# February 2019 Update from the Field: Cold

**Effects of Air Temperature on Climate-Sensitive Mortality and Morbidity Outcomes in the Elderly; a Systematic Review and Meta-Analysis of Epidemiological Evidence**. (2016). Bunker A, Wildenhain J, Vandenbergh A, Henschke N, Rocklov J, & Hajat S. *EbioMedicine*, 6, 1536-1546.
**Introduction**: Climate change and rapid population ageing are significant public health challenges. Understanding which health problems are affected by temperature is important for preventing heat and cold-related deaths and illnesses, particularly in the elderly. Here we present a systematic review and meta-analysis on the effects of ambient hot and cold temperature (excluding heat/cold wave only studies) on elderly (65+ years) mortality and morbidity. **Methods**: Time-series or case-crossover studies comprising cause-specific cases of elderlymortality (n=3,933,398) or morbidity (n= 12,157,782) were pooled to obtain a percent change (%) in risk for temperature exposure on cause-specific disease outcomes using a random-effects meta-analysis. **Results**: A 1 °C temperature rise increased cardiovascular (3.44%, 95% CI 3.10–3.78), respiratory (3.60%, 3.18–4.02), and cerebrovascular (1.40%, 0.06–2.75) mortality. A 1 °C temperature reduction increased respiratory (2.90%, 1.84–3.97) and cardiovascular (1.66%, 1.19–2.14) mortality. The greatest risk was associated with cold-induced pneumonia (6.89%, 20–12.99) and respiratory morbidity (4.93% 1.54–8.44). A 1 °C temperature rise increased cardiovascular, respiratory, diabetes mellitus, genitourinary, infectious disease and heat-related morbidity. **Discussion**: Elevated risks for the elderly were prominent for temperature-induced cerebrovascular, cardiovascular, diabetes, genitourinary, infectious disease, heat-related, and respiratory outcomes. These risks will likely increase with climate change and global ageing.

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**Are the Current Thresholds, Indicators, and Time Window for Cold Warning Effective Enough to Protect Cardiovascular Health**? (2018). Lin S, Lawrence WR, Lin Z, DiRienzo S, Lipton K, Dong G, Leung R, Lauper U, Nasca P, & Stuart N. *Science of the Total Environment*, 639, 860-867.
More extreme cold weather and larger weather variations have raised concerns regarding their effects on public health. Although prior studies assessed the effects of cold air temperature on health, especially mortality, limited studies evaluated wind chill temperatures on morbidity, and health effects under the current cold warning threshold. This study identified the thresholds, lag periods, and best indicators of extreme cold on cardiovascular disease (CVD) by comparing effects of wind chill temperatures and cold air temperatures on CVD emergency department (ED) visits in winter and winter transition months. Information was collected on 662,625 CVD ED visits from statewide hospital discharge dataset in New York State. Meteorological factors, including air temperature, wind speed, and barometric pressure were collected from National Oceanic and Atmospheric Administration. A case-crossover approach was used to assess the extreme cold-CVD relationship in winter (December–February) and transition months (November and March) after controlling for PM2.5. Conditional logistic regression models were employed to analyze the association between cold weather factors and CVD ED visits. We observed CVD effects occurred when wind chill temperatures were as high as−3.8 °C (25 °F), warmer than current wind chill warning standard (≤−28.8 °C or ≤−20 °F). Wind chill temperature was a more sensitive indicator of CVD ED visits during winter with temperatures≤−3.8 °C (25 °F) with delay effect (lag 6); however, air temperature was better during transition months for temperatures ≤ 7.2 °C (45 °F) at earlier lag days (1–3). Among all CVD subtypes, hypertension ED visit had the strongest negative association with both wind chill temperature and air temperature. This study recommends modifying the current cold warning

temperature threshold given larger proportions of CVD cases are occurring at considerably higher temperatures than the current criteria. We also recommend issuing cold warnings in winter transitional months.

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**Frostbite: Don’t Be Left Out In the Cold**. (2018). Laskowski-Jones L, & Jones LJ. *Nursing2018,* 48(2), 26-33.

**Consider this scenario**: On a bitter cold day, it’s snowing heavily. The outside temperature is −5.6° C (22° F); the wind is blowing at 20 to 25 miles per hour. While a man, age 67, is driving home from the office, his car slides off a rural road into a snow-filled ditch. He’s wearing a business suit, trench-style raincoat, and no gloves. After several unsuccessful attempts to dig out his car with ungloved hands, he tries to call a tow truck but can’t get a cell phone signal. He decides to walk to a convenience store about 2 miles away. Slipping and falling frequently on the snow-covered road, he reaches the store more than an hour later and pulls the door open with difficulty. With help from the store clerk, he removes his frozen shoes and finds his feet as well as his hands are pale, waxy, and numb. Alarmed, he asks the clerk to call an ambulance. **Cold hard facts**: Cold injuries span the gamut from minor to life threatening, and can kill or cause permanent injury. Frostbite is a severe cold-induced injury in which freezing at the tissue level produces minor to major damage. In the severest forms, it leads to gangrene and amputation. Although no comprehensive source provides incidence rates, people at highest risk are those who participate in outdoor recreational events or military operations, work in cold temperatures, are accidentally or unexpectedly caught outside in freezing conditions, or are homeless. Knowing how to recognize and intervene to competently treat frostbite is key to the best possible outcomes. This article reviews the pathophysiology of frostbite, prehospital and hospital management of a patient with frostbite, and prevention strategies for personal preparedness and patient education.