



## **International Commission on Occupational Health, Scientific Committee on Thermal Factors (SCTF)**

### **3<sup>rd</sup> Meeting Report**

**Time:** Friday, 3 June 2020, 3:00-4:30p.m. SGT (+8)

**Venue:** Virtual Meeting on Zoom

**Participants:** Annex I

## **1. Welcome and Introduction**

1.1 Jason Lee welcomed the attendees and briefed the meeting agenda:

1.1.1 Presentation by Tord Kjellstrom on 'The need for comparable local data occupational heat effects in different countries and jobs'.

1.1.2 Presentation by Matt Brearley on 'COVID-19 Heat Stress Management – Lessons from the field'.

1.1.3 Short introduction by members and friends from Thailand. A focus on country/topic specific issues related to thermal factors could be included in prospective meetings.

1.1.4 Updates and roundtable discussion from all other members.

1.2 Jason Lee reminded all that ICOH SCTF is a network for individuals with a strong interest in thermal factors in occupational. He encouraged attendees to tap on the expertise within this network and initiate their own activities.

1.3 Jason Lee and Tord Kjellstrom invited ICOH SCTF members to co-author a methodological manuscript to promote standardisation of data collection in occupational heat stress research. This will facilitate prospective data comparison across research groups.

## **2. Tord Kjellstrom, 'The need for comparable local data occupational heat effects in different countries and jobs'**

2.1 Link to presenter's deck: <https://tinyurl.com/yce8mh3k>

2.2 Variance in methods and variables used in different manuscripts and published papers makes it difficult to compare results.

2.3 Not enough emphasis on the impact of heat on indoor work, especially in less-developed areas where there are problems such as chemical poisoning and poor air-conditioning.

2.4 Combination of effects of exposure to heat and air pollution on working people is under-studied.

2.5 Based on the RCP4.5 model, there will be 474 million people living in extreme temperatures ( $>32^{\circ}\text{C}$ ) worldwide. This translates to a high risk to public health and a loss of work productivity (based on daylight work hours lost). Conclusive physiological evidence is already available.

2.6 Common approaches in measurements of data related to heat health studies will facilitate economic analysis that justifies the value of mitigation and adaptation actions.

2.7 Q&A:

2.7.1 Question from Pranab Nag: How can we address the combined effects of heat and COVID-19?

2.7.1.1 Jason Lee: GHHIN has released a set of resources that seek to address challenges related to heat and COVID-19 (<http://ghhin.org/heat-and-covid-19>).

2.7.2 Question from Marc Schenker: Are there data surrounding economic costs of heat stress today?

2.7.2.1 Jason Lee: Cai Wenjia from Tsinghua University, China, has been working on this issue — to exchange notes with her offline.

2.7.2.2 Tord Kjellstrom: Acknowledged that there is an increase in attention on this issue, especially in the agriculture industry.

#### 2.7.2.3 Cai Wenjia: Review paper on economic cost of heat-related labour

productivity loss is ongoing. Will share the summary of the findings in the near future.

2.7.3 Comments from Jason Lee: Referring to Tord Kjellstrom's presentation, while urinary specific gravity (Usg) is reliable before activity, it is a poor indicator of hydration status when used during and immediately post-activity. A practical and accurate indicator of dehydration is the measurement of body mass change before and after the activity.

### 3. Matt Brearley, 'COVID-19 Heat Stress: Lessons from the field'

3.1 Link to presenter's deck: <https://tinyurl.com/yddansy8>

3.2 Australia's national emergency response team conducted Personal Protective Equipment (PPE) training in North-western Australia where WBGT was 32.2°C. Results showed a rapid rise in body core temperature (about 1°C) within a short period (about 35 min). Sweat rate was 0.6-1L/hour.

3.3 A need to monitor daily climate data closely and how it affects sleep quality and other physiological indicators for the response team.

3.4 Half of emergency response workers who typically worked indoors found that they were working harder outdoors. 77% felt that it was too hot, and 45% experienced fatigue in some form.

#### 3.5 Q&A

3.5.1 Question from Ross Di Corletto: Was there anything done to make the PPE more permeable?

3.5.1.1 Matt Brearley: The PPE were leftovers from the recent Ebola response — not optimised for the purposes and climate in terms of quality and

permeability. They were replaced to open-back and permeable PPE halfway in, and feedback was positive.

3.5.1.2 Vidhya Venugopal: Surveys were recently conducted in healthcare frontline workers in Singapore and India. Survey results show high number of complaints regarding permeability and sub-standard in PPE quality in IND.

3.5.2 Question from Jason Lee: Were there any observations on an increase in heat tolerance after a period of heat acclimatisation?

3.5.2.1 Matt Brearley: The team had heat acclimatisation guidelines prior to arriving. But due to the short notice, there were no measurements made. He noticed fitter members were able to adapt faster, and therefore made up a larger proportion of the workload at the start.

3.5.3 Comment from Pranab Nag: Literature shows that a 0.6 – 1.0°C increase in core temperature is not dangerous.

3.5.3.1 Matt Brearley: The workers only had 1 hour shifts, so core temperature did not rise significantly (less than 1°C). But a 1°C increase in core temperature within 35 minutes is a very fast rise in core temperature — it will be dangerous if workers went for multiple or longer shifts.

#### **4. Country case-study on Thailand**

4.1 Chuleekorn Tanathithikorn (guest) from the Division of Occupation and Environmental Diseases, Ministry of Public Health, Thailand shared her efforts on creating a national weather warning system for workers in the agricultural industry.

4.2 Ram Rangsin (guest) from the Phramongkutklao College of Medicine, Thailand shared his efforts towards reducing heat-related injuries in Thailand's military (Thailand receives 100,000 recruits a year).

4.3 Manoj Potapohn (member) introduced Dr. Kampagnat Wangsan and Karnrawee Sratongno who have been studying health impacts from heat on mortality.

## **5. Introduction of guests and new members to the meeting:**

5.1 Kampanat Wangsan is a lecturer in Chiang Mai University, Thailand. He was introduced to Manoj Potapohn during the 2019 ICOH Conference in Wellington. He is interested in research on environmental health.

5.2 Karnrawee Sratongno is from Chiang Mai University, Thailand. She was introduced to Manoj Potapohn after the 2018 GHHIN Conference in Hong Kong. She is working mainly in heat and air pollution research for the protection of animal health.

5.3 Wantanee Phanprasit (member) is from Mahidol University, Thailand. She is involved in the study of occupational heat health standards in Thailand, and is concerned that current standards do not adequately protect labourers.

5.4 Efi Yolitati Yovi (member) is from IPB University, Indonesia and is the research coordinator of Forest Operations in the International Union of Forestry Research Organizations. She is interested in the workload, productivity and industrial protection of forestry workers.

5.5 Satoru Ueno is from the National Institute of Occupational Safety and Health in Japan. He is interested in heat health research.

5.6 Lily Li is a postdoctoral fellow from the Global Asia Institute, National University of Singapore. She is interested in the economic analysis of heat stress.

5.7 Mengzhen Zhao is from Tsinghua University, China and is working on the economic assessment of heat on labour productivity loss.

## **6. Roundtable Discussion by members**

6.1 Seichi Horie raised concerns about false claims in Japanese media that wearing surgical masks can cause a rise in heat stroke cases. This may cause problematic claims in the future. He also recommended members to attend the 2022 ICOH Congress in Australia (<http://icoh2021.org>).

6.1.1 Jason Lee added that the SCTF will be contributing three oral sessions and a special session at the upcoming ICOH meeting.

6.1.2 Ross Di Corleto will share literature review on the impact of respirators on heat stress that indicates there is no significant impact for low to moderate work rates.

6.2 Elspeth Opperman suggested that the SCTF could work towards contributing to GHHIN in providing protection advice to occupational workers, given that this committee's discussions are relevant to GHHIN's efforts.

6.3 Sirkka Rissanen shared her work regarding cold strain and reminded the committee that this is a potential scope of study for the SCTF as well.

6.4 Ross Di Corleto raised a question on the members' perception regarding the measurement of saliva for dehydration.

6.4.1 Jason Lee responded that it will be difficult to obtain saliva samples from very dehydrated individuals.

6.4.2 Matt Brearley added that evidence regarding saliva samples have shown to be unreliable and inconsistent. He recommended a range of options for testing dehydration.

6.5 Cai Wenjia shared her observations on the results in her work on economic analysis on heat-related labour productivity loss.

6.5.1 She noted that results are varied, and that is due to differences in input data, methodologies in economic analysis, and the consideration of adaptation measures.

6.5.2 She recommended a standardised approach to carry out labour productivity loss studies to reduce these uncertainties.

6.5.3 She also highlighted the importance of indicating how workers are paid in economic analyses, since this will determine whether losses are incurred by the employee or employer and affect the downstream analyses.

6.5.4 Tord Kjellstrom emphasised the need for more comparable data between studies so that interpretations can be more meaningful, and encouraged the committee to contribute to a joint guidance report to standardize methods in this field of research.

**7. Jason Lee thanked the participants for their attendance and encouraged them to attend the upcoming GHHIN Dialogues and to contribute to the HOTHAPS guidance manuscript.**

7.1 GHHIN Dialogue – Heat in the City, Tue, 28 July 2020 9:00 PM – 11:30PM CST, Online

Sign-up link: <https://tinyurl.com/ycdhnxjc>

7.2 GHHIN Dialogue – Heat in the Workplace, Wed, 29 July 2020 9:00PM – 11:30 PM EDT, Online

Sign-up link: <https://tinyurl.com/y8crahd9>



## Annex I – List of Attendees

### **Members:**

Jason Lee (Chair), National University of Singapore, Singapore

Sirkka Rissanen (Secretary), Finnish Institute of Occupational Health

Tord Kjellstrom (Advisor), Health and Environmental International Trust, New Zealand

Matt Brearley, Thermal Hyperformance, Australia

Cai Wenjia, Tsinghua University, China

Ross Di Corletto, Monitor Consulting, Australia

Nicholas Goh, National University of Singapore

Seichi Horie, University of Occupational and Environmental Health, Japan

Elsbeth Oppermann, Ludwig-Maximilian University of Munich, Germany

Manoj Potapohn, Chiang Mai University, Thailand

Marc Schenker, University of California, Davis, U.S.A

Matthias Otto, Nelson Marlborough Institute of Technology, New Zealand

Wantanee Phanprasit, Mahidol University, Thailand

Vidhya Venugopal, Sri Ramachandra University, India

Efi Yuliati Yovi, IPB University, Indonesia

### **Invited:**

Pranab Kumar Nag, Faculty Centre for Integrated Rural Development and  
Management, India

Ram Rangsin, Phramongkutklao College of Medicine, Thailand

Karnrawee Srangtono, Chiang Mai University, Thailand

Chuleekorn Tanathithikorn, Bureau of Occupational and Environmental diseases,  
Department of Disease Control, Thailand

Saturo Ueno, National Institute of Occupational Safety and Health, Japan

Kampanat Wangsan, Chiang Mai University, Thailand

Meng Zhen Zhao, Tsinghua University, China

**Screenshot of participants in virtual meeting on Zoom:**

