KEEPING CHILDREN SAFE DURING HEAT-WAVES

Information for schools, teachers and child care workers

ACCC
Adapting to Climate Change in China

Griffith University

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Heat waves have a serious impact on the health of a community, particularly on those most vulnerable. Schools, teachers and child care workers have a key role in preventing and managing heat-stress in children during extreme heat events.

WHAT IS A HEAT WAVE?

A heat wave is an extended period of excessively hot weather, often accompanied by high levels of humidity. A heat wave is defined locally as it is relative to the normal seasonal weather in an area.

For example the Chinese Bureau of Meteorology defines a heat wave as over 35C for over 3 days.

It is projected that in the future there will be more extreme heat waves happening more often.

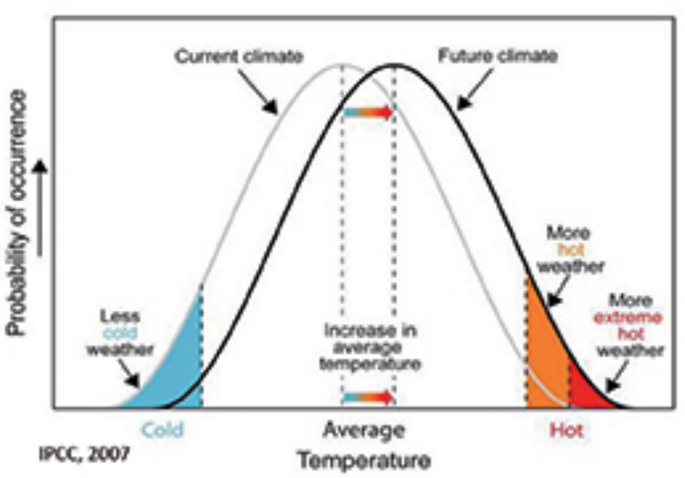


Diagram 1: Climate change and extreme weather

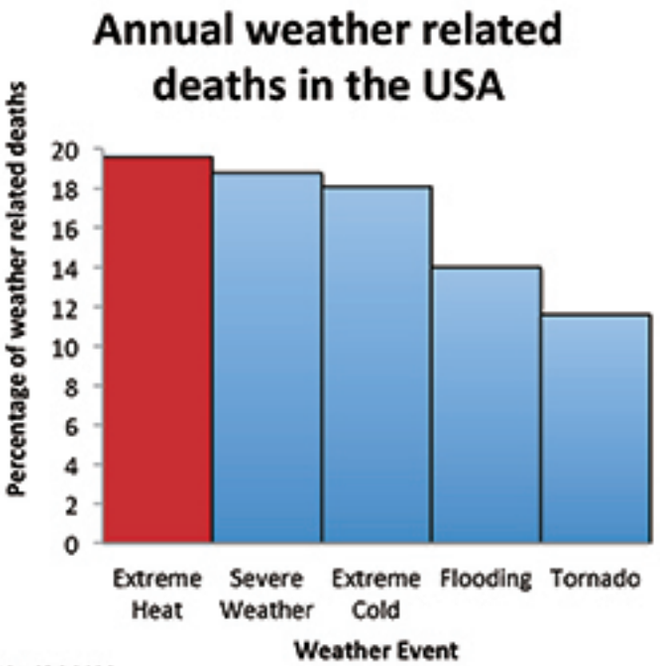
Increasing global average temperature will increase the probability of extreme weather events. In the future heat waves will be;

More extreme- the temperatures will be much hotter and the heat waves will last longer

More frequent- heat waves will occur more often

More unseasonable- heatwaves will occur at less predictable times, for example at the very start of summer or during Spring

HEALTH CONSEQUENCES OF HEAT WAVES



USA CDC 2006

Extreme heat causes more deaths every year then any other weather event.

The 2003 Europe Heat Wave caused *70,000* excess deaths across Europe. As a result many countries across Europe have implemented extensive heat wave preparation plans to prevent deaths in the future.

THE BODY & HEAT

- The body maintains an ideal core temperature of 37°C through heat loss and heat gain
- The body eliminates heat through evaporation of sweat and increasing blood flow to the skin
- Certain factors and conditions reduce a persons ability to control their temperature

Some illnesses occur as a direct result of excessive heat, including heat rash, heat exhaustion and heat stroke.

Heat also exacerbates existing chronic conditions

- Cardiovascular, respiratory and kidney disease are the most common cause of death during heat waves as extreme heat increases the demand on organ systems

Many people do not recognise that their deteriorating condition is heat related

Heat related illness is largely avoidable and therefore appropriate prevention and treatment will greatly decrease the health impacts of heat waves.

All people will be affected by increased heat but some people and places will be more vulnerable than others.

During heat waves populations with a combination of increased exposure, increased sensitivity and decreased ability to adapt will be most heavily affected.

WHO IS MOST VULNERABLE

Risk factors exist at many points along the causal chain from high temperature to death. They include;

- *Factors that increase exposure* to heat such as working outdoors or around an intense heat source
- *Factors that increase sensitivity* to heat such as age and chronic disease
- *Factors that affect ability to adapt* such as social isolation, inaccessibility to cooling devices and low self-care ability.

YOUNG CHILDREN

Children under five are especially vulnerable to health effects during heat waves as they have increased exposure, increased sensitivity to the effects of heat exposure and have little ability to adapt their environment. Factors that contribute to increased risk include;

- Decreased thermoregulatory capacity
  Young children have a lower capacity than adults to reduce body temperature.
- Signs and symptoms may not be obvious
  Young children may not show recognisable warning signs of heat stress or may be unable to communicate their discomfort.
- Dependent on others for care
  Young children rely on others to control their environment, provide water and protect their health.
- Unaware of the danger of heat waves
  Children may not be aware of the risks of extreme heat and may not respond accordingly.
- Physical activities and playground environments may increase exposure
  Physical activities in open playground without shades may increase children's sun exposure; physical activities in non-air-condition in-door room without adequate ventilation may also increase heat exposure by children.
- Infectious disease susceptibility
  Children are more susceptible to infectious disease and this risk rises during extreme heat. Heat can also increase the severity of infectious disease.
- Lack of control over environment
  Children, particularly those under five, rely on others to control their environment, provide water and protect their health.

Young children with chronic disease such as diabetes, obesity and heart conditions are particularly vulnerable to extreme heat.

ADVICE TO TEACHERS AND CARE PROVIDERS;

BEFORE HEATWAVE

The most effective way to reduce the vulnerability of children and protect their health from heat stress is to create a ***plan and educate*** staff, parents and children alike.

- *Identify individuals with increased vulnerability.*
  All children are vulnerable to the dangers of heat stress but some have heightened sensitivity due to additional factors such as obesity, medication and illness. Develop a database of individuals at extreme risk.
- Develop a heat wave response action plan
  Have a simple, easy to follow heat wave plan that can be rapidly enacted. Consult with local community groups in planning and decide on a threshold temperature for its activation. Consult with local meteorological agencies to arrange for early warnings when heat waves are likely to occur

- *Educate teachers and care givers on recognising and responding to heat illness.*
  It is crucial that all staff are able to identify a child in heat stress and undertake appropriate health measures immediately.
- *Communicate with parents about the risks of heat waves and what they can do to reduce their child's risk.*
  Parents must understand the risk heat poses to their child and be prepared to take appropriate preventative methods.
- *Implement cooling systems and ventilation where practical.*
  Consider installing air-conditioning in a "common-room" which children can access during heat wave conditions.

DURING A HEAT WAVE

During a heatwave there are many practical measures that can be taken to reduce the health burden of heat.

During a heat wave it is essential to ***limit exposure, enhance protective measures and adapt practices*** to reduce the health burden of heat in young children.

- *Provide frequent hydration*

Do not wait until thirst is evident to provide fluids to children. It is important to encourage regular sipping throughout the day to prevent dehydration.

- *Inform parents of heat wave plan activation*

Parents should be advised to consider ways to protect their children from heat such as alternate transport to and from school and providing appropriate clothing.

- *Avoid vigorous physical activity*
  During heat waves children should not undertake intense physical activity especially during the hottest hours of the day. Reschedule sporting and physical play activities to alternate times.

- *Ensure indoor classrooms are well ventilated or air-conditioned.*
  Also reduce internal heat sources such as electric lighting and computer equipment

- *Ensure children wear appropriate clothing and protection.*
  Children are very susceptible to sunburn. Prevent direct sun exposure and use sunscreen, hats and shading to avoid sunburn. Loose fitting, lightweight clothing aids in reduction of heat stress.

- *NEVER leave children alone in vehicles even if the air-conditioning is on.*

Cars heat up very quickly on hot days and can cause fatal heat stroke in minutes.

AFTER A HEAT WAVE

After a heat-wave it is important to review health care strategies.

Survey staff and children to understand which strategies helped them and which can be improved. This will allow more tailored approaches to further prevent negative health outcomes from extreme heat.

HEAT RELATED ILLNESS AND PROPER MANAGEMENT

Illness	Signs & Symptoms	Management
Heat Rash	Sweat gland inflammation presenting with itchy red papules around face and neck. Occurs due to heavy sweating.	No specific treatment. Aim to minimize sweating by remaining in cool areas. Topical antihistamines may provide relief.
Heat Cramps	Painful spasms often in lower limbs. Attributed to dehydration and electrolyte imbalance following heavy sweating.	Immediate rest in cool place. Oral rehydration therapy should begin as soon as possible.
Heat Exhaustion	Pale complexion, nausea, fatigue and dizziness. Poor blood flow to brain and heart caused by excessive dehydration	Move to air-conditioned or cool area. Remove clothing and apply damp cloths or mist with water. Lay down, with legs raised to assist venous return. Commence oral or IV hydration.
Heat Stroke	Potentially fatal, hyperthermia with core temperature >40^{o}C. Altered mental state and deliria may be present. Marked by dry skin with no sweating.	Treat immediately with IV hydration in air conditioned area. Keep skin temperature <30^{o}C.

This booklet was produced by Centre for Environment and Population Health, Griffith University in conjunction with Guangdong Provincial Centre for Disease Control and Prevention under the Adapting to Climate Change in China Project.

The Adapting to Climate Change in China Project is a joint project between China's National Development and Reform Commission, the Swiss Agency for Development & Cooperation and the UK Department of International Development and Department for Energy and Climate Change. ACCC is a policy research initiative, assisting China's response to climate change by building the evidence base needed to support policy makers across the key sectors of health, agriculture, water, disaster risk and grasslands.

The following is a Chinese example prepared by Guangdong CDC that has extracted information from scientific literature to provide suggestions for strategies relevant to the local context. This will serve as a base for future action research involving relevant stakeholders to develop guidelines and concrete suggestions tailored to suit target populations in specific contexts.

高温热浪期间如何保护儿童健康

一、什么是高温热浪？

中国气象局规定日最高温度 35℃以上为高温天气，连续 3 天以上的高温天气过程称之为热浪。

近 100 年来，全球绝大多数地区地表气温呈增高趋势，同时快速的城市化进程使热岛效应日趋明显，以致全球范围内高温热浪事件越来越多。我国高温热浪也呈增加趋势，2013 年 7-8 月，江南、江淮、江汉及重庆等地持续高温(日最高气温≥35℃)天数长达 15-20 天，纷纷进入“烧烤模式”。高温天气影响19个省、自治区和直辖市，覆盖面积达 317.7 万平方公里。

二、高温热浪如何影响儿童健康？

高温热浪环境下，体温过高可直接导致一些疾病（如热疹和中暑等），也可使一些已有的慢性疾病恶化（如心脑血管和呼吸系统疾病等），严重者可引起死亡。例如 2003 年，欧洲各国均经历了历史罕见的高温热浪天气，其中法国受灾严重，与 2000-2002 年同期相比，8 月 1-20 日期间死亡人数增加 14729 人。

儿童作为一个特殊的群体，更易受到高温热浪的影响，主要原因包括：

- **体温调节能力差**：儿童正处生长发育期，体温调节中枢发育不完善，体温调节能力较差。
- **症状和体征不明显**：热相关疾病的症状和体征可能不明显，不容易被发觉，并且儿童常无法清楚表达身体的不适感。
- **风险认知低**：儿童不知道高温热浪的危害，不会主动采取应对措施，常需要他人帮助应对高温热浪。
- **易患疾病**：由于免疫力低，易患感冒、腹泻等感染性疾病，对高温热浪敏感。

三、如何应对高温热浪？

3.1 高温热浪来临前

3.1.1 政府部门

- **做好高温热浪应对准备**：组织有关部门建立符合区域特征的热浪预警系统，修改和完善高温热浪应急预案，做好物资储备，开展相关演练，提高应对能力。
- **加强宣传教育**：加强高温热浪的宣传工作，提高教师和家长对高温热浪健康危害的认识和应对能力。

3.1.2 学校和家长

- **识别重点保护儿童**：确定肥胖和体弱多病等容易受高温热浪影响的儿童，在高温热浪期间给予重点保护。
- **掌握高温热浪应对知识**：教师和家长主动了解高温热浪相关知识和应对方法。
- **提高应对能力**：学校和家庭应储备常见防暑药品，并掌握儿童中暑的识别和处理方法，检查空调等防暑降温设施是否正常运转。

3.2 高温热浪期间

3.2.1 政府部门

- **加强预警预报工作**：及时发布高温热浪预警信息，提醒学校和家长做好应对工作。
- **启动应急预案**：根据高温预警信息和预警级别启动应急预案，各部门协同行动，迅速响应。教育部门及时将预警信息通知学校，并指导学校开展防暑降温工作。
- **加强监测及健康教育**：做好中暑及其他热相关疾病的监测、报告和救治工作，广泛宣传高温热浪防护知识，为学校和家长提供防暑降温咨询服务。

3.2.2 学校和家长

• **启动应急预案**：根据高温预警信息，学校迅速启动高温应急预案，及时将信息告知师生和家长。学校医务人员要加强宣传教育，做好中暑防治工作。

• **启用降温设备**：高温热浪期间学校开启风扇或空调等防暑降温设备，同时减少室内发热设备的使用。

• **减少高温暴露**：调整体育课时间；减少学生剧烈体力活动和户外活动时间；户外活动时注意防晒；仔细检查车辆，切勿让儿童单独留在车内。

• **穿着和饮食**：建议儿童穿宽松、轻薄的衣服，多喝水，清淡饮食，不食过夜生冷食品。

• **迅速处理中暑事件**：发现儿童中暑，立即拨打“120”与最近的医院取得联系，并立即将中暑者移到通风、阴凉的地方，仰卧，解开衣扣，脱去或松开衣服。

3.3 高温热浪发生后

高温热浪结束后，有关部门应共同确定并联合发布应急响应终止信息，并根据现场报告和应急处理情况，对高温热浪的应对进行评估，以便今后更好地应对高温热浪天气。

针对儿童的高温热浪应对指南

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Griffith UNIVERSITY

广东省疾病预防控制中心
Guangdong Provincial Center for Disease Control and Prevention

在中国适应气候变化项目资助下，这本册子由格里菲斯大学环境与人口健康研究中心，联合广东省疾病预防控制中心共同制作。