



International Commission of Occupational Health Scientific Committee on Thermal Factors (SCTF)

4th Meeting Report (2022-2024)

Time: Wednesday, 22 November 2023, 3:00 p.m. – 4:30 p.m. (GMT+8)

Venue: Virtual Meeting on Zoom

Participants: Annex I

1. Welcome and Introduction

1.1 Jason Lee welcomed the attendees.

1.2 Jason gave time for members to share updates.

1.2.1 Wenjia Cai shared about the launch of the Lancet Countdown Report in China, which discussed the effect of climate change on health and how climate actions improves health in China. The report also covered how health impacts due to climate change is attributed to human activities, and how climate change affected the daily lives of people living in China through the aspects of (1) exercise time, (2) daily comfort levels, and (3) productive working hours.

1.3 The meeting agenda was as follows:

1.3.1 Presentation by Albin Stjernbrandt on *“Adverse health effects from working in a cold climate”*.

1.3.2 Presentation by Sharifah Badriyah Alhadad on *“The effect of heat exposure on risk-taking behavior amongst healthcare workers wearing full-body personal protective equipment”*.

2. Albin Stjernbrandt: *“Adverse health effects from working in a cold climate”*.

2.1 [Link to presenter’s deck](#)

2.2 Albin Stjernbrandt presented about different studies that have investigated the effects of cold stress on health in occupational settings.

2.3 Albin shared that the research done showed that occupational cold stress has increased the probability of health conditions such as Raynaud’s phenomenon, carpal tunnel syndrome, peripheral neuropathy, reduced peripheral cutaneous perfusion, and lower airway symptoms.

2.4 Albin highlighted that while prevention measures are necessary to protect workers from the negative health effects of working in cold stress, the current ISO standard for risk assessment and management of working under cold stress is under-utilised.

2.5 Albin concluded by sharing upcoming research work that will assess the effectiveness of current risk assessment and management standards, in order to improve workers' protection against cold stress.

2.6 Discussions:

2.6.1 Mattias Otto raised a question on whether the reduced thermal perception threshold in Swedish military conscript can be considered a form of cold acclimatisation.

2.6.1.1 Jason Lee added on by asking if adaptation to the cold is purely behavioural or are there autonomic changes to the body due to the cold.

2.6.1.2 Albin answered Matthias that the reduced thermal perception threshold among the military conscripts was not a sign of cold acclimatisation, but rather a reduced sensory function causing them to be less sensitive to the cold. Albin replied to Jason that there are findings which suggest physiological adaptations to the cold, such as increase in metabolic rate to increase heat production in skeletal muscle, which are usually developed over two to four weeks of exposure.

2.6.2 Jason asked about the current application of warming strategies such as warming vest and drinking warm fluid.

2.6.2.1 Albin mentioned that warming strategies such as heating vest and electric-heated gloves are available, but their use in occupational context is low.

2.6.3 Jason commented that he had expected increased blood flow during cold stress, and was surprised that decrease in blood flow in postural muscle tissues was observed when exposed to the cold.

2.6.3.1 Albin explained that mechanisms affecting blood flow to the postural muscles might be different from the peripheral muscles. However, this has not been thoroughly researched.

Afternote: Hilde Feverik shared a [study](#) that investigated the effect of working position and cold environment on muscle activation level and fatigue in the upper limb during manual work tasks.

3. Sharifah Badriyah Alhadad: *“The effect of heat exposure on risk-taking behavior amongst healthcare workers wearing full-body personal protective equipment”*.

3.1 [Link to presenter’s deck](#)

3.2 Sharifah Badriyah Alhadad shared about a study which investigated the effect of heat exposure on maximal strength and risk-taking behaviour among healthcare workers wearing full-body personal protective equipment (PPE), and the efficacy of ice slurry ingestion to alleviate adverse effects of heat stress exposure.

3.3 Sharifah concluded that (1) healthcare workers experienced high environmental heat stress and mild thermal strain, which impaired maximal strength and increased risk-taking behaviour, and (2) ice slurry ingestion attenuated adverse effects of heat stress exposure experienced by healthcare workers.

3.4 Discussion:

3.4.1 Wenjia Cai wondered how the study team decided on the risk-taking behaviour test administered during the study.

3.4.1.1 Sharifah explained that the Balloon Analogue Risk Task is a validated tool to assess behavioural risk-taking that has been used in other settings such as individuals with gambling and alcohol addiction, and ADHD. She admits that a possible limitation of using the Balloon Analogue Risk Task on healthcare workers is that it may not fully represent the type of risk that these workers take when undergoing treatment and care activities.

3.4.2 Hilde Feverik asked about the possibility of including validated cognitive test batteries into future studies.

3.4.2.1 Sharifah replied that cognitive test batteries were initially considered for the study but not included due to two reasons. The first reason was because the study team wanted to investigate a less-researched impact of heat since the effect of heat on behavioural risk-taking is less established than the effect of heat on cognition. The second reason was that the scale of the study was limited by the COVID-19 pandemic. However, she agreed

that future studies in healthcare settings should include other tests to assess a wider range of heat effects.

3.4.3 Matthias Otto expressed his surprise about the 3°C increase in WBGT from ambient environment to inside the PPE. He also enquired if there are better PPE available for healthcare workers, rather than the ones used in the study.

3.4.3.1 Sharifah explained that a similar increase in WBGT was observed in a study involving thermal manikins since the impermeability of PPE increases with the PPE level. She elaborated that the PPE used in the study was the same as what healthcare workers would use during chemical decontamination. She added that if PPE cannot be altered, other adaptation strategies like ice slurry, cooling vests, and altering work-rest cycles to provide more rest for these workers can be considered.

4. AOB

4.1 Jason Lee shared about the upcoming [28th United Nations Climate Change Conference \(COP28\)](#), where the Southeast Asian Heat Health Note will be launched on 1 Dec 2023. Jason also shared about an upcoming global/regional heat forum which will be held in Singapore around July 2024, with more details to follow.

4.2 Jason shared about the [34th International Congress on Occupational Health \(ICOH2024\)](#) held from 28 April to 3 May 2024 in Marrakesh, Morocco.

4.3 Jason informed members about the 20th edition of the [International Conference on Environmental Ergonomics \(ICEE 2024\)](#) held from 3 to 7 June 2024 in Jeju, South Korea.

4.4 Jason shared a [BBC StoryWorks video](#) featuring heat stress exposure on occupational worker.

4.5 Jason ended the meeting by highlighting that the COVID-19 pandemic has emphasised that the foundations of our societies are healthcare workers for health, construction workers for infrastructure and gig workers for delivery of food or other items and therefore, priority should be placed to protect their health and well-being

Afternote: Sirkka Rissanen shared about [Arctic Congress 2024](#) held from 29 May to 3 June 2024 in Bodø, Norway.

Meeting minutes were recorded by Clarence Leow, endorsed by Sirkka Rissanen (Secretary) and approved by Jason Lee (Chair).

Annex I – List of Attendees

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

Sirkka Rissanen (Secretary), Finnish Institute of Occupational Health, Finland

Albin Stjernbrandt, Umea University, Sweden

Chikage Nagano, University of Occupational and Environmental Health, Japan

Clarence Leow, National University of Singapore, Singapore

Hilde Feverik, SINTEF Digital, Norway

Jenni Kaisto, Finnish Institute of Occupational Health, Finland

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

Mohammed Al-Bouwarthan, Imam Abdulrahman Bin Faisal University, Saudi Arabia

Paul Matthias Otto, Nelson Marlborough Institute of Technology, New Zealand

Seichi Horie, University of Occupational and Environmental Health, Japan

Sharifah Badriyah Alhadad, National University of Singapore, Singapore

Wenjia Cai, Tsinghua University, China

Yuri Hosokawa, Waseda University, Japan

Screenshot of participants in meeting on Zoom:

