

## Cold Weather Associated With Higher Risk of Severe Heart Attack



Cold weather is associated with a higher risk of severe heart attack, according to research presented at ESC Congress by Dr Shuangbo Liu, adult cardiology resident at the University of Manitoba in Winnipeg, Canada. The six year study found that each 10°C drop in temperature was associated with a 7% increased risk of ST-elevation myocardial infarction (STEMI), the most severe form of heart attack.

"We studied the effects of temperature on the risk of heart attacks in Winnipeg, Canada, one of the coldest large cities in the world," said Dr Liu. "We demonstrated that there is a clear relationship between daily temperature and the risk of STEMI. This risk can be predicted up to two days before the actual heart attack. Increased public awareness and reallocation of resources may help us to respond to this predictable seasonal risk of heart attacks in the future."

Winnipeg, a city of approximately 700 000 inhabitants in Manitoba, is in the geographic centre of Canada. It is known for its very cold winters and hot and dry summers. This allows the perfect opportunity to study the effect of temperature and the environment on cardiac events.

ST-elevation myocardial infarctions are the most severe types of heart attacks. They are usually due to an acute plaque rupture within the coronary arteries and the chance of dying from this type of heart attack is the highest.

The researchers from the University of Manitoba, led by supervisor Dr James Tam, performed a retrospective review of all ST-elevation myocardial infarctions in Winnipeg over the last six years. Data was collected from Environment Canada on daily high, low and average temperature of the day, previous day and two days before each heart attack. Information was also obtained on daily snowfall. Wind direction and humidity were not assessed. Some 32% of the days (n=684) had a daily high temperature under 0°C, 38% were between 0-20°C and 31% (n=663) were above 20°C.

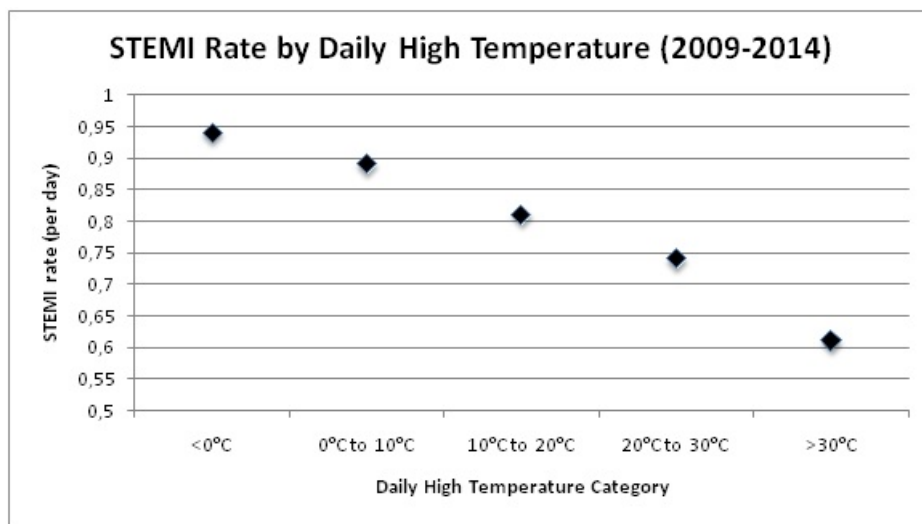
During the six year period there were 1 817 ST-elevation myocardial infarctions. The daily high was the strongest predictor of STEMI. On days with a daily high less than 0°C, STEMI event rates were 0.94/day, compared to 0.78/day when the daily high was greater than 0°C. Despite yearly variation, the average STEMI rate over the study period had a statistically significant linear trend across temperature ( $p<0.001$ ) (Figure 1). Daily high in the preceding one or two days was also predictive ( $p<0.001$ ).

Warmer temperature ranges were not associated with higher STEMI rates however with every drop of 10°C in daily high, the risk of STEMI increased by 7% ( $p<0.001$ ). Snowfall did not show an independent association after adjusting for temperature.

"Other researchers have looked at the effects of climate on total heart attack admissions and cardiac death but we are the first to look specifically at STEMI, which is known to be the most dangerous type of heart attack," said Dr Liu. "The diagnostic criteria for this type of heart attack have not changed in the last 20 years, allowing us to be consistent with our case definition over the course of the study."

Dr Liu concluded: "Our study highlights the potential influence of the environment on occurrence of STEMI. Daily temperature can predict STEMI risk one or two days before it happens. These findings create an opportunity for future research studies to examine whether there are treatment strategies that can temper the effects of climate on the risk of heart attacks."

Figure 1: STEMI rate by daily high temperature (2009-2014)



Source: ESC

Image Credit: Pixabay

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