KEEPING WORKERS SAFE DURING HEAT-WAVES

Information for employers, managers and work-place health safety officers

ACCC
Adapting to Climate Change in China
Sharing Knowledge Globally

Griffith UNIVERSITY

Guangdong Provincial Center for Disease Control and Prevention

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KEEPING WORKERS SAFE DURING HEAT WAVES

Information for employers, managers and, health and safety officers

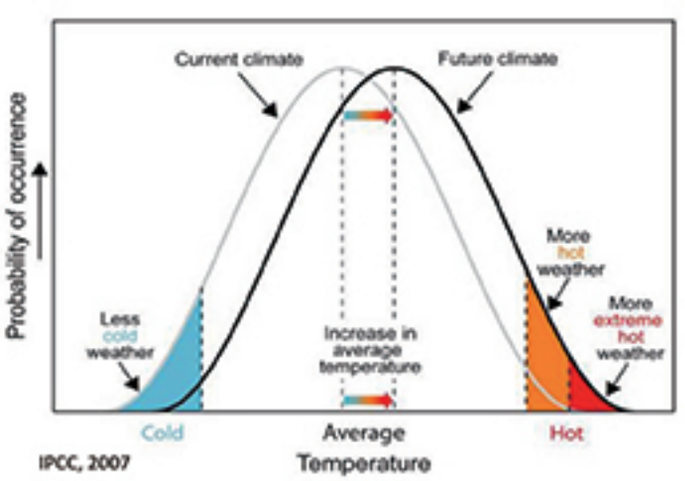
Heat waves have a serious impact on the health of a community, particularly on those most vulnerable. Employers, managers and safety officers have a key role in preventing and managing heat-stress in workers during extreme heat events.

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.



IPCC, 2007

Diagram 1: Climate change and extreme weather

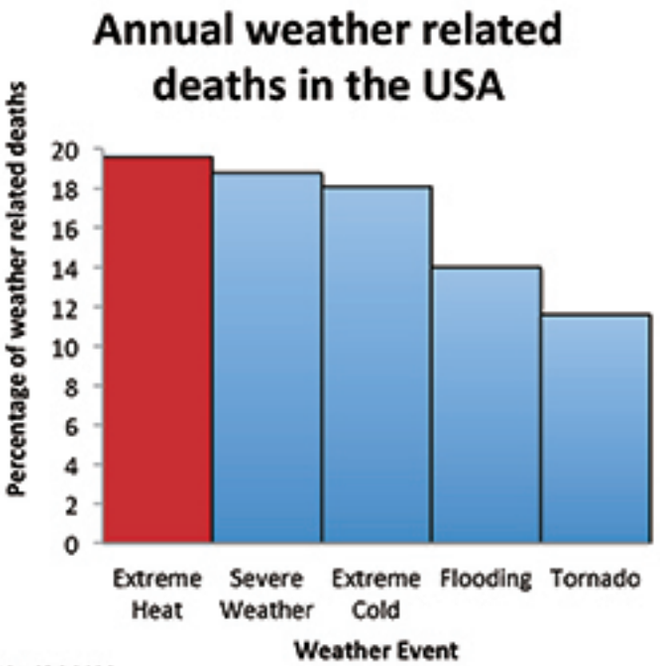
Increasing global average temperature will increase the probability of extreme weather events. In the future heat waves will be;

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.

WORKERS EXPOSED TO INTENSE HEAT

Workers exposed to intensive heat such as outdoor workers, kitchen staff and heavy manual labourers 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 their increased risk include;

- Increased exposure in direct heat outdoors
  Many outdoor jobs require prolonged, daily exposure to heat during heat waves. Most outdoor jobs rely only on shade or fans for cooling.
- Increased exposure indoors in poorly ventilated workplaces Poor ventilation and overcrowding in workplaces also increases heat exposure.
- Socioeconomic factors
  Labourers may not have access to cooling systems at work and at home.
- High body heat generation due to exertion
  During physical labour and activity the body generates metabolic heat. In hot environments the body is unable to release this heat generated causing dangerous increases in bodily temperature.
- Workplace equipment can increase heat exposure
  Many occupations require protective clothing that can exacerbate heat exposure. Many workplaces also have industrial heat sources such as furnaces.
- Unaware of danger of heat waves Heat stress caused by heavy labour can be perceived as a normal part of the job and thus few steps are taken to reduce its impact. Workers and supervisors may also lack awareness of heat-stress dangers.
- Lack of control over work environment
  Workers often have inadequate rest, activities during the hottest parts of the day and poor access to adequate hydration and cooling.

Workers exposed to intense heat such as outdoor workers, heavy labourers, kitchen staff, and those with chronic disease such as diabetes, obesity and heart conditions, are particularly vulnerable to extreme heat.

ADVICE TO WORKPLACE SUPERVISORS AND HEALTH & SAFETY MANAGERS

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*** managers, staff and workplace health and safety officials.

- *Educate at-risk workers about the signs, symptoms and risks of heat stress.* Co-ordinate with local health care sector to organise a workshop focusing on the recognising and reacting to heat illness.

- *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.
- *Have an acclimatization period for new workers.*
  Give new workers time to adjust to hot environments by starting them at a reduced workload and gradually increase it over the first week.
- *Communicate with local media and weather authorities.*
  Establish warning criteria and request to have direct weather warnings from meteorological agencies.
- *Implement cooling systems and ventilation where practical.*
  Consider installing air-conditioning in a "common-room" which workers 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 for workers, particularly outdoor workers, kitchen staff and heavy manual labourers.

- *Encourage and promote proper hydration of workers.*
  Employers are encouraged to supply clean, preferably cool, water and strongly encourage workers to drink regularly.
- *Ensure access to "cooling off areas".*
  Reducing heat exposure for even short periods throughout the day can greatly improve health outcomes. Designate a "cool zone" that is air-conditioned, ventilated or well shaded and encourage its use.
- *Adapt work schedules to avoid intense work during the hottest hours.*
  Scheduling physical work early in the morning, at cooler hours, will increase worker productivity and decrease health risks. Also schedule short breaks often throughout the day to allow cooling down.
- *Recommend employees wear thin, breathable clothes.*
  Appropriate clothing can improve heat resilience but always consider the workplace safety of attire first.
- *Monitor health of workers constantly.*
  Early recognition of heat-stress greatly reduces the overall health impact. Recognise the warning signs and seek medical attention promptly.

AFTER A HEAT WAVE

After a heat wave it is important to review workplace strategies.

Survey staff and managers to understand which strategies helped them and which can be improved. This will allow more tailored approaches to each workplace, further preventing 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户外工作者健康

1、什么叫高温热浪?

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，全球绝大多数地区的地表气温呈增高趋势，同时因城市化加速发展，热岛效应与日俱增，全球范围内高温热浪事件越来越频繁。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℃)日数达 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。

2、高温热浪为何影响户外工作者的健康?

高温热浪环境下，体温过高可直接导致一些疾病（如热痉和中暑等），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）。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了 14729 人。

户外工作者长时间暴露于高温环境下，高温热浪对他们的健康影响不容忽视，是需要重点保护的人群。造成他们健康风险增加的主要因素包括：

➢**暴露增加：** 高温热浪期间，户外工作者高温暴露时间增加；生产性热源以及降温措施不利会增加热暴露；城市热岛效应加剧热暴露。高强度劳动产生的热量难以释放，可造成体温上升；

➢**敏感性增加：** 工作环境中无空调等降温设备；户外工作者也没有充分认识到高温热浪对人体健康的危害。

3、如何应对高温热浪?

3.1 高温热浪来临前

3.1.1 政府部门

➢**制定高温热浪劳动保护政策：**政府有关部门应出台防暑降温相关政策法规，规定高温热浪期间户外工作时间、劳动保护措施以及发放高温津贴。

➢**建立多部门应对机制：**明确应对高温热浪的牵头单位，建立政府统筹协调、有关部门密切配合、基层专人负责、用人单位具体实施的高效有序运转的工作机制。

➢**加强高温热浪应急准备：**组织有关部门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，提高应急能力。

➢**加强宣传教育：** 建立符合区域特征的高温热浪健康预警系统，及时发布预警信息，广泛开展防暑降温科普宣传工作。

3.1.2 用人单位

➢**严格执行有关政策：**结合实际情况制定防暑降温实施细则，明确责任部门，合理调整劳动时间，设置空调休息室，密切关注高温天气及预警信息，做好相应准备。

➢**明确需重点保护人群：**对患有心脑血管疾病、中枢神经系统疾病者要及时调离高温工作岗位。

3.1.3 户外工作者

➢**密切关注天气预报：**及时了解高温热浪信息，做好防暑降温准备。

➢**密切关注自身健康：**发现异常，及时处理。

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号，提醒公众做好应对工作。

➢**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。

➢**加大监督力度：**加强对用人单位遵守相关法规的监督检查，重点检查作息时间、防暑降温措施以及高温津贴的发放等执行情况。

➢**加强监测及健康教育：**做好中暑及其他热相关疾病的监测、报告及救治工作，广泛宣传高温热浪防护知识，为高危人群提供健康服务和防暑降温咨询。

3.2.2 用人单位

➢**调整作息时间：**适当调整作息时间，减轻劳动强度，减少高温工作时间。

➢**落实防暑降温措施：**提供降温防晒设施和个人防护用品，供应清凉饮料。

➢**按时发放高温津贴：**高温津贴的具体标准由省级政府或劳动保障部门制定。

➢**迅速处理中暑事件：**一旦发现有人出现中暑症状，及时拨打“120”，并立即将中暑者移到通风、阴凉、干燥的地方，仰卧，解开衣扣，脱去或松开衣服，尽快冷却体温；对于重症中暑者应立刻与最近的医疗机构取得联系配合救治。

3.2.3 户外工作者

➢**工作时间方面：**尽量减少工作量，合理安排作息时间，密切监控自身健康。

➢**衣着方面：**尽量穿轻薄、浅色及宽松的衣服，以免大量出汗时不能及时散热而引起中暑。

➢**饮食方面：**多饮水，最好加点食盐，不要饮用含酒精、咖啡因或含糖量较高的饮料，注意平衡膳食，以清淡饮食为主。

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。

针对高温作业工人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。