduce vulnerabilities while also advocating for more systemic changes. If resourced, the program could provide a sustained mechanism that provides the forum for bringing stakeholders together in tackling resilience issues through a place-based approach.

Finally, the flexibility of the LMCF funding allowed each project team to develop their own activities that were place-based and context specific, and also enabled them to take advantage of opportunities to work with other organisations as they arose. This flexibility should be maintained. Indeed, one of the project leads emphasised that the coming 2020-2021 summer will be challenging. COVID demands that we keep people well and in their homes. Yet the quality of much public and social housing (alongside other issues identified in the Hotspots work) means that they may not be able to safely stay home. The compounding risks associated with COVID and climate related issues need to be considered in future service delivery and program design.

5.2 A 'core' coordinating group

The Hotspots funding enabled and legitimised the role of primary care partnerships and community service organisations to both build their own capacity and their networks, to better understand heatwaves and associated impacts, and helped them better support their communities. A future

Hotspots program could facilitate and support 'core groups' in different places in or across local government areas.

In future, a 'core group' could play a key role in ensuring that a learning space is created, where knowledge and experience can be shared across different organisations and places. The group could manage and facilitate this process which could then inform relevant policy processes and programs (e.g. revision of municipal health and wellbeing plans, and development of state-wide Adaptation Action Plans for the health and human services sector).

Initially including representatives of the original Hotspots projects, with representation rotating on an annual basis, this core group could meet 4 times per year to share lessons, insights and struggles. As an important intermediary organisation, Victoria's PCPs are well-placed and trusted organisations to undertake such coordination and facilitation.

5.3 Develop a community of practice/network

As noted above, the Hotspots teams saw value in sharing their experiences and methods, as well as hearing about current research and the practices of other organisations. Building on the previous recommendation, a 'core/ coordinative group' might also:

- Provide and facilitate a forum that bring local service providers together to share their knowledge, methods, and experiences to help build a community of practice;
- In doing the above, support the development of Health Heatwave Plans that are tailored to the cultural or disadvantaged contexts of different communities;
- Provide support for explicitly cross-sectoral activities across health heat projects and climate change issues more broadly;
- Resource project coordinators, similar to the three pilot projects, with relative flexibility in delivering fit-for-context activities and processes; and
- Monitor, evaluate and distribute more widely the outcomes and lessons from this ongoing work. Each Hotspots project might also be supported to do this work at the local, place-based scale.

5.4 Continue and expand

To continue and expand the important work started by this Hotspots pilot initiative there will be a need for further resources and support. Therefore, it is recommended that:

- Resources be provided to enable the current PCPs and CSHOs to continue to build on their work with existing networks as well as identifying opportunities to expand to different PCPs and CSHOs;
- PCPs and CSHOs are supported to build new partnerships with key target groups such as homelessness services and youth groups;
- Teams are helped to strategically map their shared and individual networks for this advocacy and outreach to be even more influential (and help reduce some workload for the teams);
- A range of communication mediums, co-developed with community leaders, are used to engage with specific cultural communities; and
- Processes and mechanisms are used or developed to give greater attention to the issue of heat and health impacts.

5.5 Evidence base and research

Through the evaluation process a number of areas were identified where data or research might help build the case for an ongoing program such as Hotspots:

- Heat related hospital admissions. One Hotspots teams' local hospital is interested in the issue and the project more generally. DE 50 suggested that there is a desire to collect data to raise greater awareness. Collecting data on the rates of heat related illness would be an important way to make visible the risks associated with heat for different cohorts. This data could then be used to design and inform programs and to raise awareness around heat related health risks. Relevant data from Ambulance Victoria may be available as one of the Hotspots team was provided a sample from the 2018-2019 summer for hospital admissions due to 'heat exposure';
- Sustainability Victoria's study of the financial benefits in terms of health outcomes from housing retrofits would be a powerful source of data to inform the next steps for Hotspots, helping it systemically tackle heat health impacts (Sustainability Victoria, 2019);
- Updating of Monash's heat vulnerability indexes² analyses could help identify other 'hot spots' for the Initiative's focus;
- Consolidating information from similar activities by other organisations at differing levels of government and across the NGO/NFP sector would further help target the Initiative's future actions and identify areas for collaboration and wider impact; and
- Gathering evidence of the impact of Hotspots work. While this evaluation has provided an initial basis, a sound monitoring and evaluation process as part of the program's overall program logic would be invaluable (see the subsequent recommendation).

5.6 Monitoring, evaluation and learning

In order to help guide future efforts and understand how such work is contributing to the reduction of heat vulnerabilities, it is recommended that the Hotspots Initiative establish and implement a monitoring and evaluation program through:

- Continuing to gather experiential stories and insights from communities Hotspots is seeking to support. Developing deep understandings of peoples' lived experience helps provide a strong evidence base for improving community resilience building strategies including practical interventions and to inform advocacy for systemic change. Hotspots could support this by undertaking a simple 'professional development' activity in methods of story collection from community members (diaries, stories, artworks, etc.);
- Documenting and engaging with cross-sectoral advocacy across heat health projects and more broadly with climate change responses;
- Undertaking an annual Appreciative Inquiry Workshop with Hotspots team members to provide opportunities for learning and reflection;
- Sharing existing resources and experiences such that other CSHOs and PCPs, and their stakeholders, might learn from each other;

² More detail on Monash at <https://www.monash.edu/news/articles/6639> and see Sun *et al.* (2019).

- Contributing lessons learned from different project activities to the Australian Disaster Resilience Knowledge Hub <https://knowledge.aidr.org.au/>;
- Exploring questions such as:
 - Impact of/responses to heatwave declarations;
 - Impact of/responses to culturally and linguistically appropriate communications materials and methods; and
 - Differing needs of at-risk community groups.

5.7 Strengthen advocacy to address systemic drivers

Reflecting understandings from academic research, the Hotspots pilots also highlighted that reducing exposure to heat will do little to reduce long term heat risks and vulnerabilities. Therefore, alongside continuing actions aimed at addressing immediate and acute impacts of heatwaves, the Hotspots Initiative can build and use a body of evidence to advocate the need to address systemic drivers of vulnerabilities, such as sub-standard housing. It is therefore recommended that, the Initiative's next phase:

- Use this evidence base to continue CSHO and VCOSS advocacy targeting significant improvements to public, social and community housing, including maintenance and building programs that create sustainable, energy efficient homes. This includes identifying gaps and inadequacies in the regulations or standards governing social and public housing retrofitting and upgrades;
- Send a submission to those responsible for development of the Health and Human Services Adaptation Action Plan required under Victoria's Climate Change Act (2017);
- Advocate for the role of PCPs in guiding and enabling such programs, and their role in delivery of council health and wellbeing plans; and
- Advocate for regular and consistent reporting on hospital admissions due to heat stress. This could involve a central repository of such data that can be analysed by heat event, geography, de-identified relevant socio-economic data, outcomes, and needs analyses. This data would assist PCPs, CSHOs, and other relevant organisations to better understand risks and help tailor and target interventions.

The Hotspots projects have provided vital support to those most vulnerable during heatwaves and have developed the evidence that significant changes are needed to address the drivers of peoples' vulnerabilities to heat.

Final note

The Hotspots Initiative is important in that it explicitly seeks to enable and empower the most vulnerable in the face of climate change, while also identifying and documenting drivers of vulnerability. This both elevates the issues associated with heat related health impacts and highlights some of the systemic reasons why marginalised populations are most at risk from climate change. The focus on public and social housing in the Hotspots Initiative clearly points to significant challenges in addressing and improving housing quality if at risk populations are to be better prepared for heat events. Hotspots has therefore highlighted the wider implications of dealing with heat stress for vulnerable populations, which is essential if we are to increase community resilience to the impacts of climate change.

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