#### HUMAN & ENVIRONMENTAL PHYSIOLOGY RESEARCH UNIT

# NEWSLETTER

#### HOME OF OPERATION HEAT SHIELD CANADA

Generating the knowledge to help Canadians adapt and prepare for rising temperature extremes

#### JANUARY 2025 • VOLUME 4 • ISSUE 1



### **NEWS AND NOTEWORTHY**

#### RECENT INSIGHTS ON PROTEIN INTAKE: NAVIGATING NEW RECOMMENDATIONS AND EVOLVING RESEARCH FOR HEALTH AND LONGEVITY

The importance of nutrition for healthy living is a well understood concept. In the last decades, there has been important advancement in the field of nutritional science. However, the emergence of new information, which at time is contradictory to popular beliefs, may have left some with more confusion about which nutritional approach they should embrace. One area that has been highly argued in the literature is protein intake. The current recommended daily allowance for protein is 0.36 g/lb per day. Several reports suggest that this recommended intake may be insufficient to prevent declines in lean body mass associated with aging. In fact, the daily allowance for protein is a broad recommendation meant to prevent deficiencies (mainly in essential amino acids) rather than promote muscle growth and maintain a high standard quality of life. (continued on page 2)

#### TABLE OF CONTENTS

News and Noteworthy • P.1-2

A Message From the Director • P.3-4

In Their Words with Margaret Lethe and David Morrow • P.5-8

#### Spotlight Feature

• Energy Accountability with Ryan Rodriguez • P.9-10

Fresh Off the Press • P.11

HEPRU Picks • P.12

HEPRU Team Highlight • P.13–14

Recruitment Corner

- Multi-Day Heatwave P.15
- Protecting workers performing their duties in the heat • P.16
- How does menopause affect the ability to cool down • P.17
- Protecting older women during heatwaves P.18

### NEWS AND NOTEWORTHY (CONTINUED)

RECENT INSIGHTS ON PROTEIN INTAKE: NAVIGATING NEW RECOMMENDATIONS AND EVOLVING RESEARCH FOR HEALTH AND LONGEVITY

On the flip side, some scientists believe that high protein intake induces aging because the negative effects certain amino acids (such as leucine) have on muscle growth. However, those studies are often conducted on animal models and cannot always be extrapolated to humans. In addition, it is well established that older individuals are less sensitive to the muscle growth effects of amino acids and protein. This would put those individuals at a heightened risk of losing muscle mass which could affect their ability to perform strenuous and vigorous physical activities.

So, how much protein should I consume daily? While the answer is not that simple, we can follow recent recommendations provided by the American College of Sports Medicine (ACSM). They recommend a daily protein intake that ranges from 0.54 g/lb to 0.77 g/lb for physically active adults. Notably, these recommendations are supported by our <u>recent studies</u> in which we found no differences between daily protein intakes of 0.54 g/lb, 1.00 g/lb and 1.00 g/lb in younger athletes on changes in body composition during weight loss. Therefore, aiming for 0.54–1.00 g/lb is likely to allow most individuals to meet their daily needs.

That's great, but what are some good protein sources, especially if you don't eat meat? Good sources of protein include meat, fish, eggs, dairy and protein powders, because they contain all the essential amino acids. Legumes, nuts and seeds may be a good alternative for those who do not consume animal products. <u>A recent review</u> suggests that, so as long as the daily recommendation for protein are met (i.e., 0.54-1.00 g/lb), the quality of the protein becomes of secondary importance. However, caution must be taken with plant-based protein sources as they also generally contain plenty of carbohydrates and fats which adds to their caloric load (similarly to fatty meat cuts).



### A MESSAGE FROM THE DIRECTOR

Blizzards are predicted to become more intense in the face of climate change, despite shorter winters and rising global temperatures. Several severe blizzards hit the northeastern United States in late November causing massive disruptions and putting lives at risk. In January 2016, a historic and deadly blizzard, nicknamed "Snowzilla," struck the mid-Atlantic region. Although it is expected that Canadian winters, on average, will have milder temperatures in the future, extreme cold events are still predicted to occur. In fact, Ottawa and surrounding regions are expected to experience more extreme cold weather events as compared to last year. The change in weather patterns is largely due to the fact that climate change is causing the Arctic to warm

faster than the rest of the world, which weakens and destabilizes the <u>polar vortex</u>. This can allow cold air to escape the vortex and move south, causing extreme cold weather in lower latitudes. So where does that leave us and how do we prepare for these weather extremes and how will it affect our health?

Cold weather can affect your health increasing your <u>risk of illness and death</u> including worsening pre-existing

conditions, such as cardiovascular and respiratory disease and worsen mental health. Interestingly, in Australia, more deaths are related to

moderate cold than to heat or extreme cold. As we get older, we have a reduced ability to regulate body temperature which can be exacerbated by the presence of chronic health conditions. For example, diabetes can limit blood flow to the skin resulting in a more rapid cooling of the body while thyroid problems can affect how much heat the body can produce. Some medications can also affect body temperature regulation. These include prescription medications and those bought over the counter, such as some cold medicines. Memory problems can cause a person to forget to take precautions for staying warm, such as wearing appropriate attire when conditions become too cold outdoors. Even a brief exposure to the cold can have a negative impact on our health. However, it is not just the cold outdoors that can affect your health. About 20% of injuries related to exposure to cold occur in the home. Even mildly cool homes with temperatures from 15 to 18°C can lead to hypothermia in vulnerable older adults.

(continued on page 4)

# A MESSAGE FROM THE DIRECTOR (CONTINUED)

Hypothermia can start to develop when the body's core temperature drops below 36°C (normal resting core temperature can range between 36.0 and 37.0°C). It can lead to serious health problems. Hypothermia can also occur at cool temperatures (above 5°C) if you become chilled from rain, sweat (from shoveling snow outdoors), or being in cold water. Hypothermia can make it difficult to think clearly, so people may not realize they are in danger and that they need help. It's important to be aware of warning signs and early symptoms. These include cold feet and hands, puffy or swollen face, pale skin, shivering or shaking, slowed or slurred speech, feeling sleepy, angry, or confused among others. While winter brings enjoyable winter activities, it is important to recognize that like exposure to hot weather, cold weather can harm your health and well-being. Take the appropriate precautions to ensure that you stay warm when outdoors or indoors. For those that hate the cold, summer is not far behind!

#### Dr. Glen P. Kenny

Director Human and Environmental Physiology Research Unit



### IN THEIR WORDS WITH MARGARET LETHE

HEAR FROM OUR PARTICIPANTS ABOUT OUR NEW MULTI-DAY HEATWAVE SIMULATION STUDY

A 3-day study where participants are placed in a hot room and their responses to the excessive temperatures are monitored and evaluated by different devices that, in some cases, require placement in "nether" regions. They are poked and prodded extensively in a sweaty, fish bowl type environment and are committed to this state of affairs for a full, long weekend? Who volunteers for this stuff!? Well, because of who I am and what I believe in, I readily agreed for this study for reasons that I feel are important.

First, I worked in our health care system for over 50 years. I know the value of providing care that is evidence-based care and provided according to treatment guidelines that support decision-making.

Second, as an avid cyclist I was keen to undergo a VO<sub>2max</sub>test to discover if those multiple double hill climbs in Gatineau Park had paid off!

Third, it was heartening to see that the results of previous heat studies in seniors have already had an impact on policy for Health Canada and World Health Organization (WHO). This highlights the impact of the work and the importance of contributing to these studies.

But probably the most important reason was my confidence in the investigative team of doctoral and post-doctoral candidates. Throughout the 3 heat studies I have been involved in, their continuous display of professionalism has been impressive. They are patient, respectful, and very kind human beings who went out of their way to ensure I remained comfortable both physically and mentally. I trusted in their care, treatment and abilities to keep my information secure and confidential. It was fascinating to hear of their areas of study and the hopeful results they want to achieve to improve overall population health or worker wellbeing and safety.

I have tried to recruit many of my peers to participate in these heat studies but have not had much success so far which I don't understand or accept.

<u>5 Star Review</u> "A Hot Sweaty Fishbowl"

(continued on page 6)

### IN THEIR WORDS WITH MARGARET LETHE

HEAR FROM OUR PARTICIPANTS ABOUT OUR NEW MULTI-DAY HEATWAVE SIMULATION STUDY

Study participation is always a unique and interesting experience. I was very comfortable in the study "apartment" and found my physical surroundings quite remarkable for a lab. I had no complaints about the food because I was able to bring my own. I planned my stay by ensuring I had plenty of reading material and binge-worthy TV shows to watch. It was also a great opportunity to really focus on planning my next bike trip to BC's Gulf Islands!! Of course, there was also the 6 hours of extensive testing and so, overall, time flew by. I didn't even miss seeing the world outside.

Thanks for this opportunity to continue to give back and to be a part of informing important strategies for helping seniors to manage in excessive heat.

#### Margaret Lethe



Take a <u>virtual tour</u> of our new studio apartment enviornmental chamber that is fitted for our multi-day heat wave simulations

### IN THEIR WORDS WITH DAVID MORROW

#### HEAR FROM OUR PARTICIPANTS ABOUT OUR NEW MULTI-DAY HEATWAVE SIMULATION STUDY

In August, I read an article in the National Association of Retired Federal Employees newsletter about the heat study and how the heat dome of 2021 led to the death of over 600 people in BC. I remembered living in Vancouver in the late 1970's as a young man in an apartment with no air conditioning. There was no need. Summer temperatures never sweltered like here in Ottawa. I'm not sure how the elderly are able to cope when conditions exceed the normal parameters. The article indicated the University of Ottawa was looking for volunteers. I thought of my grandfather who had bequeathed his body to his Alma mater so I decided if I can help science by contributing a bit of time I should. It didn't hurt that both my sons araduated from Ottawa U as did their wives so this would give me an understanding of what kinds of things are done at a university. After getting through the vetting process and finding a 3 day window that didn't conflict with my hockey schedule I finally had the opportunity to spend 3 days in a pseudo studio apartment sized room at the University of Ottawa.

I have participated in a number of allergy studies at Queens so I was used to answering questions, being poked or filling out symptoms forms. This was different as now lots of monitoring equipment was hooked up and while I figured blood work would be done I thought it might be once a day, not 3 times. While I expected to possibly have balance issues when it was warm or I was tired at the end of the day I also discovered how easily you want to fall asleep while doing controlled breathing and looking at nothing but the ceiling for 10+ minutes. The room heat accentuated the issue of concentration and contributed to memory lapses when completing the tests. This made me think how many people probably weren't thinking straight and made poor decisions during the heat dome. I have a 93 year old mother with dementia that I am sure would have struggled if she lived in a building with no air conditioning.

I will say that I was thoroughly impressed with the staff of doctors, post grads, as well as the students who attended to me. I felt so well looked after and was interested to learn where everyone was from.



(continued on page 8)

### IN THEIR WORDS WITH DAVID MORROW

HEAR FROM OUR PARTICIPANTS ABOUT OUR NEW MULTI-DAY HEATWAVE SIMULATION STUDY

The 3 days was challenging but not onerous. Instructions were clear, the room was comfortable and I appreciated having a second monitor that I could use as a window. Looking back I am glad I didn't take a book. I don't think I could read without falling asleep so having access to streaming services as well as the internet allowed me to stay awake in between the extended testing sessions. While I don't know everything they were monitoring I always felt that I am contributing towards understanding how climate change impacts not just seniors but everyone.

#### David Morrow

### **TEAMWORK IN ACTION**



Study participant Heather Bracken (left) completed three full days of heat exposure simulating conditions experienced by Canadians indoors during an extreme heat event. She is surrounded by members of the study's investigative team, including Jeremy McCormick, Kelli King, Tasfia Hussain, Nicholas Goulet, and Gil Bourgois

### SPOTLIGHT FEATURE wITH RYAN RODRIGUEZ

UNIFOR URGES GOVERNMENT AND INDUSTRY TO 'KEEP IT IN THE PIPE'

Natural gas is an important part of Canada's commercial and residential energy and chemical framework. In other words, millions of us couldn't heat or cool our homes and businesses without it.

But the system of distribution pipelines that brings methane from refineries and distribution centres to consumers is aging—and it is leaking.

Historically, highly qualified union workers have worked around the clock to detect these leaks, report them, and fix them. But the ruthless pursuit of profits from natural gas companies results in cutting back on inspections, as evidenced by Enbridge's announcement to eliminate the evening and overnight

shifts in Toronto. Where they are doing inspections, companies are outsourcing work to sub-contractors with without the training to deal with leaks effectively.

With methane leaks increasingly ignored or insufficiently addressed, there is a significant threat to the climate as well. Methane is more than 70 times more potent than carbon dioxide as a greenhouse gas over the medium term.

All of this is leading to an unsustainable system with dangerous consequences. Canada's energy workers' union is sounding the alarm with the "Keep it in the Pipe" campaign.

"Unchecked methane leaks pose serious risks to workers, our communities, and ultimately the climate," said Unifor National President Lana Payne. "But it doesn't have to be this way. Today energy workers are proposing solutions that bring government, industry, and labour to the table."

The Keep it in the Pipe campaign outlines specific calls to action for the federal and provincial governments, including convening a meeting with industry and union stakeholders to establish best practices for managing methane leaks, funding technology to detect and reduce emissions,

and closing regulatory loopholes in the gas supply chain. Unifor is also calling for regular leak inspections and repairs in distribution networks where significant leaks currently go almost entirely unregulated.

(continued on page 10)

### SPOTLIGHT FEATURE (CONTINUED)

#### UNIFOR URGES GOVERNMENT AND INDUSTRY TO 'KEEP IT IN THE PIPE'

Investing in infrastructure upgrades and methane detection technology could also lead to the creation of hundreds or thousands of skilled, unionized jobs in manufacturing, construction, and maintenance, contributing to local economies across Canada.

"The 'Keep it in the Pipe' campaign is about accountability at every level," said Unifor Ontario Regional Director Samia Hashi. "Communities deserve clean air and workers deserve safe workplaces. By fighting methane leaks and getting a handle on inspections, Canada can create good-paying, unionized jobs all the while contributing to climate goals."

To learn more about Unifor's campaign and how you can support these efforts, visit <u>keepitinthepipe.ca</u>.

#### **Ryan Rodriguez** National Representative Health - Safety - Environment Représentant National en santé, sécurité et environnement Unifor





### FRESH OFF THE PRESS

The effect of highintensity exercise in temperate and hot ambient conditions on autophagy and the cellular stress response in young and older females

James J. McCormick, Nicholas Goulet, Kelli E. King, Naoto Fujii, Tatsuro Amano, and Glen P. Kenny



Effect of cold beverages on whole-body heat exchange in young and older males during intermittent exercise in the heat

Brodie J. Richards, Fergus K. O'Connor, Nicholas J. Koetje, Kristina-Marie T. Janetos, Gregory W. McGarr, and Glen P. Kenny





Modulation of cutaneous vasodilation by reactive oxygen species during local and whole body heating in young and older adults

Gregory W. McGarr, Caroline Li-Maloney, Kelli E. King, Kristina-Marie T Janetos, Naoto Fujii, Tatsuro Amano, and Glen P Kenny



The Effect of 7-Day Cold Water Acclimation on Autophagic and Apoptotic Responses in Young Males

Kelli E. King, James J. McCormick, and Glen P. Kenny

#### Media-Based Post-Event Impact Analysis of the 2021 Heat Dome in Canada

Emily J. Tetzlaff, Nicholas Goulet, Melissa Gorman, Gregory R. Richardson, Paddy M. Enright, Sarah B. Henderson and Glen P. Kenny

#### Brain-derived neurotrophic factor in older adults exposed to simulated indoor overheating

READ MORE!

Nathalie V. Kirby, Robert D. Meade, James J. McCormick, Kelli E. King, Sean R. Notley, and Glen P. Kenny



www.hepru.ca

## **HEPRU PICKS**

Members of the HEPRU team have recommended several peer-reviewed papers that delve into important topics related to human health. Whether you're interested in improving your own health or staying informed on current health trends, these papers provide practical, evidence-based knowledge for a healthier future.

### CAROLINE'S PICK

A recent study titled "<u>Migraines, vasomotor symptoms, and</u> <u>cardiovascular disease in the coronary artery risk development in</u> <u>young adults"</u> found that having both migraines and severe menopausal symptoms increase the risk of cardiovascular disease. In this study, investigators followed women from early adulthood to post-menopause. Those with migraines, severe hot flashes, and night sweats were more likely to develop cardiovascular disease or have strokes, even after accounting for factors like smoking, diabetes, and hypertension. Researchers emphasized the need for better treatment and heart health education for women.

#### EMILY'S PICK

A great new open-access article in the International Journal of Environmental Research and Public Health titled "Exploring the nexus of climate change and substance abuse: A scoping review." The authors conducted a scoping review to examine the current state of knowledge on the relationship between substance abuse and climate change, including during extreme heat events. The study authors emphasized the threats faced by individuals with substance abuse and mental health disorders. This timely and important topic is a very relevant read with takeaways applicable to public health and community

preparedness initiatives across Canada.

#### NICK'S PICK

A new article titled "<u>SARS-CoV-2-specific plasma cells are not</u> <u>durably established in the bone marrow long-lived compartment</u> <u>after mRNA vaccination</u>" explores a study of 19 individuals who, despite receiving multiple COVID-19 vaccines and, in some cases, natural infection, failed to produce long-lived plasma cells (LLPCs), which are crucial for long-lasting immunity. The study findings may explain why COVID-19 vaccines provide only short-term protection. A fascinating read for those interested in vaccine development and immunology!

### HEPRU TEAM HIGHLIGHT

#### MEET DR. EMILY TETZLAFF



Emily had been a PhD Candidate with the Human and Environmental Physiology Research Unit since fall 2021 and recently successfully defended her thesis. Emily also holds a Master of Human Kinetics and an Honours Bachelor of Physical Education specializing in Health Promotion and a university certification in Gerontology. She is also a Registered Kinesiologist with the College of Kinesiologists of Ontario.

Emily began her doctoral studies in Human Kinetics at Laurentian University, where she was awarded a Natural Sciences Engineering Research Council of Canada postgraduate scholarship for investigating heat stress in underground mining environments. However, following the

university's declaration of insolvency, she found herself a new home at the University of Ottawa, where she completed the rest of her doctoral program. With the transition of universities, Emily pivoted her research to focus on improving Canada's heat health communication practices to better protect the public from hot weather and extreme heat events.

While at HEPRU, Emily was also awarded a Canadian Institute of Health Research Health System Impact Fellowship, which allowed her to work jointly with the Heat Division of the Climate Change and Health Office (CCHO) at Health Canada. Through this collaboration, Emily led research projects investigating heat-health communication in Canada, including leading a team of researchers in reviewing nearly 3,000 online news articles published on the deadly 2021 Heat Dome and over 400 public health authority extreme heat-oriented webpages and online resources. She also led consultations with 42 public health experts, researchers and meteorologists across Canada to help improve the heat-health statements delivered through the Environment and Climate Change Canada weather warning system, which will be enacted in the summer of 2025. This work resulted in 11 publications highlighting practical implications for journalists, public health agencies, meteorologists, and others engaged in public health communication in Canada and globally.

Although her primary work transitioned to a public health focus, Emily maintained her strong connection to health and safety by pursuing several side projects investigating occupational heat stress. Now that she has completed doctoral program, Emily is looking forward to returning to the mining industry, where she will continue to pursue her research interests in occupational health and safety, health promotion, and risk management.

#### **KEY PUBLIC HEALTH AND SAFETY ARTICLES LED BY EMILY**

<u>The Intersection of the COVID-19 Pandemic and the 2021 Heat Dome in Canadian Digital News</u> <u>Media: A Content Analysis.</u>

<u>Hot Topic: A Systematic Review and Content Analysis of Heat-Related Messages During the 2021</u> <u>Western Heat Dome in Canada.</u>

Working Under the 2021 Heat Dome: A Content Analysis of Occupational Impacts Mentioned in the Canadian Media.

### HEPRU TEAM HIGHLIGHT (CONTINUED)

#### MEET ROBERTO HARRIS-MOSTERT



Roberto Harris-Mostert completed his bachelor's degree in Human Kinetics with a minor in Sports and Sports Psychology at the Vrije Universiteit in Amsterdam. During this time, he tested a device designed to quantitatively measure sweating at night, which sparked his interest in environmental physiology. He began his master's at the Human and Environmental Research Unit in September 2022. His thesis aims to improve worker health and safety in the heat, by investigating safe work times for people working in the heat, and understanding how working a prolonged day in the heat affects young and older males the following day. Besides his thesis project, Roberto also led other studies aiming to improve occupational heat stress guidelines and assisted in

qualitative studies at the laboratory. Since starting his master's, Roberto has had the opportunity to present his work at the American College of Sport's Medicine's Annual Meeting in Boston, winning a student award, and at the Workplace Safety North Mining Health and Safety Conference in Sudbury. After graduating, Roberto hopes to continue his research in environmental physiology, aiming to enhance heat health and safety in a time marked by rising temperature extremes.

#### MEET NATE JAY



Entering his third year, Nathaniel Jay is in the midst of completing his Honours Bachelor of Science in Human Kinetics with Applied Studies in Kinesiology. Nathaniel joined the HEPRU team in February 2024, after being introduced to their research via Dr. Glen Kenny's course on exercise physiology. Since joining the team, he has dedicated himself to analyzing the effects of heat and cold stress on physiological and cellular responses in diverse populations. Currently, Nathaniel is collaborating with other team members to analyze the behavioural responses to prolonged heat exposure and using direct whole body calorimetry to examine physiological changes in response to cold stress. He enjoys the opportunity to translate classroom knowledge into applicable skills that

are appropriate for the team's research tasks, those including exercise and stress testing, indirect calorimetry, microdialysis, and more. Nathaniel demonstrates an undeniable passion for research, one that shows itself through his commitment in various research projects and his willingness to contribute where extra hands are needed. Beyond his academics, Nathaniel tutors a wide range of subjects, such as mathematics, physics, biology, and chemistry. He also volunteers at a local physiotherapy clinic, where he aims to apply his knowledge in exercise prescription and clinical anatomy to aid in patient rehabilitation. He is passionate about physical health and patient care and is motivated to pursue a career in physiotherapy or rehabilitation medicine.

THE HEPRU AND HEALTH CANADA JOINING FORCES TO CREATE **HEAT-RESILIENT COMMUNITIES** 

In partnership with Health Canada, over the next 4 years we are conducting a series of aimed heat-resilient studies at creating communities. This builds on our recently completed heat wave simulation trial aimed at defining indoor temperature limits. Our recent <u>published fidings</u> provided the first experimental data on the physiological and health impacts of indoor heat stress experienced by heatvulnerable persons. Specifically, we showed that maintaining indoor temperature at or below 26°C safeguards older, heat vulnerable adults against potentially dangerous increases in thermal and cardiovascular strain durina exposures simulating indoor overheating during an extreme heat event. While our study findings have been adopted by Health Canada (and the World Health Organization) to implement a national 26°C upper temperature limit in Canada, important gaps remain in terms of understanding how other factors thought to affect heat tolerance influence the appropriateness of a 26°C indoor temperature limit. This includes evaluating whether the 26°C temperature limit is protective over multiple days or requires adjustment for the level of ambient humidity, worn clothing, and physical activity levels (e.g., activities of daily living).

It is our hope that you will join us once again and help us generate the critical knowledge we need to help protect Canadians across Canada against the harmful effects of extreme heat.

We are looking looking for individuals who meet the following criteria:

- Men and women 60-85 years of age, with and without a history of chronic conditions (e.g., diabetes, hypertension)
- May be physically active but not engaged in a structured, intense exercise training program.

Please contact Dr. Glen Kenny at gkenny@uottawa.ca to participate.

Learn more about our heatwave research at www.hepru.ca



Effects of daylong exposure to indoor overheating on thermal and cardiovascular strain in older adults: A randomized crossover trial.



Physiological responses to 9 hours of heat exposure in young and older adults. Part I: Body temperature and hemodynamic regulation

#### PROTECTING WORKERS PERFORMING THEIR DUTIES IN THE HEAT

Occupational heat stress directly threatens workers' ability to live healthy and productive lives. Heat exposed workers are at an elevated risk of experiencing impaired work performance and cognitive function leading to a greater risk of work-related injuries, which includes traumatic injury (e.g., fractures) and heatrelated illnesses (e.g., heat stroke, acute kidney injury, adverse cardiovascular events).

To mitigate this risk, safety organizations recommend upper limits for heat stress, typically defined by the level of effort and ambient conditions. Yet, heat stress continues to compromise worker health and safety. This can in part be attributed to the fact that employers underestimate the risks associated with heat stress and are given relatively limited guidance in how best to implement heat mitigation strategies.

Perhaps the strongest contributing factor is the fact that current occupational heat stress management guidelines assume a one size fits all approach and do not consider individual variability in physiological tolerance to heat stress, leaving many heat vulnerable workers, such as older individuals, under protected. With climate change fueling an increase in the occurrence of hot weather, the risk of heat-related injury and disease is expected to rise dramatically in both prevalence and severity over the next decades. To address the shortcomings of current heat management guidelines, we are conducting a study to generate safe work times to protect all workers, regardless of age or sex, that must perform their jobs in hot environments.

We are looking for individuals who meet the following criteria:

- Men 18-30 or 60-69 years of age
- Habitually active (not enduranced trained)

### Please contact Dr. Glen Kenny at gkenny@uottawa.ca to participate.

Learn more about our occupational heat stress research at www.hepru.ca





Heat tolerance and the validity of occupational heat exposure limits in women during moderateintensity work

Initial stay times for uncompensable occupational heat stress in young-to-older men: a preliminary assessment

HOW DOES AGE AND MENOPAUSE AFFECT THE ABILITY TO COOL DOWN

HEPRU's research has demonstrated that aging is associated with large reductions in the body's ability to lose heat—which can result in marked elevations in body temperature and a greater strain on the cardiovascular system during a heat stress. HEPRU is committed to continue exploring the mechanisms that contribute to these impairments in heat loss. Furthermore, there is a lack of research on whether menopause—which is a normal part of the aging process—is a factor in how women respond to heat stress. Women have diverse experiences of menopause that may further impact how they deal with heat.

As part of a follow-up on our previous research, we are investigating how aging modifies the regulation of blood flow in the skin during exercise, as this is one of the primary mechanisms by which we lose heat.

We are also seeking to better understand the effects of menopause on heat tolerance during exposure to heat at rest. The studies are currently focused on assessing the separate effects of hot flashes and type 2 diabetes on heat loss responses. We are looking for individuals who meet the following criteria:

- Women 60-85 years of age
- No history of cardiovascular disease or type 2 diabetes

Additionally, if you are interested in our menopause-related studies we are looking for post-menopausal women 50-69 years of age with:

- Type 2 diabetes OR
- Currently experiencing severe or frequent hot flashes

Please contact Dr. Glen Kenny at gkenny@uottawa.ca to participate.

Learn more about how age and sex affect thermoregulation at www.hepru.ca



Do sex differences in

thermoregulation pose a

concern for female

athletes preparing for

the Tokyo Olympics?



The relation between age and sex on whole-body heat loss during exercise-heat stress

**PROTECTING OLDER WOMEN DURING HEATWAVES** 

It is well established that heatwaves can be more harmful for women compared to men. During the Western Heat Dome of 2021, more men lost their lives. women than and internationally, it was found that 56% more women than men died during the 2022 European heatwave. The vast majority of these women were above the age of 60. HEPRU has demonstrated that women experience an overall 5% decrease in heat loss compared to men-a difference that is compounded by the impairments in heat dissipation associated with age.

There is an urgent need to develop heatmitigation strategies that are tailored to older women to better protect them in future heatwaves. While air-conditioning provides the most effective protection from extreme heat, it is inaccessible for many Canadian women, due to financial cost and energy demands. Instead, improving heat tolerance may reduce the harm to women from extreme heat.

We are now looking for participant for a study testing a potentially home-based strategy for improving heat tolerance: warm-water immersion for 7 consecutive days. We will assess whether this mitigates the effects of a day-long exposure to heat on body temperature, the cardiovascular system, cognitive function and thermal comfort. This research has the potential to shape public health policy and provide an accessible way to keep women safe in the heat.

We are looking for individuals who meet the following criteria:

- Women 65-85 years of age
- May be physically active but not engaged in intense exercise training programs.

Please contact Dr. Glen Kenny at <u>gkenny@uottawa.ca</u> to participate.

