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

APRIL 2025 • VOLUME 4 • ISSUE 2

THE SPRING EDITION

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NEWS AND NOTEWORTHY

DID YOU KNOW THAT HEAT EXPOSURE CAN NEGATIVELY AFFECT YOUR MENTAL HEALTH?

Depression is a rising concern among older adults, with studies indicating a significant increase in prevalence, potentially linked to the challenges of aging. A recent study showed that over a third of older populations globally had depression. There were approximately 1 billion people aged 60 years and older in 2019, which is estimated to increase to 1.4 billion by 2030, and 2.1 billion by 2050. Aging is associated with impaired physical and cognitive health, and increased risk of depression. Depression among older adults has a negative impact on physical health and daily life function. This includes worsening cognitive functioning. Depression is also closely linked with the development of chronic physical diseases (e.g., arthritis, angina, asthma, cardiovascular diseases and diabetes).

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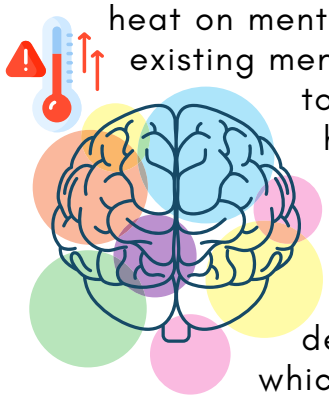
NEWS AND NOTEWORTHY (CONTINUED)

DID YOU KNOW THAT HEAT EXPOSURE CAN NEGATIVELY AFFECT YOUR MENTAL HEALTH?



As global temperatures soar to unprecedented levels, the influence of extreme heat on mental well-being has become a growing focus of attention. Pre-existing mental illnesses such as depression can cause adverse reactions to climate-related stressors, leading to reduced resiliency to heat extremes and modifying a person's ability to respond to heat. It is also associated with worse morbidity and mortality outcomes during hot weather and extreme heat events. Depression was among the health conditions that left people most susceptible to heat-related illnesses or death during the 2021 extreme heat event in British Columbia which claimed the lives of 619 older adults. Depression was associated with nearly 2 times greater risk of death from heat compared with more typical summer weather.

Even a brief exposure to heat can affect a person's mood, behavior and cognition. For older adults suffering from depression, it can worsen symptoms of depression including increased irritability, anxiety and insomnia. The inability to recognize and respond to the effects of heat can place older persons suffering from depression at an increased risk of experiencing a heat-related injury or death. Despite our growing knowledge on the effects of heat on health, there remains major gaps in our understanding of the consequences of mental health disorders such as depression on one's tolerance and ability to appropriately respond to heat.

To better understand the impacts of heat on older adults suffering from depression, our team at the Human and Environmental Physiology Research and our partners at the Centre of Addiction and Mental Health and Health Canada are conducting studies to better understand the impacts of heat on the health and well-being of older adults with depression.

Our aim is to advance our understanding of the underlying changes in both mental and physical well-being during a daylong exposure to heat in Canadians suffering from depression that will help inform heat protection solutions and advice.

(continued on page 3)

Health Canada Santé Canada

camh
Centre for Addiction and Mental Health
Centre de toxicomanie et de santé mentale

NEWS AND NOTEWORTHY (CONTINUED)

DID YOU KNOW THAT HEAT EXPOSURE CAN NEGATIVELY AFFECT YOUR MENTAL HEALTH?

If you or someone you know is suffering from depression, please reach out and or provide them with our contact information (Dr. Glen P. Kenny, gkenny@uottawa.ca). We are seeking middle-aged to older men and women between 50 and 85 years of age who may be interested in participating in this important work. Through your help we can help make a difference for those living with depression. All volunteers receive a free fitness evaluation and compensation for their time.

If you or someone you know is experiencing depression or a mental health crisis, remember that support and guidance are available. Please visit The Canadian Mental Health Association, Ottawa Branch (CMHA Ottawa) for information.

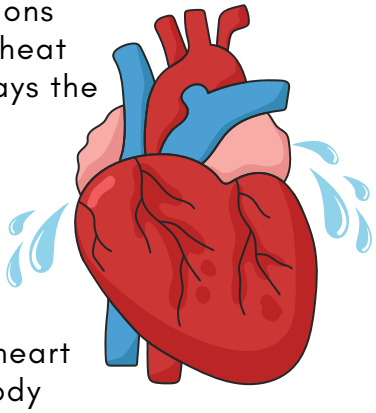
WHERE THEY ARE NOW WITH DR. FERGUS O'CONNOR

HEART FAILURE AND HEAT STRESS

Living with heart failure makes it harder for people to do everyday tasks and reduces their quality of life. In a warming climate, epidemiological and laboratory-based studies show that people with heart failure are especially at risk during long periods of extreme heat. During heat exposure, there is increased demand emplaced on the cardiovascular system to support thermoregulatory requirements of skin blood flow and sweating. In individuals with cardiovascular diseases, following on from increases in heart rate and cardiac contractility during heat exposure, increased myocardial blood flow requirements (i.e., the heart muscle requires more oxygen as it begins to work harder) may place individuals with impaired coronary flow reserve (i.e., reduced ability to increase blood flow) at risk of ischemia (i.e., oxygen supply to the heart is reduced, which can lead to heart and attacks or other cardiovascular events). The resultant outcome is that individuals living with preexisting heart conditions are at 4 to 7 times greater risk of cardiovascular mortality during periods of hot weather.

Since completing a Postdoctoral fellowship at the University of Ottawa under the guidance of Professor Kenny, I have returned to Australia where I currently hold a joint position between Griffith University and The Prince Charles Hospital, Brisbane. In my appointment, we are primarily investigating the management of heart failure during heat stress, while looking at interventions such as passive heat heating (i.e., submerging the lower limbs [knee down] in hot water) to promote physiological adaptation.

Managing heat stress while living with heart failure can be extremely challenging, particularly for individuals who may be placed on fluid restrictions by their cardiologist. While we are likely to sweat more during heat exposure, and thus lose more body fluid to sweat, there is always the danger of 'fluid overload' with increased fluid consumption for those with heart failure. Indeed, individuals with heart failure are particularly susceptible to fluid overload/retention. When a person with heart failure drinks excessive amounts of fluid, the already weakened heart struggles to circulate the extra fluid efficiently. The kidneys may continue to hold onto more water in an attempt to keep the body hydrated, but since the heart can't pump the blood properly, the fluid gets trapped in the body instead of being processed and eliminated. This can cause fluid retention (also called edema), which leads to cardiovascular complications.



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WHERE THEY ARE NOW (CONTINUED)

HEART FAILURE AND HEAT STRESS

Further to this, current heat-health guidance regarding cooling interventions largely fails to account for the unique aetiology of heart failure. Indeed, guidance often suggests 'blanket' recommendations which do not consider important contextual factors such as the increased likelihood that an individual with heart failure may experience more frequent periods of dehydration (due to being on fluid restrictions). To this end, we are currently conducting a review of heart failure guidelines which highlights the ambiguous and broad nature in the current heat-health messaging for those with heart failure. For these reasons, heart failure patients are often left confused an unclear as how to best manage their condition in a warming climate.

In my current role, we are currently finalizing analysis stemming two from focus group discussions; one with heart failure patients, and one with heart failure patients and carers. The heart failure patients overwhelmingly indicated that they were 'left to do their own research' and 'self-manage their condition' (hopefully management is better in Ottawa!). This fact, combined with what we are uncovering within publicly available guidelines, highlights the multifactorial challenges faced by those living with heart failure in a warming climate. Indeed, given the complexity of managing heat stress in individuals with heart failure, particularly when fluid restrictions are involved, it is crucial that tailored guidance and individualized care plans are developed to ensure these patients can safely navigate the challenges posed by heat stress. Therefore, it is recommended to consult a physician as how to best manage heart failure within a warming climate.

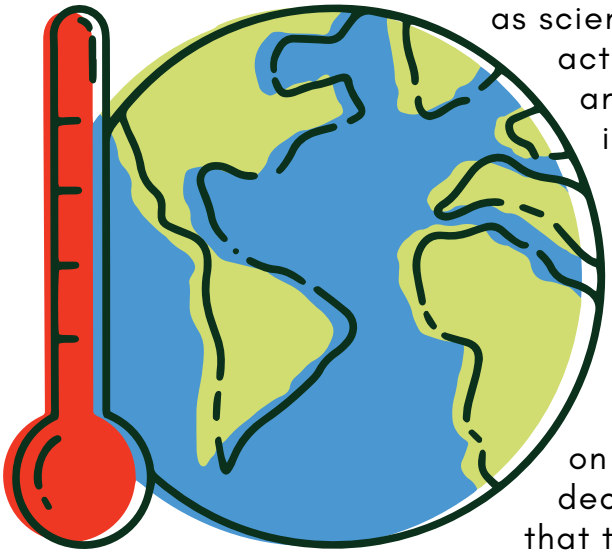
Dr. Fergus O'Connor
Postdoctoral Fellow
Griffith University

A MESSAGE FROM THE DIRECTOR

LET'S STEP BACK 25 YEARS...WAS GLOBAL WARMING ON OUR MINDS BACK THEN?

While the turn of the century brought a lot of celebration, marking the beginning of the new millennium with large festivities, fireworks, and cultural events around the globe, there was widespread anxiety and a sense of impending doom leading up to the year 2000, fueled by the "Y2K bug" or "Millennium Bug" scare, which predicted that computers would malfunction and society would collapse. Many computer programs represented four-digit years with only the final two digits, making the year 2000 indistinguishable from 1900. Computer systems' inability to distinguish dates correctly had the potential to bring down worldwide infrastructures for computer-reliant industries. Contrary to expectations, few major disruptions occurred in 2000.

While concerns about heat extremes were growing amongst scientists worldwide at the turn of the century, the public wasn't yet as deeply concerned about the impending global crisis. In Canada, new research released in 2000 indicated that in Toronto alone an average of 120 people died from extreme heat annually between 1954 and 2000, yet public concern remained low as the impacts of extreme heat were not widely discussed or understood as they are now. By the early 2000s, studies and reports increasingly highlighted the issue as scientific evidence showed a link between human activities, particularly the burning of fossil fuels, and the rise in global temperature and the increasing frequency and intensity of extreme heat events. However, public concern quickly shifted to global warming in 2003 as a devastating heat wave claimed the lives of ~55,000 people across Europe.



In 2010, alarms were sounded as the 2000-2009 decade turned out to be the warmest on record, easily surpassing the previous hottest decade — the 1990s — providing fresh evidence that the planet may be warming at a potentially disastrous rate. The warmest year on record was 2005 at approximately 1 degree celsius above normal. While the 2000s were the warmest decade on record, the rate of warming was slower than expected by some climate models, which led to discussions about a "hiatus" or slowdown in global warming which seemed to temporarily calm concerns around the world. However, scientists subsequently determined that this slowdown was likely due to natural variability in climate processes, and the long-term trend of warming was expected to continue.

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A MESSAGE FROM THE DIRECTOR
(CONTINUED)

The decade of the 2010s saw further acceleration of climate change impacts. In 2010, global surface temperatures tied with 2005 as the warmest on record, indicating a clear trend of increasing temperatures. The year saw a combination of extreme weather events, including heatwaves, floods, and droughts, which were linked to the effects of global warming. By 2020, global warming was a global problem with the year tying with 2016 for the warmest year on record, despite a cooling La Niña event, and the global average temperature being about 1.2 degrees celsius above pre-industrial levels. While 2016 was a very warm year, 2023 and 2024 were the warmest years on record globally highlighting the ongoing and dramatic warming trend of the planet. Sadly, 2025 is predicted to be hottest on the record, with a forecast of a global mean temperature of 1.45 degrees celsius above pre-industrial levels, and potentially rivaling 2024's record-breaking heat, despite the strong emergence of La Niña.

Are we prepared for rising heat extremes? The short answer is no. In fact, recent projections indicate that large geographical areas will soon experience heat and humidity exceeding the limits for human survival. As global temperatures continue to rise, it is important that with your help, we can continue our cutting-edge heat wave simulation research to define evidence-based, globally relevant heat-alleviation solutions and public health guidance to create heat-resilient communities and workforce in Canada and worldwide. Human survival depends on it.

Dr. Glen P. Kenny

Director
Human and Environmental Physiology Research Unit

SPOTLIGHT FEATURE

ARE YOUR CLOTHING CHOICES POTENTIALLY HARMING YOUR HEALTH DURING HOT WEATHER?

Too much heat is not safe for anyone. Yet, people around the world are increasingly exposed to heat extremes that are more dangerous, causing a rise in heat-related deaths and illnesses, particularly among vulnerable populations like older adults and those with pre-existing health conditions. A key recommendation by many health agencies worldwide to prevent heat-related illnesses is to stay in a cool space indoors, avoid strenuous activity, wear lightweight clothing, and drink cool water regularly throughout the day. While staying indoors would seem like a logical place to remain protected from the outdoor heat, it is estimated that 54%-98% of heat-related deaths occur indoors. While lack of access to air conditioning or ambient cooling methods is an important contributing factor to heat-related deaths indoors, the clothing worn also plays an important role. Clothing by nature, creates a layer of insulation between the body and the environment. This trapped air, particularly in thicker or more tightly woven fabrics, acts as a barrier, preventing heat from escaping the body as efficiently. Consequently, individuals who are overdressed may face dangerous increases in body temperature that places them at an elevated risk of a heat-related illness or death during heat extremes.

Clothing is a powerful tool for expressing identity, and older adults, like people of all ages, may choose to dress in ways that reflect their own cultural backgrounds or values. This can lead to overdressing in warm weather, which can increase their risk of heat-related illnesses. But is overdressing only about cultural norms and values? While it is to some extent, older adults may overdress in the heat because they do not feel heat as intensely as a younger person. As we age, our bodies undergo changes that affect our ability to sense and regulate temperature, which can mean we feel a bit cool even when temperatures may be dangerously warm in the home. For this reason, it is important to remind ourselves and others to dress appropriately when the weather gets warm as clothing acts as a barrier to heat loss during heat exposure, hindering the body's ability to dissipate heat, especially in hot environments.

While older adults are certainly at greater risk when overdressing during warm summer days, individuals who wear heavy and/or dark-coloured garments due to cultural or religious norms would also be at risk. While not all religious or cultural clothing poses a risk, some types of clothing, particularly those made of thick, non-breathable materials, can increase the risk of heat-related illnesses and potentially death during hot weather. Individuals living in temperate climates who are less heat-acclimated are particularly vulnerable especially during an early summer heat wave. This is because their bodies haven't had time to physiologically adjust to higher temperatures, making it harder to regulate their internal temperature and cool down effectively.

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SPOTLIGHT FEATURE (CONTINUED)

ARE YOUR CLOTHING CHOICES POTENTIALLY HARMING YOUR HEALTH DURING HOT WEATHER?

Wearing garments such as niqabs, hijabs, thobes, abayas, and turbans in hot weather can increase heat strain by interfering with heat loss from the body. Notably, in recent years, large suppliers of athletic apparel have improved garment design and fabric type for the hijab to facilitate thermal comfort and enhance heat exchange in those individuals engaged in sports or engaging in an active lifestyle.

While clothing is indeed a powerful expression of culture and identity which allows us to assert our autonomy, express our values, and make a statement about our place in the world, it is important to remember that it can also affect how we thermoregulate. As our team moves forward in our quest to better understand the human factors that can affect our survival during heat extremes, a key focus of our work over the next year will be to examine how the level of clothing insulation may impact how heat-vulnerable older adults respond to indoor overheating. This will include assessing how garments worn for cultural or religious beliefs may impact heat dissipation during physical activity in the heat in young and older adults.

If you or someone you know may be interested in our upcoming studies on clothing, please reach out and or provide them with our contact information (Dr. Glen P. Kenny, gkenny@uottawa.ca). We are seeking young adults (18-39 years) as well as older men and women between 60 and 85 years of age who may be interested in participating in this important work. All participants receive a free fitness evaluation and compensation for their time.

IN THEIR WORDS WITH JANET SPENCER

HEAR FROM OUR STUDY VOLUNTEERS ABOUT PARTICIPATING IN OUR RESEARCH STUDIES

Being a Guinea pig for science is a thing that I didn't think much about until presented with the opportunity to participate in some heat trials about four years ago. I felt enormously relieved that I qualified for a heat trial at HEPRU after a brief fitness bike ride while being "wired" six ways to Sunday.

Since then, I have sat in hot tubs, cycled in a hot, humid room, watched Netflix endlessly while soaking my feet in a tub of cool water, and recently spent four nights in the very comfortable studio apartment at 34°C and 26°C. Through each of these trials, a very clever, bright bunch of students ranging from undergrads to doctoral and some international post-doctoral fellows conducted exquisitely detailed physical and cognitive tests. Challenging indeed to perform the latter after sitting around in a very hot, humid room for hours.

I feel fortunate to have contributed to these studies. The various findings have led to important recommendations being made to Health Canada such as: that senior residences be cooled to temperatures that are healthy for most older people. I think about the 600 plus mostly elderly people who succumbed in BC recently during an extreme weather event largely because they couldn't escape from the heat.

As weather events become more extreme we need to be prepared to protect our most vulnerable members of society. To this end, I hope to continue being a Guinea pig for as long as the HEPRU team of research scientists will have me.

Sincerely,
Janet Spencer

HEPRU TEAM HIGHLIGHT

MEET DR. KIRSTY REYNOLDS

I moved to Ottawa at the end of January from the UK. I completed my PhD in 2023 at Loughborough University, (England, UK) where my research focused on optimising carbohydrate intake in endurance sports in warm and temperate environments. After completing my PhD, I took on a role as a Research Associate in Exercise Nutrition at Loughborough University leading a project investigating the impact of a dietary supplement in females post-exercise. Here at HEPRU I will be looking at physiological and nutritional responses to prolonged heat/humidity exposure.

MEET SYDNEY LYNDON

Sydney is a first-year master's student at the Human and Environmental Physiology Research Unit. She completed her Bachelor of Science in Kinesiology at the University of Prince Edward Island in 2022. While at UPEI, she was a member of the Women's Hockey team, participating in two USport National Championships.

Since beginning in September, Sydney has been assisting with our ongoing multi-day heat wave trials. In collaboration with fellow researchers, she is exploring the effects of prolonged heat exposure on tissue oxygenation and sleep patterns.

For her upcoming master's thesis, Sydney's research will focus on understanding the role of inflammation and associated cellular mechanisms on heat tolerance during work in extreme heat. She will place particular emphasis on how these factors vary across biological sex and aging populations.

RESEARCH UPDATE

At the Human and Environmental Physiology Research Unit, we are dedicated to advancing scientific knowledge and making impactful discoveries across a wide range of fields. We're excited to share the progress of our ongoing projects and invite individuals to participate in our studies.

OUR ONGOING WORK

Assessing the impact of indoor overheating on your health and well-being

Taking our heatwave simulations to the next level, we are examining how physiological and cellular responses are impacted during 3 consecutive days of a heatwave simulation at 34°C and whether recommended indoor temperature limits of 26°C can protect older adults to facilitate a heat-resiliant community. We're excited to report that we are on track to complete this study by the end of May 2025.

Understanding how indoor humidity impacts tolerance to indoor overheating

To better understand if our recommended upper indoor temperature limit of 26°C is protective even at high humidities, we assessing changes in physiological strain during a daylong heat wave simulation at different levels of humidities. This study will take a break come July, but will be resuming in Fall of 2025

Improving heat resiliency in women using warm-water immersion therapy

Recently, our lab showed that immersing the body in warm water over 7 consecutives days can improve heat loss capacity as assessed during exercise in the heat. We now want to assess if this can improve heat resiliency in women exposed to a daylong simulated heat wave. Read more about this study on pages 15 and 19!

How does age and menopause affect the ability to cool down.

We're exploring the mechanisms responsiblefor regulating skin blood flow which represents a major avenue for heat dissipation. We are assessing this response in in post-menopausal women who also have type II diabetes or experience severe or frequent hot flashes during locally applied heat exposure. See page 20 to learn more!

Assessing the influence of aging on heat dissipation during exercise.

This study focuses on the mechanisms that control skin blood flow during physical activity, aiming to identify how the body adapts to exercise in the heat and promotes cooling. We're actively recruiting men and women who are 55+ years old.

Can steroid use increase the risk of heat stress?

We're examining how steroid use affects the body's ability to regulate temperature during heat exposure. This ongoing study will help us understand the risks of impaired heat dissipation in steroid users.

Contact Dr. Glen Kenny at gkenny@uottawa.ca to participate

RESEARCH UPDATE

This summer, we are launching several exciting new studies exploring the effects of heat stress on our health and daily lives.

UPCOMING STUDIES

Understanding how heat affects everyday life.

In older adults, the added heat strain from everyday activities and clothing insulation during hot weather may increase the risk of heat-related illness, even at currently recommended indoor temperature limits. This study will investigate how light physical activity and different clothing choices affect physiological strain at 26°C, with the goal of refining temperature guidelines to better protect heat-vulnerable individuals.

Investigating the impact of acute hypoxia and heat on occupational performance and health.

Workers exposed to both heat and high-altitude environments face unique risks to their health, safety, and performance that are often overlooked in current occupational guidelines. Our research is investigating how the body responds to combined heat and hypoxia stressors, with the goal of improving safety practices and protecting those working in these extreme conditions.

Mental health & heat stress - Coping with depression or schizophrenia in the heat.

As extreme heat events become more frequent, older adults living with depression face unique risks to both their physical and mental health. Our team, in partnership with the Centre for Addiction and Mental Health and Health Canada, is launching new studies to better understand how heat affects mood, cognition, and well-being in older adults with depression — and to help inform life-saving heat protection strategies.

Are your clothing choices potentially harming your health during hot weather?

As heat extremes become more dangerous, the clothing we wear indoors and outdoors plays a crucial role in how our bodies cope with rising temperatures. Our team is launching new studies to explore how clothing insulation — especially garments worn for cultural or religious reasons — affects heat stress in both young and older adults during indoor overheating events.

Pushed too far: How exercise-induced muscle damage influences heat loss.

Exercise-induced muscle damage (EIMD) — the soreness and reduced muscle function that can follow unfamiliar or intense activity — may have important consequences for how the body handles heat. This study is examining how EIMD affects heat loss, thermoregulation, and physiological strain during exercise in the heat, with the goal of improving safety recommendations for physically active individuals.

Contact Dr. Glen Kenny at gkenny@uottawa.ca to participate

FEATURED RESEARCH UPDATE

MILLIONS OF WORKERS ACROSS NORTH AMERICA ARE EXPOSED TO HEAT IN THEIR WORKPLACES.

Some of you may have worked in a hot environment or had a family member, a neighbor, or a friend whose job exposed them to the harsh outdoor summer heat or a hot indoor environment. But did you know that heat extremes is the leading weather-related killer of workers in North America?
A recent report showed that for every 1°C increase in the daily maximum summer temperature for the 2001-2016 period, the daily number of accepted heat illness claims (e.g. edema, syncope, exhaustion, sunstroke/heatstroke) increased by as much as 50%. It is estimated that the daily number of heat-related illnesses will increase 1.7-fold by 2050 if global temperatures continue to rise.

To address this growing threat, in 2023, Ontario's Ministry of Labour introduced new heat-stress regulations to better protect workers. The regulations require that employers take all necessary steps to protect workers from exposure to hot environments. While this would seem like a logical step to ensure the health and safety of workers who must perform their duties in hot conditions, the regulations propose an occupational heat stress management strategy that relies on long-standing guidelines such as those provided by American Conference of Governmental Industrial Hygienists (ACGIH) that assume a one-size-fits-all solution. The question is, are these guidelines helpful for the industry and can they be applied easily? The short answer is no.

For decades, workplaces across North America have relied upon the ACGIH guidelines which indicate that when either the work effort and or ambient temperature increase, workers are required to intersperse increasingly longer periods of rest throughout their work shift. While these occupational heat stress guidelines aim to protect most workers, they may not be universally protective for all individuals due to varying personal risk factors. Some workers are more susceptible to heat-related illness due to age, medical conditions, lack of physical fitness, and other factors that blunt their ability to lose heat. Furthermore, relative to men, women have a reduce heat loss capacity that remains intact across the lifespan. Despite these important differences, current guidelines fail to account for these important differences.

Another important limitation of current guidelines is that they fail to provide direction on the duration of work that individuals can safely perform before rest breaks should be taken. This lack of direction can place workers at an elevated risk of developing a serious heat-related injury especially if rest breaks are not appropriately timed.

(continued on page 15)

FEATURED RESEARCH UPDATE (CONTINUED)

MILLIONS OF WORKERS ACROSS NORTH AMERICA ARE EXPOSED TO HEAT IN THEIR WORKPLACES.

Over the last two years, our team and the Human and Environmental Physiological Research Unit in partnership with industry (BBE consulting, Hydro One, Technica Mining), trade unions (Unifor); and health and safety agencies (Workplace Safety North), have conducted several studies to help refine current occupational heat stress management practices. Through the great support of volunteers like you, we have generated new guidance on work exposure limits for young and older men and women who must perform their duties during a warm summer day or an extreme heat event. This includes providing specific guidance on duration of work that all workers can perform safely over a daylong work shift and on the next work day.

As we navigate our way to the completion of this study on June 30, 2025, the knowledge generated from this research will help keep Canada the healthiest and safest place to work, as the need to keep workers safe from heat grows. Following the completion of this work, we will be sharing the results of our work with you in future newsletters and posting on research unit website.

On behalf of the team at the HEPRU, and our partners we want to thank all those who made this important work possible. Thank you!

FEATURED RESEARCH UPDATE

PROTECTING OLDER WOMEN FROM EXTREME HEAT

Women are often underrepresented in research, leading to a lack of heat mitigation strategies specifically designed to protect them. This is despite evidence that men and women respond to heat differently. This gap leaves older women, who are especially vulnerable to heat-related health risks, without adequate solutions to stay safe during extreme heat events.

In the fall of 2024, we launched a new study to test a simple strategy that may help protect women experiencing extreme heat in their homes. We are testing whether warm-water immersion—similar to taking a bath at home—is effective at gently raising body temperature and helping the body adapt to heat over time.

We're excited to share that several women have already participated in the study, and they've been absolute star volunteers—dedicated, enthusiastic, and incredibly helpful in advancing this important research. Our research unit is deeply grateful for their commitment and contributions, which are bringing us closer to finding solutions that could shape public health policies and provide an affordable, practical way to protect older women from the dangers of extreme heat.

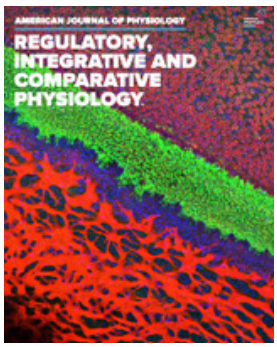
Stay tuned for updates as we continue this important work!

To participate in this study see more details on PAGE 20

FRESH OFF THE PRESS

The effect of an exercise- and passive-induced heat stress on autophagy in young and older males

McCormick JJ, King KE, Goulet N, Carrillo AE, Fujii N, Amano T, Boulay P, and Kenny GP



CLICK HERE TO READ MORE!

Meta-analysis of heat-induced changes in cardiac function from over 400 laboratory-based heat exposure studies

Meade RD, Akerman AP, Notley SR, McGarr GW, McCourt ER, Kirby NV, Costello JT, Cotter JD, Crandall CG, Zanobetti A, and Kenny GP

nature COMMUNICATIONS

CLICK HERE TO READ MORE!

Effects of 24-h sleep deprivation on whole-body heat exchange in young men during exercise in the heat

Koetje NJ, Kirby NV, O'Connor FK, Richards BJ, Janetos KM, Ioannou LG, and Kenny GP

CLICK HERE TO READ MORE!

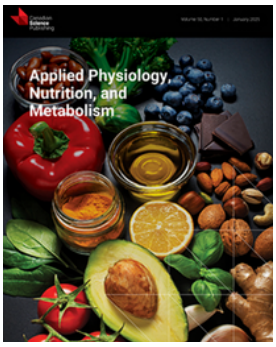
Short-Term Warm-Water Immersion for Improving Whole-Body Heat Loss in Older Men

Janetos KM, O'Connor FK, Meade RD, Richards BJ, Koetje NJ, Kirby NV, McCormick JJ, Flouris AD, and Kenny GP

CLICK HERE TO READ MORE!

Effects of pedestal-mounted electric fans on self-reported symptoms and mood-state in older adults exposed to indoor overheating during a simulated heatwave: an exploratory analysis

O'Connor F, McGarr GW, Harris-Mostert RC, Boulay P, Sigal RJ, Meade RD, and Kenny GP



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Effect of fluid temperature on the relation and agreement between perceptual and physiological strain during simulated work in a hot environment

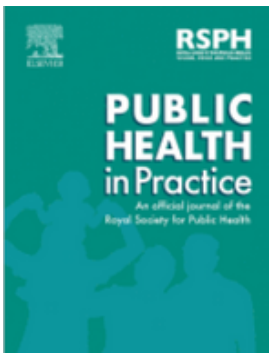
O'Connor FK, Richards BJ, Ioannou LG, and Kenny GP

CLICK HERE TO READ MORE!

FRESH OFF THE PRESS

Heat-health messaging in Canada: A review and content analysis of public health authority webpages and resources

Tetzlaff EJ, Wagar KE, Johnson SJ, Gorman M, and Kenny GP



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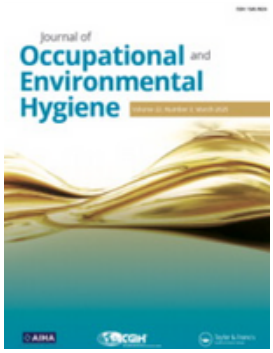
The combined impacts of toxic drug use and the 2021 Heat Dome in Canada: A thematic analysis of online news media articles

Tetzlaff EJ, Goulet N, Gorman M, and Kenny GP

CLICK HERE TO READ MORE!

An exploratory survey assessing the determinants of heat stress and heat strain in the Canadian mining industry from the worker's perspective

Tetzlaff EJ, Kirby NV, Ioannou LG, Meade RD, O'Connor FK, Flouris A, and Kenny GP



CLICK HERE TO READ MORE!

A Content Analysis of Web-Based Heat Stress Materials Published by Occupational Health and Safety Ministries, Associations, and Agencies in Canada

Tetzlaff EJ, Richards BJ, Wagar KE, Harris-Mostert RC, Journeay WS, O'Connor FK, and Kenny GP

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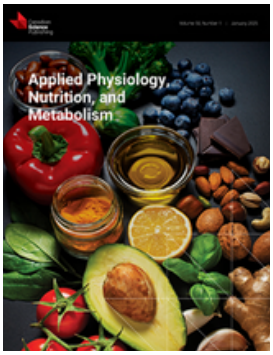
Effects of daylong exposure to indoor overheating on enterocyte damage and inflammatory responses in older adults: A randomized crossover trial

Lee B, Meade RD, Davey SL, Thake CD, McCormick JJ, King KE, and Kenny GP



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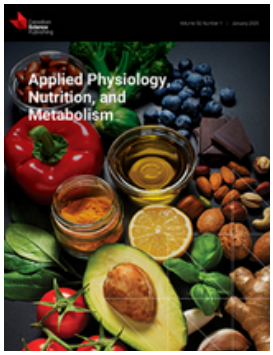
Effect of Brief Ambient Cooling on Serum Stress Biomarkers in Older Adults During a Daylong Heat Exposure: A Laboratory-Based Heat Wave Simulation

Lee B, Meade RD, Davey SL, Thake CD, McCormick JJ, King KE, and Kenny GP



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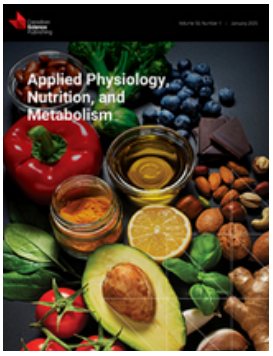
FRESH OFF THE PRESS

Brain-derived neurotrophic factor response to daylong exposure to extreme heat in young and older adults: A secondary analysis

Kirby NV, Meade RD, McCormick JJ, King KE, and Kenny GP



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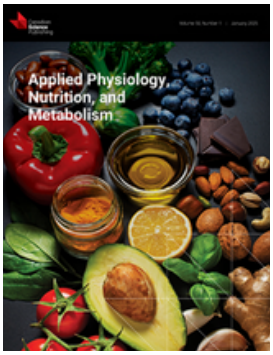
Physiological monitoring for occupational heat stress management: recent advancements and remaining challenges

Notley SR, Meade RD, Looney DP, Chapman CL, Potter AW, Fogarty A, Howlader T, Main LC, Friedl KE, and Kenny GP



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Biophysical versus machine learning models for predicting rectal and skin temperatures in older adults

Forbes C, Coccarelli A, Xu Z, Meade RD, Kenny GP, Binnewies S, and Bach AJ

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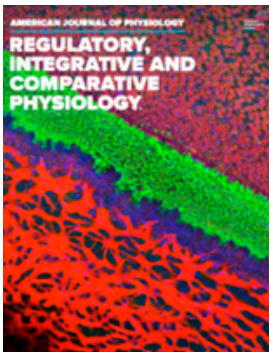
TRPA1 channels modulate cutaneous vasodilation during exercise in the heat in young adults when NOS is inhibited

Hattori R, Kajiki M, Fujimoto T, Amano T, Kenny GP, Watanabe K, Nishiyasu T, and Fujii N



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RECRUITMENT CORNER

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 women than men lost their lives, 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 heat-mitigation strategies that are tailored to older women to better protect them in future heat-waves. 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 gkenny@uottawa.ca to participate.

RECRUITMENT CORNER

INDOOR HEAT STRAIN IN OLDER ADULTS: THE IMPACT OF ACTIVITIES OF DAILY LIVING AND CLOTHING

With the great contribution of many of our readers, we recently assessed the impacts of indoor overheating on physiological strain in older adults during a simulated heat wave. We determined that maintaining an upper indoor temperature limit of 26°C was protective for heat-vulnerable older occupants. This new indoor temperature upper limit was recently incorporated by Dr. Theresa Tam, Chief Public Health Officer of Canada, in her recently released report on Mobilizing Public Health Action on Climate Change in Canada.

However, this recommendation did not consider the added heat burden associated with increases in internal heat production accompanying activities of daily living or the restriction to heat loss caused by clothing insulation. A key recommendation by many health agencies worldwide to prevent heat-related illnesses in older adults is to "stay cool during hot weather for example, stay in a cool space indoors, avoid strenuous activity, wear lightweight clothing, and drink cool water regularly throughout the day". Older adults do not sense heat as well as their younger counterparts. Consequently, they are likely to overdress despite high indoor temperatures. In other cases, individuals may wear heavy and/or dark-coloured garments due to cultural or religious norms and may not align with the need to dress lightly during very hot weather. Moreover, many individuals may be unaware of the consequences of increases in physical activity on heat gain and may therefore not adjust their normal day-to-day activity levels to prevent potentially dangerous rises in body temperature. Consequently, this may necessitate a lowering of recommended upper indoor temperature limit during a heat event.

In September, with the support of Health Canada, we will be conducting an important next stage of our work to determine if refinements in indoor temperature limits are needed. The study will evaluate four separate visits involving a daylong exposure to 26°C while either resting daylong or performing activities of daily living (simulated by performing light-intensity exercise each hour and while wearing light or heavier clothing insulation.

We are looking for individuals who meet the following criteria:

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

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

RECRUITMENT CORNER

MUSCLE DAMAGE AND HEAT STRAIN: HOW SORENESS AFFECTS THERMOREGULATION

Feeling your muscles ache or stiffen for a few days after exercise is normal, especially when we have not performed strenuous exercise for some time. Many of you may experience this discomfort in the springtime when because of the nice weather you engage in physical activity more often. Muscle soreness that you may experience after performing exercise is called exercise-induced muscle damage (EIMD). EIMD occurs when muscles are damaged after physical activity, often due to unaccustomed exercise or increased intensity/duration. This damage can lead to soreness, reduced strength, and decreased muscle function. The damage can impact muscle function and causing increased inflammation. Our team is undertaking a study to better understand the impacts of EIMD on exercise performance especially as it relates to performing exercise in the heat. EIMD can negatively impact heat loss during exercise in the heat. EIMD can lead to increased heat strain and impaired thermoregulation, potentially raising core body temperature.

If you have experienced muscle soreness or discomfort following exercise, you would be a good candidate for our study. Even if you haven't, we'd love to have you participate in our study that will be commencing shortly. If you are interested, and are between the ages of 18 and 70 years, please reach out to Dr. Glen Kenny at gkenny@uottawa.ca. You will receive a free fitness assessment valued at $650 and compensation for your time.

We are looking for individuals who meet the following criteria:

- Men & Women 18-70 years of age
- May be physically active but not engaged in intense exercise training programs.

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

RECRUITMENT CORNER

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:

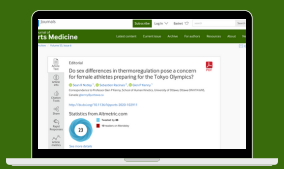
- Women 60-85 years of age
- No history of cardiovascular disease or type 2 diabetes

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

RECRUITMENT CORNER

INVESTIGATING THE IMPACT OF ACUTE HYPOXIA AND HEAT ON OCCUPATIONAL PERFORMANCE AND HEALTH

Occupational environments characterized by both heat stress and high altitude pose significant health and performance challenges. Workers exposed to these combined stressors, such as those employed in regions with high elevations and frequent heat waves, are particularly susceptible to impaired physical performance, diminished cognitive function, and increased risk of heat- and hypoxia-related illnesses (e.g., heat exhaustion, heat stroke, acute mountain sickness).

Despite the prevalence of such combined environmental stresses, current occupational guidelines often address hypoxia and heat stress independently, neglecting the interplay between these factors. This oversight potentially places workers at greater health and safety risks due to inadequately informed mitigation strategies and safety guidelines.

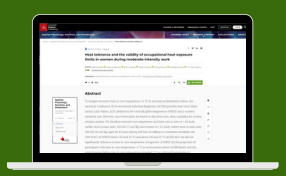
Our research aims to address this critical gap by examining the physiological and cellular responses to concurrent acute hypoxia and heat exposure, seeking insights to inform more effective occupational safety standards and practices. The outcomes of this study will directly contribute to better protecting the health and performance of workers in challenging environmental conditions.

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

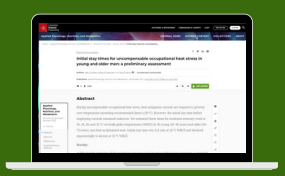
- Men and women aged 18-30 or 60-75 years
- Healthy, habitually active (not endurance trained)

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 moderate-intensity work



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

RECRUITMENT CORNER

EXPLORING THE LINK BETWEEN SLEEP, MEMORY, AND MELATONIN AT THE UNIVERSITY OF OTTAWA SLEEP RESEARCH LAB

The University of Ottawa Sleep Research Laboratory is looking for adults to participate in a research study investigating the relationship between sleep & memory. Eligible participants will be asked to come to the University of Ottawa Sleep Research Laboratory for a total of 4 sessions, including an initial, daytime orientation session and 3 overnight sessions. During the overnight sessions, participants will spend most of their time sleeping with electrodes on their scalp and face to monitor brain waves. During 2 of their 3 overnights in the lab, participants will be asked to; (1) consume either melatonin (a natural supplement) or a placebo, (2) provide saliva samples before and after sleeping, and (3) complete a computer task. If interested, please call: 613-562-5800 ext. 4854 or email: sleeplab@uottawa.ca

SLEEP RESEARCH LABORATORY

uOttawa

Study: The impact of melatonin on sleep and sleep-dependent memory consolidation

Principal Investigator: Dr. Stuart Fogel

The uOttawa Sleep Laboratory is looking for adults to participate in a research study investigating the relationship between sleep & memory.

- 60+ years of age
- Right-handed
- Native English speakers
- No psychiatric disorders (past or present)
- Healthy adults, those with memory complaints, or those with mild cognitive imparirment

If interested, please call
(613) 662-5800 ext. 4854
or email
sleeplab@uottawa.ca

Click HERE to visit our website

uOttawa

www.hepru.ca gkenny@uottawa.ca Montpetit Hall, University of Ottawa, 125 University Pvt. Ottawa, Ontario K1N 6N5, Canada