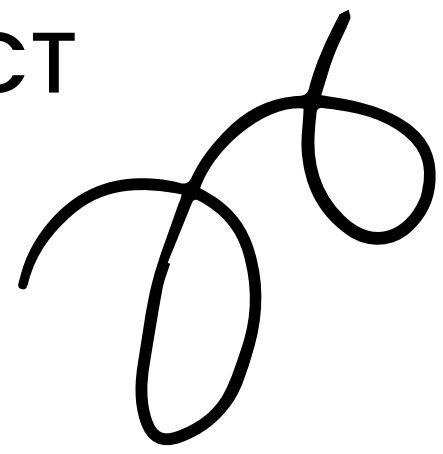


*New Study!*



# CANADA- WIDE SCAN TO EVALUATE HEAT STRESS IN THE MINING INDUSTRY

AN INDUSTRY DRIVEN RESEARCH PROJECT



**DR. GLEN P.. KENNY**  
Director, Human & Environmental  
Physiology Research Unit

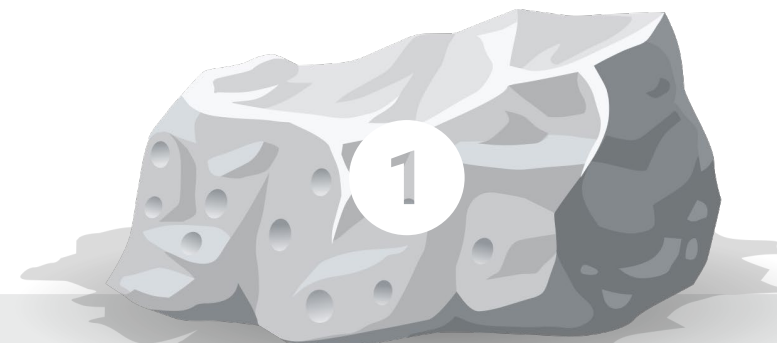


**EMILY TETZLAFF, R.KIN**  
Ph.D. Candidate, Human & Environmental  
Physiology Research Unit

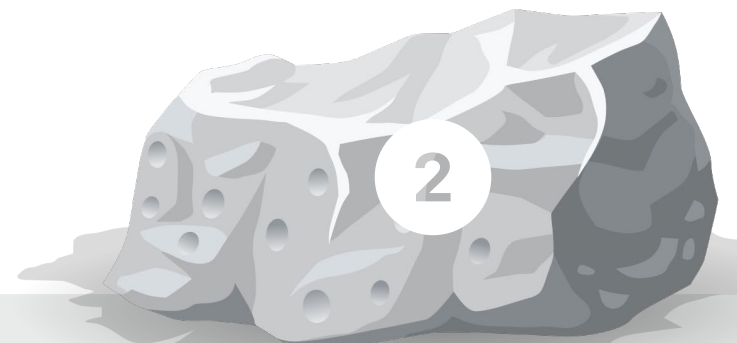
# DEFINING EFFECTIVE HEAT STRESS/HEAT STRAIN IDENTIFICATION AND MANAGEMENT STRATEGIES FOR THE MINING INDUSTRY

## WHAT IS THE PROBLEM TO BE ADDRESSED?

Heat stress is a deadly occupational hazard that is projected to increase in severity with global warming. While upper limits for heat stress designed to protect all workers have been recommended by government and occupational safety institutes for some time (e.g., ACGIH guidelines), heat stress continues to compromise health and productivity.



Nearly all workers in the mining industry experience moderate to high levels of occupational heat strain resulting in impaired mental function, physical discomfort, as well as deterioration in physical performance (e.g., impaired motor dexterity and coordination), and in more severe cases heat-related injury or even death.



Even in temperate environments, a workers' ability to thermoregulate is impaired due to the high levels of metabolic heat production (due to the increased work intensity) and the blunted heat loss caused by the insulation and limited permeability of personal protective equipment.



Additionally, miners face a unique set of risk factors for heat-induced injury associated with stress and overexertion, which are worsened during prolonged exposure to high temperatures and excessive fluid losses (due to sweating).

While recent studies assessing miners (including miner rescuers) provide unique information about the physical demands and the physiological strain experienced by miners, these studies have evaluated a relatively small number of workers, demographics, and locations. Therefore, we have only a superficial understanding of the key factors contributing to excessive heat stress and heat strain across the mining industry, which limits our ability to design practical and effective heat-mitigation strategies to safeguard worker health and safety.

## WHAT IS THE AIM OF THE STUDY?

To develop effective heat stress/heat strain identification and management strategies to protect miners against the potentially harmful effects of a prolonged heat exposure.

## WHO CAN PARTICIPATE IN THE STUDY?

To achieve this important objective, two heat stress questionnaires have been developed to advance our understanding of how heat stress/heat strain is viewed and managed within the industry (including underground mines, open-pit miners, smelters, refineries, and exploration projects) by both Health and Safety Personnel and front-line workers.



## HOW IS THE QUESTIONNAIRE ADMINISTERED?

To achieve this important objective, two heat stress questionnaires have been developed to advance our understanding of how heat stress/heat strain is viewed and managed within the industry by both Health and Safety Managers/Directors and front-line workers. The questionnaires, which we have also used in other industries (e.g., electric utility) are completed anonymously, using a pre-established secure link hosted on SurveyMonkey. Those individuals wishing to participate can complete the questionnaire at work or home in less than 15 minutes. It is important to note that Survey Monkey is a fully secured site which ensures full confidentiality of the responder and of the data collected from the survey.

### FRONT-LINE WORKERS

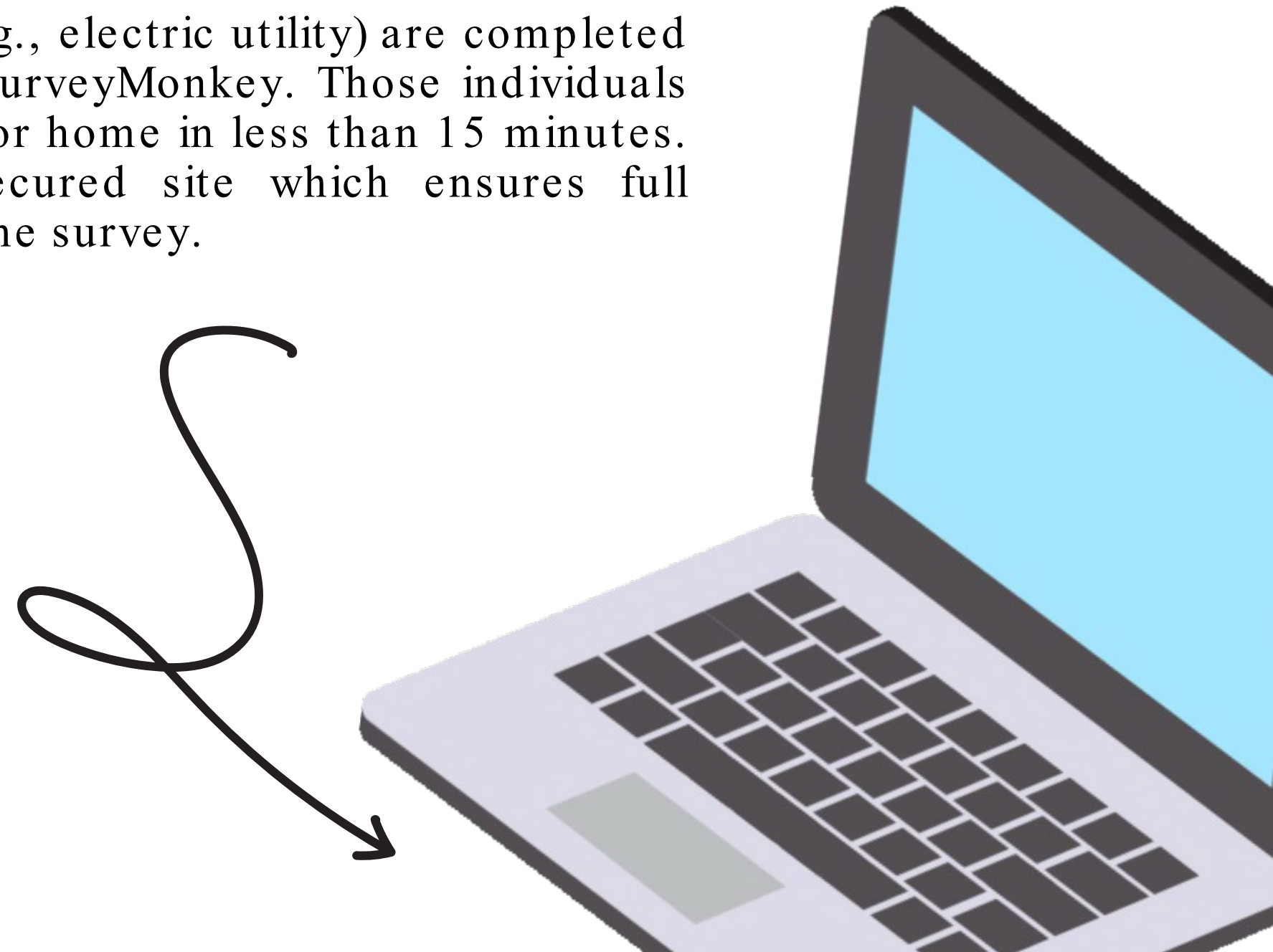
English: <https://www.surveymonkey.com/r/DCMD3L9>

French: <https://www.surveymonkey.com/r/ZBBP2FQ>

### HEALTH AND SAFETY PERSONNEL

English: <https://www.surveymonkey.com/r/VWKLH7Q>

French: <https://www.surveymonkey.com/r/ZHKZYJC>





# FRONT-LINE WORKER QUESTIONNAIRE

This questionnaire includes the following concepts:

- Personal Characteristics (e.g., age, sex, height, weight)
- Occupational Description (e.g., sector, occupational title, years of experience, location, work schedule, production incentives, employment type)
- Heat Stress Exposure (e.g., perceived risk, primary task assignments, heat-related signs/symptoms, heat-related illnesses, urinate rate/colour, weight loss over shift length)
- Heat Strain Score Index (HSSI) (validated tool)
- Self-Management Practices (e.g., work effort medication, personal strategies, water/electrolyte consumption)
- Current Workplace Management Practices (e.g., management mitigation of heat stress, strategies in use, reporting culture, environmental changes)
- Heat Stress Vulnerability (e.g., health conditions, medication use, medical history, heat-related illness not at work)
- Lifestyle Determinants of Heat Stress Susceptibility (e.g., alcohol consumption, tobacco use, sleep, energy drinks, physical activity, water source, pesticide use)
- Additional Comments

# OHS PERSONNEL QUESTIONNAIRE

This questionnaire includes the following concepts:

- Occupational Background (e.g., Sector, Occupational Title, years of experience, Site Size, Demographics)
- **Workplace Heat Stress Risk** (e.g., seasonal risk, heat stress reporting, use of energy drinks, incentive programs)
- Heat Stress Management Program (e.g., real-time monitoring, environmental assessment strategies, use of ACGIH TLV, pre-task assessments, training, vulnerability screening, provision of electrolyte replacement, break areas)
- Heat Stress Emergency Response (e.g., heat-related illness, training, treatment, rural/remote location)
- Environmental Monitoring for Heat Stress (e.g., techniques, sources, heat wave planning)
- Legislation and Governance (e.g., OHS / mining-specific legislation, provincial/territorial guidance, information and resources)
- Additional Comments

# HOW WILL THE RESULTS OF THIS QUESTIONNAIRE BE USED?

The questionnaire results will help:

- 1 Identify the level of physiological strain (and therefore risk of a heat-related or heat-induced injuries) a worker may face during the performance of their regular duties.
- 2 Increase awareness about the risks associated with exposure to heat and help managers/directors as well as workers understand those factors which may increase a worker's risk of experience dangerous levels of heat stress/heat strain.
- 3 Help guide companies in revising management strategies, if and where needed.
- 4 Health and Safety personnel can use the data acquired from the worker survey to assess the effectiveness of current heat stress management programs.

If you have any questions about the project, please contact  
Dr. Glen Kenny or Emily Tetzlaff.

Dr. Glen Kenny  [gkenny@uottawa.ca](mailto:gkenny@uottawa.ca)  Dr. Glen P. Kenny  [@HEPRU\\_uOttawa](https://twitter.com/HEPRU_uOttawa)  [www.hepru.ca](http://www.hepru.ca)

Emily Tetzlaff  [etetz085@uottawa.ca](mailto:etetz085@uottawa.ca)  Emily Tetzlaff  [@emtetzlaff](https://twitter.com/emtetzlaff)  [www.hepru.ca](http://www.hepru.ca)

 Montpetit Hall, University of Ottawa, 125 Universite Pvt. Ottawa, Ontario K1N 6N5, Canada