

High temperatures and cardiovascular-related morbidity

Fact Sheet No. 5

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Introduction

Since 1948, the average ambient temperature in Canada has increased by 1.7 °C. These increases are expected to continue by an additional 1.8 °C by mid-century [1]. Along with this, heat events and heat waves are expected to become more frequent and intense [2]. Exposure to heat events, and heat waves can become dangerous for a person's health, as it can potentially lead to heat stroke, heat stress, renal disease and, acute cardiovascular disease (CVD) [3]. Current research studies also suggest that higher temperatures can lead to mortality [4,5]. Certain populations are especially vulnerable to heat-related mortality, including the elderly [6–8], those with underlying medical conditions [9], individuals residing in urban settings [6,7], and those living at higher latitudes [4, 6]. This is especially concerning for Canada, as it has an aging population, and is located at a higher latitude with over 80% of citizens living in urban regions [10].

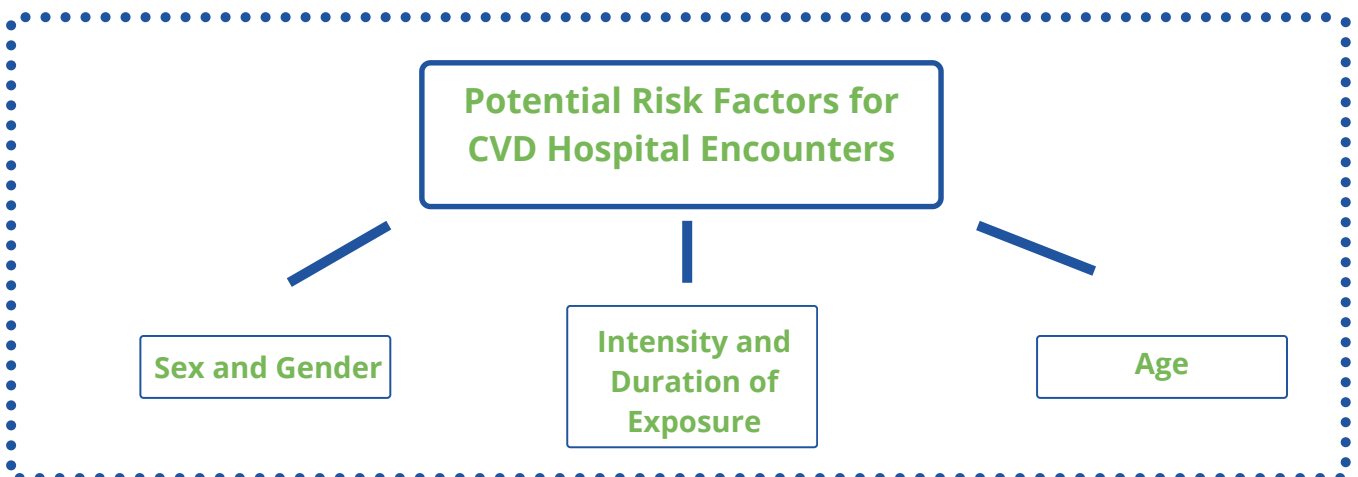


Study Spotlight: High Temperatures and Cardiovascular-Related Morbidity: A Scoping Review

Researchers conducted a scoping review to explore the relationship between high temperatures, such as heat waves and extreme heat and CVD-related hospital encounters (emergency department [ED] visits and hospitalizations) in urban areas. The scoping review was carried out by searching several databases for relevant articles published between 2008 and 2020. In the end, 22 studies were included in the review. Several studies found that high temperatures may be related to total CVD-related ED visits and hospitalizations. Studies included in the review suggest that there was some variation the effect of high temperatures had on the risk of CVD-related hospital encounters, and this variation was likely due to age, delayed effects of high temperatures, and how the exposure to high temperatures was defined. Age, sex/gender, as well as the intensity and duration of the exposure to high temperatures were also found to potentially impact the risk of CVD-related hospital encounters [11].

Hospital Encounters for CVD

Figure 1: Factors that may influence the risk of hospital encounters for CVD.



Next steps

More Canadian-specific research is needed, especially as temperatures continue to rise and more frequent and intense heatwaves are expected. Understanding our risks to such events is crucial for future adaptation planning. More research is also required for specific populations, such as those with pre-existing CVD or CVD risk factors. Researchers should also look at CVD beyond ED visits and hospitalizations, which would help to provide a better understanding of the relationship between CVD and high temperatures.

References

1. Cohen, S.; Bush, E.; Zhang, X.; Gillett, N.; Bonsal, B.; Derksen, C.; Flato, G.; Greenan, B.; Watson, E. Synthesis of Findings for Canada's Regions; Chapter 8 in Canada's Changing Climate Report; Bush EaL, D.S., Ed.; Government of Canada: Ottawa, ON, Canada, 2019; pp. 424–443.
2. Ebi, K.L.; Capon, A.; Berry, P.; Broderick, C.; de Dear, R.; Havenith, G.; Honda, Y.; Kovats, R.S.; Ma, W.; Malik, A.; et al. Hot weather and heat extremes: Health risks. *Lancet* 2021, 398, 698–708.
3. The Intergovernmental Panel on Climate Change. Global Warming of 1.5 Degrees Celsius. Special Report. Summary for Policy Makers. 2018. Available online: <https://www.ipcc.ch/sr15/chapter/spm/> (accessed on 19 July 2021).
4. Curriero, F.C.; Heiner, K.S.; Samet, J.M.; Zeger, S.L.; Strug, L.; Patz, J.A. Temperature and mortality in 11 cities of the eastern United States. *Am. J. Epidemiol.* 2002, 155, 80–87.
5. Huynen, M.M.; Martens, P.; Schram, D.; Weijenberg, M.P.; Kunst, A.E. The impact of heat waves and cold spells on mortality rates in the Dutch population. *Environ. Health Perspect.* 2001, 109, 463–470.
6. Basu, R.; Samet, J.M. Relation between elevated ambient temperature and mortality: A review of the epidemiologic evidence. *Epidemiol. Rev.* 2002, 24, 190–202.
7. Gabriel, K.M.; Endlicher, W.R. Urban and rural mortality rates during heat waves in Berlin and Brandenburg, Germany. *Environ. Pollut.* 2011, 159, 2044–2050.
8. Gouveia, N.; Hajat, S.; Armstrong, B. Socioeconomic differentials in the temperature-mortality relationship in Sao Paulo, Brazil. *Int. J. Epidemiol.* 2003, 32, 390–397.
9. Kovats, R.S.; Hajat, S. Heat stress and public health: A critical review. *Ann. Rev. Public Health* 2008, 29, 41–55.
10. The World Bank. Urban Population (% of total population)-Canada-United Nations Population Division. World Urbanization Prospects. 2018. Available online: <https://data.worldbank.org/indicator/SP.URB.TOTL.IN.ZS?end=2019&locations=CA&start=2011> (accessed on 19 July 2021).
11. Cicci, K. R., Maltby, A., Clemens, K. K., Vicedo-Cabrera, A. M., Gunz, A. C., Lavigne, É., & Wilk, P. (2022). High Temperatures and Cardiovascular-Related Morbidity: A Scoping Review. *International Journal of Environmental Research and Public Health*, 19(18), 11243. <https://doi.org/10.3390/ijerph191811243>

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