ASIA-PACIFIC NETWORK FOR
GLOBAL CHANGE RESEARCH

Final Report
ARCP2014-23NSG-Huang

The following collaborators worked on this project:

1. Cunrui Huang, Griffith University, Australia/Sun Yat-sen University, China, huangcr@mail.sysu.edu.cn
2. Wenjun Ma, GDCDC, China, Email: mwj68@vip.tom.com
3. Dung Tri Phung, Ministry of Health, Vietnam, Email: ptdzung70@yahoo.com
4. M. Mamun Huda, ICDDR, Bangladesh, Email: mhuda83@icddrb.org
5. Adrian Barnett, QUT, Australia, Email: a.barnett@qut.edu.au
6. Xiaoming Wang, CSIRO, Australia, Email: xiaoming.wang@csiro.au
7. Shannon Rutherford, Griffith University, Australia, Email: s.rutherford@griffith.edu.au
8. Cordia Chu, Griffith University, Australia, Email: c.chu@griffith.edu.au

Griffith UNIVERSITY

SUN YAT-SEN UNIVERSITY

Guangdong Provincial Center for Disease Control and Prevention

Project Reference Number: ARCP2014-23NSG-Huang

"Scoping Workshop to Develop Proposal: Assessing the Health Effects of Extreme Temperatures and the Development of Adaptation Strategies to Climate Change in the Asia Pacific Region"

Final Report Submitted to the APN

Part One: Overview of Project Work and Outcomes

Non Technical Summary

The health effects of extreme temperatures are the most significant source of weather-related public health problems. They are also the most direct and well-understood of climate change impacts on human health. Our research team aims to investigate the health effects of extreme temperatures and climate change in the Asia Pacific region and to formulate local adaptation strategies for dealing with temperature-related health risks and reduce vulnerability. With the scientific and financial support from the APN, two scoping workshops were held in Guangzhou, China with the purpose of broadening partnerships within the region. Workshop participation from invited experts met or exceeded expectations. Almost all invited experts were able to attend scoping workshops and provided valuable inputs. Team members especially learned an appreciation of the difficulties in engaging in this type of research in developing countries and critical importance of strong international collaboration involving researchers with connections to local governments and science agencies. After the scoping workshops, the proponents started to conduct the preliminary research in China and Vietnam. The preliminary results have been achieved since early 2015. Finally, the whole research team agreed to finish this seed project and to apply for the continual funding from APN.

Keywords

Climate change, temperature, health, impact, adaptation

Objectives

The main objectives of this seed grant were as follows:

1. Plan and execute two scoping workshops attended by the research team and local scientists in China;
2. Establish and strengthen relationship with international partners, local science agencies and universities;
3. Improve the research framework and methodologies of the full proposal to be submitted to APN in the next Annual Calls for Proposals.

Amount Received and Number of Years Supported

The Grant awarded to this project was:

US$ 12,000 for Year 1 (2014-2015)

Activity Undertaken

- To communicate with the APN Science Office for clear understanding of the requirements for seed grant and proposal development;
- To take teleconferences and mail exchanges for the scope and preparation of proposed project;
- To hold two scoping workshops in Guangzhou, China in June 2014 and December 2014, respectively;
- After the scoping workshops, the proponents start to conduct the preliminary research in China and Vietnam.
- To communicate with other researchers/organisations for their future support on cooperation in the proposed project.

Results

Well understanding of the seed grant requirements from the APN has been reached, with a lot of communication and discussion in the project team.

Two scoping workshops have been held in Guangzhou, China with the main aim of strengthening the research team and country composition in the proposal.

New partners have been involved in this project. The scientists from Thailand are interested in this project and have agreed to be the part of proponents.

The research team especially learned an appreciation of the difficulties in engaging in this type of research in developing countries and critical importance of strong international collaboration involving members with connections to local governments and science agencies.

The preliminary results have been achieved since early 2015. In the meantime, the outcomes have been disseminated into other country partners for their future support on cooperation in the proposed project.

A new summary proposal has been discussed and the full proposal will be submitted to APN for the next call for proposal of ARCP.

Additional funding has been fixed to support this proposed project. SYSU Global Health Institute at Sun Yat-sen University in China has agreed to provide some kind of funding to support the project.

Relevance to the APN Goals, Science Agenda and to Policy Processes

Climate change is one of the biggest health threats in the 21st century. Research on climate change and human health is increasing, but it is still relatively weak in relation to the complexity of the issue and the magnitude of the potential risks from inadequate or inappropriate responses. A high priority should be given to building adaptive capacity in this field, particularly in developing countries that are most vulnerable to the health effects of climate change and have the least research capacity.

This project will enable countries in the Asia Pacific region to address temperature-related health problems through investigations that will assess regional vulnerability of public health

in the context of climate change and identify present and future needs and emerging challenges. This is under the areas identified in the APN's Scientific Agenda: climate change and climate variability. It aims to improve the understanding of global climate change and its implications by conducting regional research through international collaboration and capacity building.

Self-evaluation

With the financial and scientific support from APN, the research team successfully planned and executed all activities stated in the seed grant proposal.

Workshop participation from invited experts met or exceeded expectations. Almost all invited experts were able to attend the scoping workshops and provided valuable inputs.

The whole research team are pleasure to finish this seed grant project and to apply for the continual funding from the APN.

Potential for further work

Results have established strong potential for future collaborative work. The most important thing in the quite near future is to submit the modified full proposal to the APN.

Publications

Huang, C., A. Barnett, X. Wang, C. Chu. 2015. Scoping workshop to develop proposal: assessing the health effects of extreme temperatures and the development of adaptation strategies to climate change in the Asia-Pacific region. *APN Science Bulletin*, March Issue: 63

Huang, C., C. Chu, X. Wang, A.G. Barnett. 2015. Unusually cold and dry winters increase mortality in Australia. *Environmental Research*, 136:1–7

Gu S., C. Huang, L. Bai, C. Chu, Q. Liu. 2015. Heat-related illness in China, summer of 2013. *International Journal of Biometeorology*, doi:10.1007/s00484-015-1011-0

Phung, D., S. Rutherford, C. Chu, X. Wang, M. Nguyen, N.H. Nguyen, C.M. Do, T.H. Nguyen, C. Huang. 2015. Temperature as a risk factor for hospitalizations among young children in the Mekong Delta area, Vietnam. *Occupational and Environmental Medicine*, doi:10.1136/oemed-2014-102629

Acknowledgments

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Preface

Temperature-related health effect has become a matter of increasing public health concern, especially in light of global climate change. This project aims to investigate the health effects of extreme temperatures and climate change in the Asia Pacific region and to formulate local adaptation strategies to deal with temperature-related health risks and reduce vulnerability. With the scientific and financial support from APN, two scoping workshops were held in Guangzhou, China with the purpose of broadening partnerships within the region and gathering information among collaborators to further improve the research framework and methodologies of the full proposal to be submitted to APN.

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1. Introduction

There is a scientific consensus that the world's climate is changing, due to greenhouse gas (GHG) emissions caused by human activity [1]. The Intergovernmental Panel on Climate Change (IPCC) has concluded that warming of the climate system is unequivocal. Observational evidence from around the world shows that many systems are already being affected by recent climate change, particularly temperature increases.

Climate change poses a critical challenge to the health sector [2-4]. An increase in the frequency and magnitude of extreme events, along with reduced water and food security as well as degrading ecosystems, will have a significant impact on human health [5, 6]. The health impacts of climate change include both direct to indirect effects, such as extra deaths due to heat waves, increased transmission of climate-sensitive infectious diseases, and mental health problems caused by income loss due to a reduction in agricultural productivity [7-11].

All people will be exposed to the potential impacts of climate change, however some populations may be more vulnerable than others. The vulnerability depends on the level of exposure, population sensitivity and adaptive capacity [12, 13]. The health impacts will therefore depend on the rate and magnitude of changes in climate, on social, economic, demographic, infrastructure and other factors that can influence the sensitivity of populations to climate change, and on the adaptive capacity to manage the health effects of climate change [6, 14-17].

There are two main elements in climate change response policy: mitigation and adaptation. Mitigation means implementing policies to reduce GHG emissions and enhance carbon sinks [18]. Adaptation refers to "adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities" [19]. Although mitigation endeavours to avoid the unmanageable, adaptation endeavours to manage the unavoidable [20]. Hence, public health adaptation has become an important issue on the climate change agenda, and it is required to address the adverse health impacts of climate change using a multidisciplinary and intersection collaborative approach [21-25].

A particular area of concern is the occurrence of heat waves, which pose a significant challenge to health systems managing health risks and testing the resilience of public health infrastructure [10, 17, 26-28]. In the future, climate change is projected to lead to an increase in the frequency and intensity of extreme weather events, including heat waves. This trend will increase the risk of heat-related mortality and morbidity, especially for the elderly, chronically ill, very young and socially isolated individuals [29]. In order to respond to the challenges it is necessary to improve public health responses to heat waves in particular and to continually collect evidence on the health effects of climate change.

To date, international research has mainly focused on the identification and quantification of the associations between temperature and health, with less focus on applied research to manage the health effects of temperature and climate change [30]. This should be addressed urgently, especially for vulnerable groups. For example, many susceptible individuals often do not perceive themselves to be at risk from the health effects of heat. Research is therefore needed on how to make these susceptible people to be aware of their vulnerability and take preventive actions during hot weather. Also, a high priority should be given to building

adaptive capacity in this field, particularly in developing countries that are most vulnerable to the health effects of climate change and have the least research capacity.

This project will enable countries in the Asia Pacific region to address temperature-related health problems through investigations that will assess regional vulnerability of public health in the context of climate change and identify (in consultation with policy-makers and other end-users) present and future needs and emerging challenges. The project aims to improve the understanding of global climate change for the region, and to contribute to the development of policy options and decision making.

The main objectives of this seed grant project were as follows:

1) Plan and execute two scoping workshops attended by the research team and local scientists in China;
2) Establish and strengthen relationship with international partners, local research agencies and universities;
3) Improve the research framework and methodologies of the full proposal to be submitted to APN in the next Annual Calls for Proposals.

2. Methodology

For the clear understanding on the requirement for proposal development, we communicated with APN science office through email exchanges. Then, we took teleconferences among the research team for the scope and preparation of proposed project.

During June 2014 and December 2014, we organised two scoping workshops in Guangzhou, China. The scoping workshops involved literature review, sharing information by individual presentations and group discussion during the meetings, and site visit to Guangdong CDC in China. Topics presented in the workshops included current climate change related health issues over Asian countries and the development of full proposal to be submitted to APN.

After the scoping workshops, the proponents started to conduct the preliminary research in China and Vietnam. The preliminary results have been achieved since early 2015. In the meantime, the outcomes have been disseminated into other country partners for their future support on cooperation in the proposed project.

3. Results & Discussion

3.1 Scoping workshops

Well understanding of the seed grant requirements from the APN has been reached, with a lot of communication and discussion in the project team. Two scoping workshops were planned and executed with the main aim of strengthening the team and country composition in the proposal.

The first workshop in Guangzhou, China on 25-26 June 2014

A total 26 participants attended the workshop and 12 people presented their research work during the workshop. Following the individual presentations and group discussion, a scoping excise was conducted to address three questions: What are the main research questions in

the area of climate change and public health? What expertise is required for meaningful results in the Asia-Pacific region? What are data gaps and challenges in developing climate change adaptation strategies?

Figure1. Dr. Cunrui Huang introducing the project in the first scoping workshop.

Figure 2. First scoping workshop attendees.

New partners have also been involved in this project. The scientists from Thailand are interested in this project and have agreed to be the part of proponents.

The second workshop in Guangzhou, China on 3-5 December 2014

During the workshop, 14 participants attended the workshop and 9 people presented their work. After the individual presentations and breakout sessions, a new summary proposal was discussed and the project team tried to address two questions: How to improve the full research proposal? How to guarantee the implementation of the project?

Figure 3. Second scoping workshop breakout group sessions.

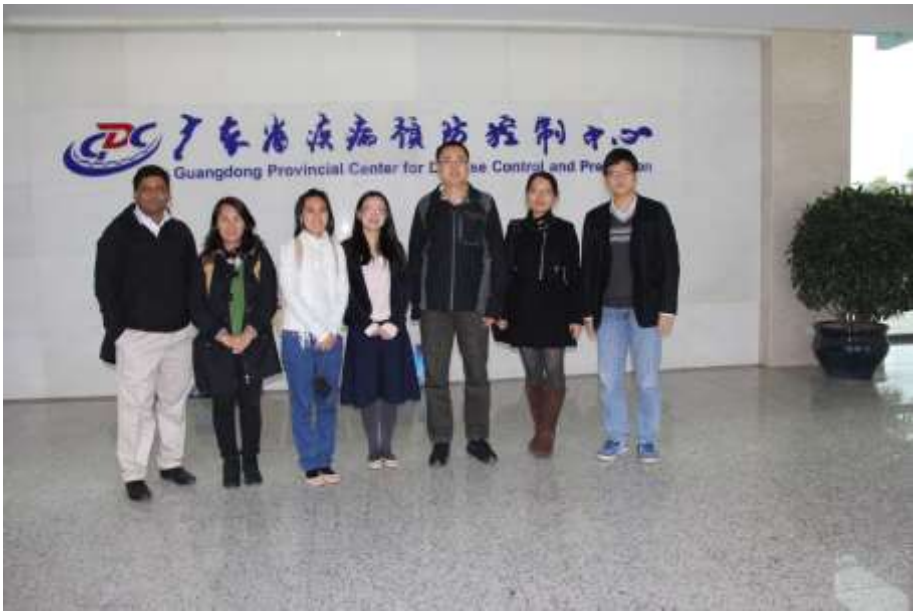

Figure 4. Site visit to Guangdong Provincial Center for Disease Control and Prevention in China.

Figure 5. Site visit to Nansha Wetland Park in Guangzhou, China.

The research team especially learned an appreciation of the difficulties in engaging in this type of research in developing countries and critical importance of strong international collaboration involving members with connections to local governments and science agencies.

Additional financial funds have been fixed to support this proposed project. SYSU Global Health Institute at Sun Yat-sen University in China has agreed to provide some kind of funding to support the project.

3.2 Preliminary results

After the scoping workshops, the proponents started to conduct the preliminary research in China and Vietnam.

Heat-related illness in China, summer of 2013

Extreme heat events have occurred more frequently in China in recent years, leading to serious impacts on human life and the health care system. To identify the characteristics of individuals with heat-related illnesses in China during the summer of 2013, we collected the data from the Heat-related Illness Surveillance System in Chinese Center for Disease Control and Prevention (China CDC). A total of 5758 cases were reported in the summer of 2013, mostly concentrated in urban areas around the middle and lower reaches of the Yangtze River. We found a difference in age distribution of percentage of deaths from heat-related illness between males and females. Severe cases in males mostly occurred in the age group 45–74 years but in females mostly in the age group over 75. A distributed lag non-linear model had been used to identify population vulnerabilities in Ningbo and Chongqing. The results show that there was a clear positive relationship between maximum temperature and heat-related illness, and the heat effect was nonlinear and could last for 3 days. The elderly and males in the range of 45–64 years old might be the most vulnerable people of

heat-related illness in China. The study also highlighted some deficiencies of the surveillance system, such that the reported data were not accurate, comprehensive, or timely enough at this stage.

Table 1. Number and percentage of deaths from heat-related illnesses in China, summer of 2013.

	Observed cases	Deaths	
		Numbers	%
Total	5758	186	3.23
Sex			
Male	3779	124	3.28
Female	1979	62	3.13
Age			
0–24	590	0	0.00
25–44	1840	29	1.58
45–64	2012	78	3.88
65+	1316	79	6.00
Type			
Mild	4023	0	0.00
Severe	1735	186	10.72
Severe heat-related illness			
Heat cramps	468	9	1.92
Heat exhaustion	243	41	16.87
Heat stroke	797	109	13.68
Mixed type[a]	167	22	13.17
Unclassified[b]	60	5	8.33

[a] Other than heat cramp, heat exhaustion, and heat stroke, mixed type can also be found in severe cases of heat-related illness, whose symptoms could contain all of the above three types

[b] There were 60 reported cases with no classification, accounting for 3.45 % of total severe cases of heat-related illness

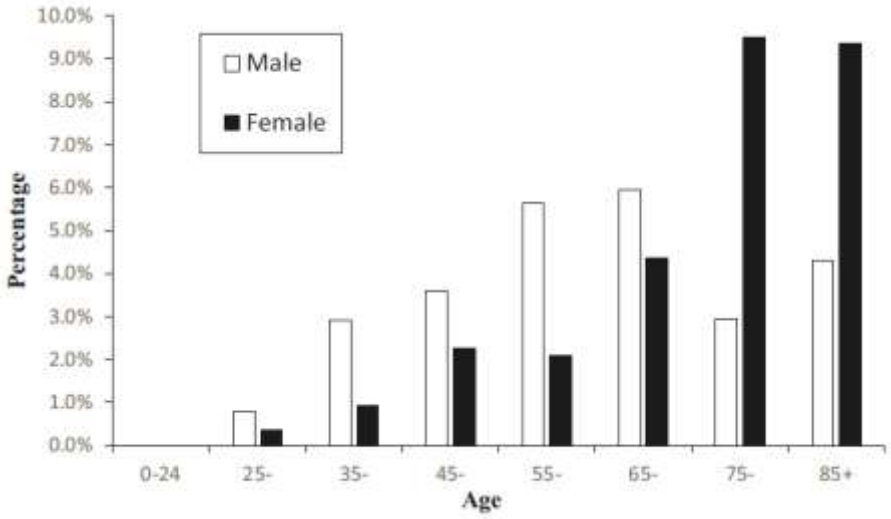

Figure 6. Percentage of deaths from heat-related illness in each age group in China, summer of 2013

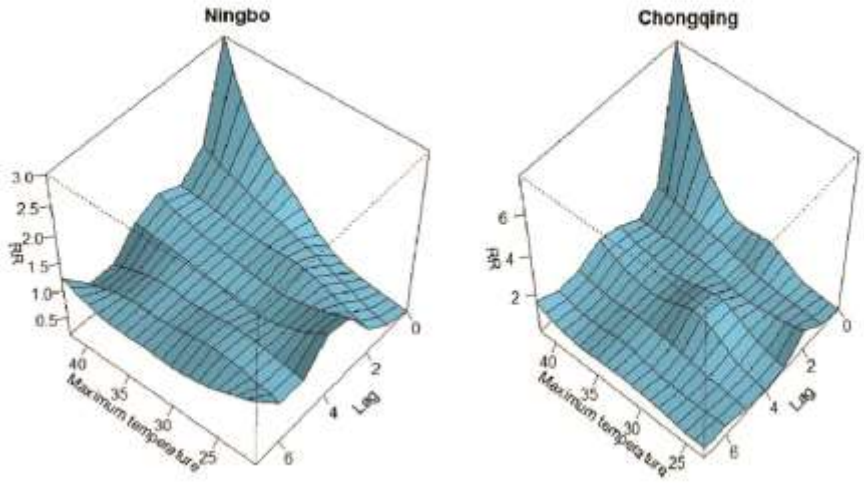

Figure 7. Relative risks of heat-related illness by maximum temperature in Ningbo and Chongqing using a DLNM

Table 2. The cumulative relative risks of heat effect on heat-related illness in Ningbo and Chongqing, 2011–2013.

	Lag 0		Lags 0–2	
	RR	95%CI	RR	95%CI
Ningbo				
Total	2.45	1.79–3.37	3.91	2.56–5.96
Male	2.59	1.82–3.69	4.18	2.59–6.75
Female	2.23	1.49–3.34	3.51	2.05–6.02
0–24	2.33	1.27–4.27	2.83	1.24–6.48
25–44	2.43	1.62–3.64	3.22	1.88–5.53
45–64	2.77	1.72–4.45	5.90	3.08–11.30
65+	1.97	1.02–3.80	3.60	1.53–8.46
Chongqing				
Total	5.58	3.74–8.33	8.28	4.59–14.96
Male	7.68	4.68–12.6	13.03	6.28–27.00
Female	3.45	1.94–6.13	4.15	1.74–9.92
0–24	6.27	2.28–17.25	5.22	1.21–22.52
25–44	6.00	3.21–11.20	9.96	3.94–25.20
45–64	6.38	3.75–10.87	7.46	3.37–16.45
65+	1.76	0.76–4.12	4.85	1.07–22.06

In the summer of 2013, China suffered the strongest intensity of heat waves since 1951. At the same time, heat-related illnesses had a great percentage increase compared to previous years. We found that there was a clear positive relationship between extreme temperature and heat-related illness, and the elderly and males in the 45–64 years old range might be the most vulnerable people. However, we also found some deficiencies of the surveillance system, which will have an overall negative effect on heat-related morbidity and mortality as a whole if they continue. Climate change, aging population, and urbanization are the three major challenges in China, which will all lead to a higher health risk. In response to this threat, we should improve our surveillance system, find relevant risk factors, and make local prevention planning more timely and efficient.

Temperature as a risk factor for hospitalizations among young children in the Mekong Delta area, Vietnam

The Mekong Delta is the most vulnerable region to climate change in South-East Asia; however, the association between climate and children's health has rarely been studied in this region. We examined the short-term association between daily temperature and hospital admissions for all causes, gastrointestinal and respiratory infection, among young children in the Mekong Delta area in Vietnam. Daily pediatric hospital admissions and meteorological data were obtained from January 2008 to December 2012. A time-series approach was used

with a combination of a Poisson regression and constrained distributed lag models to analyze the data. The long-term and seasonal trends, as well as other time-varying covariates, were adjusted using spline functions. Temperature-pediatric admission relationship was evaluated by age-specific (0–2 and 3–5-year-olds) and cause of admission groupings. A 1°C increase in the 2-day moving average temperature was significantly associated with a 3.4% (95% CI 1.2% to 5.5%), 4.6% (95% CI 2.2% to 7.3%), 2.6% (95% CI 0.6% to 4.6%), 4.4% (95% CI 0.6% to 8.2%) and 3.8%(95% CI 0.4% to 7.2%) increase in hospital admissions with 0–2-year-old children, 3–5-yearold children, all causes, gastrointestinal infection and respiratory infection, respectively. The cumulative effects from 1-day to 6-day moving average temperature on hospital admissions were greater for 3–5-year-old children and gastrointestinal infection than for 0–2-year-old children and other causes. Temperature was found to be significantly associated with hospital admissions in young children with the highest association between temperature and gastrointestinal infection. The government agencies of Mekong Delta should implement measures to protect children from the changing temperature conditions related to climate change.

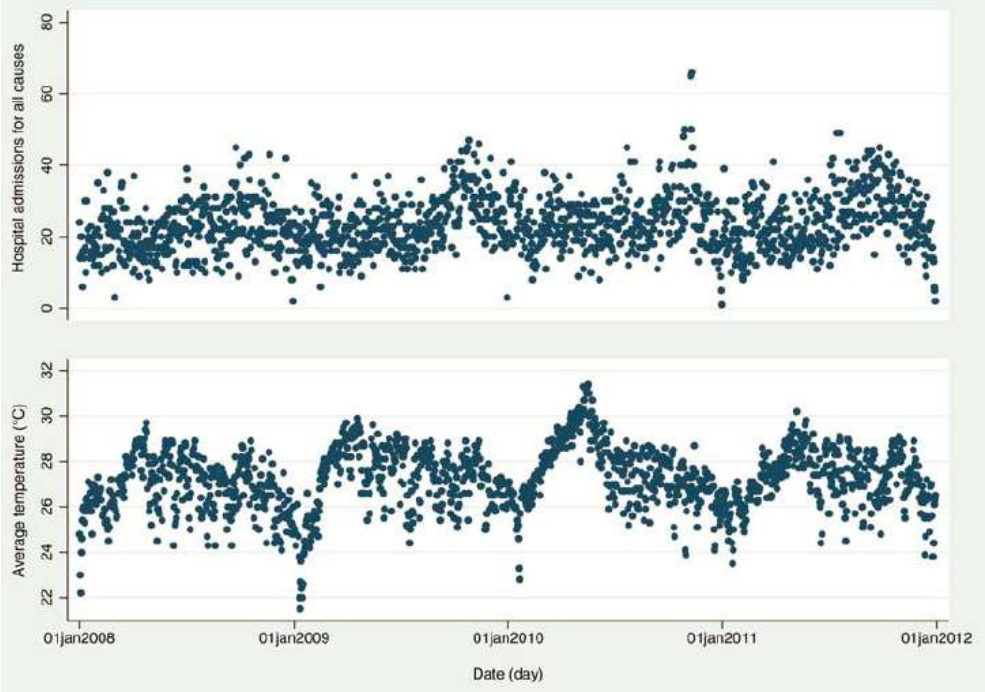

Figure 8. Raw plots showing daily counts of hospital admissions (all causes) and daily average temperature over time.

Table 3. Daily and annual hospital admissions by age groups and causes.

	Age group		Cause		
Day/year	0–2-year-old	3–5-year-old	All causes	Gastrointestinal	Respiratory
Daily min	1	1	1	0	0
Daily mean	17	14	24	5	7
Daily max	57	57	66	17	24
2008	5850	2040	7890	1738	2159
2009	6263	2330	8593	1824	2412
2010	6386	2534	8920	2028	2754
2011	6561	2396	8957	1763	2321
Total	25 060	9300	34 360	7353	9646

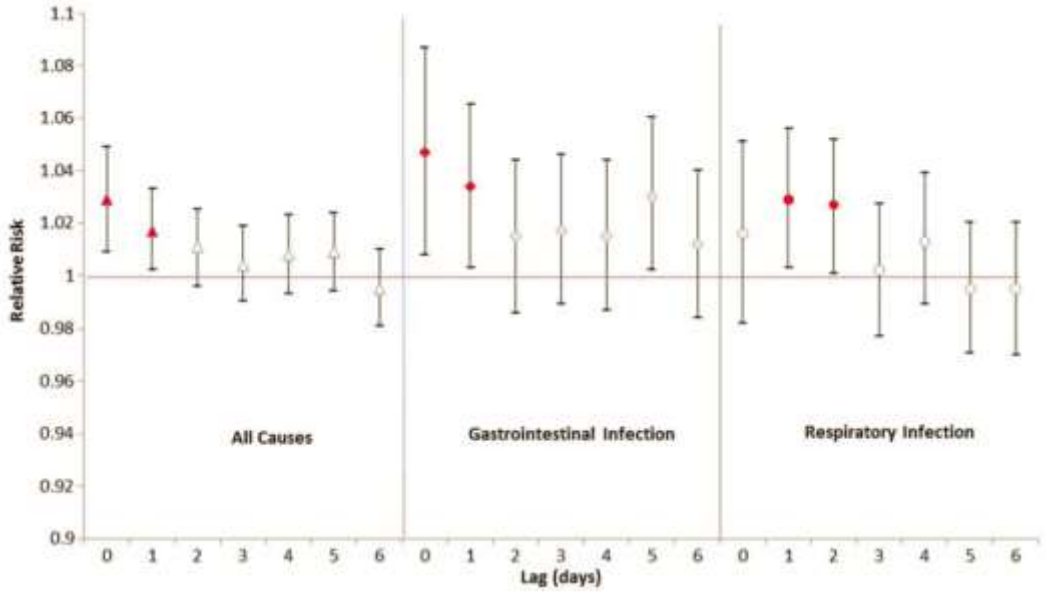

Figure 9. Relative risk for daily pediatric hospital admissions associated with a 1°C increase in mean temperature, by lag period and causes.

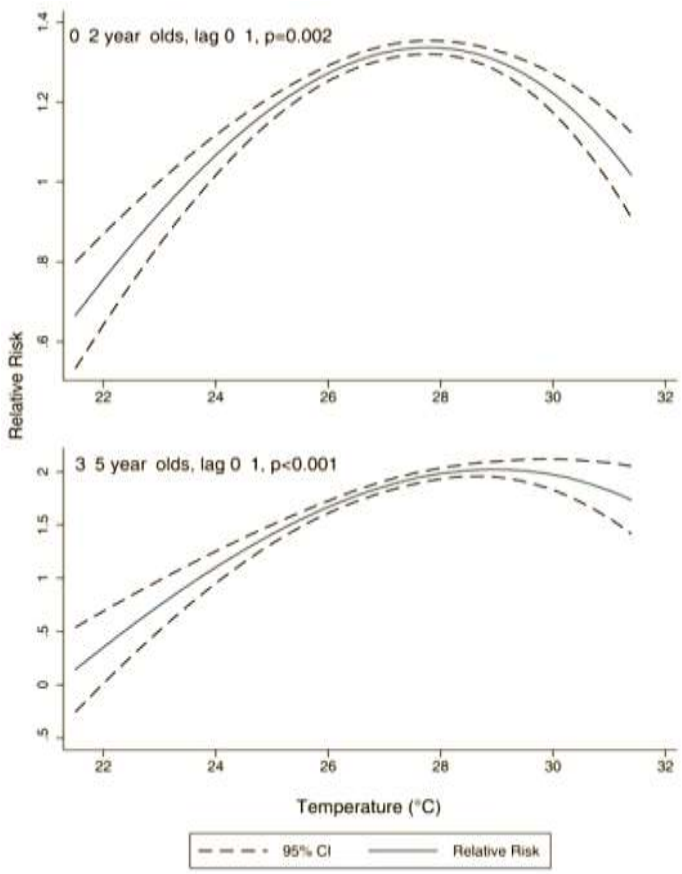

Figure 10. Relative risk of daily pediatric hospital admissions among age groups associated with increases in mean temperature (compared with the baseline of 22–24°C) over lag 0–1 days. Dash lines are the corresponding 95% CIs.

This study adds some new dimensions and information. This is the first study of the relationship between temperature and pediatric hospitalizations in the Mekong Delta region, one of the most vulnerable areas to climate change in Southeast-Asia. High temperatures were found to be associated with increased hospital admissions among young children in in the Mekong Delta area of Vietnam. As the Mekong Delta is highly vulnerable to climate change, temperatures will continue to rise in this region; thus, our findings have important implications for the projected health impacts on children. A better understanding of the underlying mechanisms for these associations will be important for governments within Mekong Delta to design and implement programs that target preventing children from suffering the impacts of increased temperatures.

4. Conclusions

A team of international researchers from Australia, Bangladesh, China, Indonesia, Thailand and Vietnam have planned and executed two scoping workshops in Guangzhou, China. The aim of two scoping workshops is to gather information among collaborators to further improve the research framework and methodologies of the full proposal to be submitted to APN's call for regional research proposals. Workshop participation from invited experts met or exceeded expectations. Almost all invited experts were able to attend the scoping workshops and

provided valuable inputs. The workshops have helped the collaborators to clearly define activities of the proposed project to assess the health effects of extreme temperatures in the region. Finally, the team members are pleasure to finish this seed grant project and to apply for the continual funding from APN.

5. Future Directions

As a result of seed grant supported by APN, the project team has identified a research agenda that will take forward in efforts to secure funding for a larger scale project. Our future research should enable countries in the Asia Pacific region to address temperature-related health problems through investigations that will assess regional vulnerability of public health in the context of climate change and identify (in consultation with decision-makers and other end-users) present and future needs and emerging challenges. It is expect that the proposed study will improve the understanding of global climate change for the region and contribute to the development of policy options and decision making. Our next step is to submit a full research proposal to APN in October 2015.

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Appendices

- **Appendix 1. Workshop-One Agenda, Participants List, Letter of Invitation**

- **Appendix 2. Workshop-Two Agenda, Participants List, Letter of Invitation**

Appendix 1.

Agenda
Health Vulnerability in the Context of Climate Change
Location: Guangzhou, China
Date: 25–26 June, 2014

Day 1 (25th June 2014)	Session	Presenter	Topic
9:00 to 9:30am	Opening session		
9:30 to 10:00am	Introduction	Prof Cordia Chu (Griffith University, Australia)	PSLP overview and expectations
10:00 to 10:30am	Vulnerability assessment	Prof Scott Baum (Griffith University, Australia)	Developing an individual / household level climate change vulnerability index (Part 1)
10:30 to 11:00am	Morning tea		
11:00am to 12:00pm	Vulnerability assessment	Prof Scott Baum (Griffith University, Australia)	Developing an individual / household level climate change vulnerability index (Part 2)
	Vulnerability assessment	Dr Tao Liu (GDCDC, China)	Vulnerability assessment of heat waves in Guangdong Province
12:00 to 1:30pm	Lunch		
1:30 to 3:00pm	Country reports (Thailand)	Dr Benjwwan Tawatsupa (MOH, Thailand)	Effects of heat stress on human health: input into health impact assessment from climate change, Thailand
	Country reports (Bangladeshi)	Dr M. Mamun Huda (ICDDR, Bangladesh)	Climate variability and spared of Visceral Leishmaniasis in Bangladesh: some adaptation strategies
	Country reports (China)	Prof Qiyong Liu (China CDC)	Climate change impacts on human health and adaptation in China
3:00 to 3:30pm	Afternoon tea		

3:30 to 5:30pm	Country reports (Vietnam)	Dr Do Manh Cuong (MOH, Vietnam)	The temporal trend and seasonal patterns of diarrheal diseases and its associated climatic factors in Vietnam
	Country reports (Vietnam)	Dr Dung Phung (MOH, Vietnam & Griffith University, Australia)	Identification of the best prediction model for Dengue incidence in a Mekong Delta Area, Vietnam
	Country reports (Indonesia)	Dr Febi Dwirahmadi (Red Cross, Indonesia & Griffith University, Australia)	Perceived barriers to adaptation and strategies to overcome those barriers in Jakarta, Indonesia
	Country reports (China)	Dr Li Bai (China CDC)	Temperature effects on health and vulnerability assessment in Tibet, China
5:30 to 6:00pm	Discussion of first day outcomes		
	Dinner		

Day 2 (26th June 2014)	Session	Presenter	Topic
9:00 to 10:00am	Research update	Prof Wenjun Ma Dr Hualiang Lin (GDCDC, China)	Current research progress on climate change and health in China
10:00 to 10:30am	Research update	Prof Roger Street (Oxford University, UK)	Update on current issues in climate change vulnerability and adaptation (Part 1)
10:30 to 11:00am	Morning tea		
11:00am to 12:00pm	Research update	Prof Roger Street (Oxford University, UK)	Update on current issues in climate change vulnerability and adaptation (Part 2)
	Research update	Prof Cordia Chu (Griffith University, Australia)	Summary
12:00 to 1:30pm	Lunch		
1:30 to 3:00pm	APN scoping exercise	All participants lead by Dr. Cunrui Huang (Griffith University, Australia)	Scoping Workshop to Develop Proposal: Assessing the Health Effects of Extreme Temperatures and the Development of Adaptation Strategies to Climate Change in the Asia Pacific Region
3:00 to 3:30pm	Afternoon tea		
3:30 to 5:00pm	Future collaboration	All participants lead by Prof Cordia Chu (Griffith University, Australia)	Group workshop
	Dinner		

Health Vulnerability in the Context of Climate Change

Participants List

#	Name	Title	Institute	Country	Email
1	Cordia Chu	Professor	Griffith university	Australia	c.chu@griffith.edu.au
2	Scott Baum	Professor	Griffith university	Australia	s.baum@griffith.edu.au
3	Roger Street	Professor	Oxford University	UK	roger.street@ukcip.org.uk
4	Cunrui Huang	Dr.	Griffith university	China/Australia	c.huang@griffith.edu.au
5	Dung Tri Phung	Dr.	Griffith university	Vietnam	d.phung@griffith.edu.au
6	Benjawan Tawatsupa	Dr.	Department of Health	Thailand	ben_5708@hotmail.com
7	M. Mamun Huda	Mr	Centre for Population Urbanization and Climate Change, ICDDR,B	Bangladesh	m_huda83@yahoo.com
8	Do Manh Cuong	Dr.	Ministry of Health	Vietnam	cuong_ytdp@yahoo.com
9	Yulia Suryanti	Dr.	Ministry of Environment	Indonesian	yssuryanti@yahoo.com
10	FebiDwirahmadi	Dr.	Griffith university	Indonesian	febi.dwirahmadi@gmail.com
11	Yao-Dong Du	Dr.	Guangdong Provincial Weather Bureau	China	yddu@grmc.gov.cn
12	Qi-Yong Liu	Professor	China CDC	China	liuqiyongcdc@126.com
13	Li Bai	Dr.	China CDC	China	15198743615@126.com
14	Wen-Jun Ma	Professor	GDCDC	China	mwj68@tom.com
15	Wei Wu	Dr.	GDCDC	China	cnnjwuwei@163.com
16	Hua-Liang Lin	Dr.	GDCDC	China	hualianglin@gmail.com
17	Tao Liu	Dr.	GDCDC	China	gztt_2002@163.com
18	Jian-Peng Xiao	Doctor	GDCDC	China	jpengx@163.com
19	Wei-Lin Zeng	Doctor	GDCDC	China	letitiazeng@foxmail.com
20	Yu -Zhou Gu	Doctor	GDCDC	China	YuChouKu@gmail.com
21	Xiao-Juan Lv	Doctor	GDCDC	China	1012421619@qq.com
22	Shao-Wei Sang	Doctor	China-CDC	China	sangshaowei1@163.com
23	Meng-Meng Li	Master	China CDC	China	limm55@126.com
24	Shao-Hua Gu	Master	China CDC	China	Gushaohua1989@sohu.com
25	Bin Chen	Doctor	China CDC	China	drchenbin@126.com
26	Jun Yang	Doctor	China-CDC	China	Smart_yjun@163.com

[Name]
[Institution]
[Address]
[Email]

May 10, 2014

Dear …,

On behalf of the Guangdong Provincial Institute of Public Health, China and the Centre for Environment and Population Health (CEPH), Griffith University, it gives us great pleasure to invite you to attend our upcoming workshop/seminar on Climate Change and Public Health.

The two-day regional workshop/seminar will be held at Guangdong Provincial Institute of Public Health, Guangzhou, China on June 25th and 26th, 2014. Funded by the Australian Government and the Asia-Pacific Network for Global Change Research (APN), the workshop/seminar will focus health vulnerability in the context of climate change. A scoping workshop will also be conducted to gather information among collaborators to further improve the research framework and methodologies of the full proposal to be submitted to APN in the next Annual Calls for Proposals under ARCP Programme.

We hope that you will make a brief 20 minutes presentation about research you have been doing in the area relevant to vulnerability assessments, health outcomes and climate change. We provide you with return economy airfare, 4-night accommodation and meals during the seminar.

A more detailed program will be sent out shortly.

We would appreciate confirmation of your attendance as soon as possible. Please reply to Dr. Cunrui Huang: c.huang@griffith.edu.au (Tel: +617-37357485).

Yours sincerely

Dr Cunrui Huang
Research Fellow
Griffith University, Australia

Appendix 2.

Agenda

Scoping workshop to develop proposal:
Assessing the health effects of extreme temperatures and the development of adaptation strategies to climate change in the Asia Pacific region

Location: Guangzhou, China
Date: December 3–5, 2014

Date	Time	Task	Location
Day One 3 December 2014	Morning 9:00-10:00	Registration & welcome	Sanyu Hotel, Guangzhou
	10:00-12:00	Introduction to APN workshop Individual presentations: 1. **Hualiang Lin:** Health effects of temperature and air pollution in Guangzhou 2. **M. Mamun Huda:** Climate change and infectious disease in Banglaesh 3. **Sujaritpong Sarimya:** Interaction between temperature and air pollution on the health effects of air pollution in Melbourne: current and future estimates	Sanyu Hotel, Guangzhou
	Lunch		
	Afternoon 14:30-18:00	Individual presentations: 4. **Cunrui Huang:** Seasonal deaths in Australia: the role of unseasonal weather 5. **Ngoc Diep Le:** Overview of climate change and public health studies in Vietnam 6. **Xiaohui Hou:** An assessment of vulnerability to flooding in Guangxi, China 7. **Tao Liu:** Projecting the heat effects of climate change on years of life lost in Guangzhou, China 8. **Jiajia Wang:** Exploration of associations between maternal exposure to heatwave and adverse birth outcomes 9. **Xin Qi:** Associations between climate variability, unemployment and suicide in Australia: a multicity study	Sanyu Hotel, Guangzhou
	Dinner		

Day Two 4 December 2014	Morning 9:00-12:00	Group meeting & discussion ➢ Development of the APN full proposal	Sanyu Hotel, Guangzhou
	Lunch		
	Afternoon 14:30-17:30	Group meeting & discussion ➢ Site visit at Guangdong Provincial Center for Disease Prevention and Control ➢ Discussion on future collaborations	Guangdong CDC, Guangzhou
	Dinner on the Pearl River (Night Trip)		
Day Three 5 December 2014	Morning 9:00-12:00	Field trip: Nansha Wetland Park, Guangzhou	Guangzhou
	Lunch		

Scoping workshop to develop proposal:
Assessing the health effects of extreme temperatures and the development of adaptation strategies to climate change in the Asia Pacific region

Workshop Attendees

Fist Name	Last Name	Institution	City	Country	Email
Cunrui	Huang	Griffith University & Sun Yat-sen University	Brisbane	Australia	c.huang@griffith.edu.au
Sujaritpong	Sarimya	Institute for Global Environmental Strategies, Regional Centre	Bangkok	Thailand	sujaritpong@yahoo.com
Ngoc Diep	Le	Institute of Public Health, Ho Chi Minh City	HCMC	Vietnam	ngocdieple@gmail.com
M. Mamun	Huda	International Centre for Diarrhoeal Disease Research, Bangladesh	Dhaka	Bangladeshi	mhuda83@icddrb.org
Jiajia	Wang	Institute of Occupational and Environmental Health, Capital Medical University	Beijing	China	wangjj1023@gmail.com
Xin	Qi	School of Public Health, Xi'an Jiaotong University Health Science Center	Xi'an	China	chester.qi@yahoo.com
Xiaohui	Hou	China CDC	Beijing	China	seanhxh@qq.com
Wenjun	Ma	Guangdong CDC	Guangzhou	China	mwj68@vip.tom.com
Hualiang	Lin	Guangdong CDC	Guangzhou	China	hualianglin@gmail.com
Jianpeng	Xiao	Guangdong CDC	Guangzhou	China	
Tao	Liu	Guangdong CDC	Guangzhou	China	gztt_2002@163.com
Weilin	Zeng	Guangdong CDC	Guangzhou	China	zengwl@gdiph.org.cn
Xing	Li	Guangdong CDC	Guangzhou	China	lixing.echo@foxmail.com
Yuzhou	Gu	Guangdong CDC	Guangzhou	China	

Name:
Institution:
Address:
Email:

20 October 2014

Dear…,

I am writing on behalf of a collaborative research team led by Dr. Cunrui Huang of Griffith University, Australia to participate in a research workshop, entitled "Scoping workshop to develop proposal: Assessing the health effects of extreme temperatures and the development of adaptation strategies to climate change in the Asia Pacific region". This workshop is funded by the Asia-Pacific Network for Global Change Research (APN) (Project Reference Number: ARCP2012-23NSG-Huang).

The workshop is to be held at Guangdong Provincial Institute of Public Health in Guangzhou, China on December 3–5, 2014. It is intended to gather information among collaborators to further improve the research framework and methodologies of the full proposal to be submitted to APN in the next Annual Calls for Proposals under ARCP Programme. During the workshop, the attendees will also have very good opportunities to exchange views and ideas on interested topics.

The included attachments provide a registration form, venue information, a preliminary schedule/agenda, and the list of research team members who will be traveling to Guangzhou, China for this meeting. There is no registration cost for you to attend. We also provide you with return economy airfare, four-night accommodation, meals and refreshments during the workshop.

Please fill out the included registration form if you plan to attend and send via email. I would appreciate your response as soon as possible.

A more detailed program will be sent out shortly. Should there be any questions, please feel free to contact me (Email: c.huang@griffith.edu.au; Telephone: +61-7-37357485).

Yours sincerely

Dr Cunrui Huang
Research Fellow
Griffith University, Australia

Scoping workshop to develop proposal:

Assessing the health effects of extreme temperatures and the development of adaptation strategies to climate change in the Asia Pacific region

Location: Guangzhou, China
Date: December 3–5, 2014

Registration Information

Please type information in the boxes below and email to Dr. Cunrui Huang: c.huang@griffith.edu.au

Full Name:	[family name], [given name]
Gender:	
Nationality:	
Passport Number:	
Job Title:	
Institution:	
Telephone:	
Mobile Phone:	
Working Address:	
Email Address:	
Intended Depart Date: (from your city)	
Intended Leave Date: (from Guangzhou, China)	
Do you need a Chinese Visa?	

Glossary of Terms

APN: Asia-Pacific Network for Global Change Research

CEPH: Centre for Environment and Population Health

China CDC: Chinese Center for Disease Control and Prevention

CI: Confidence interval

CSIRO: Commonwealth Scientific and Industrial Research Organisation

GDCDC: Guangdong Provincial Center for Disease Control and Prevention

GHG: greenhouse gas

ICDDR, B: International Centre for Diarrhoeal Disease Research, Bangladesh

IPCC: Intergovernmental Panel on Climate Change

MOH: Ministry of Health

QUT: Queensland University of Technology

RR: Relative Risk

SYSU: Sun Yat-sen University

WHO: World Health Organization