

## ABSTRACT

**Objectives:** Changes in air temperature are associated with an increase in cardiovascular events, but the role of pro-coagulant and pro-inflammatory blood markers is still poorly understood. We investigated the association between air temperature and fibrinogen, plasminogen activator inhibitor type 1 (PAI-1), interleukin-6 (IL-6), and high-sensitivity C-reactive protein (hsCRP) in two potentially susceptible groups.

**Methods:** Our prospective panel study was conducted between March 2007 and December 2008 in Augsburg, Germany. The study population comprised 187 participants with type 2 diabetes mellitus (T2D) or impaired glucose tolerance (IGT) and 87 participants with genetic polymorphisms on the detoxification and inflammation pathways. Overall, 1,766 repeated blood measurements were collected. Hourly meteorology data were available from a central measurement site. The association between temperature and blood markers was analysed with additive mixed models.

**Results:** For T2D and IGT participants, we observed immediate, lagged and cumulative increases in fibrinogen (range of %-changes in geometric mean: 0.6-0.8%) and PAI-1 (6.0-10.1%) in association with a 5°C-temperature decrement. Participants with a body mass index above 30kg/m<sup>2</sup> and females showed particularly strong fibrinogen effects. In participants with the special genetic background, 5°C-decreases in the 5-day-average of temperature led to a change of 8.0% (95%-confidence interval: [0.5;16.2%]) in IL-6 and of -8.4%[-15.8;-0.3%] in hsCRP, the latter driven by physically active individuals.

**Conclusions:** We observed different temperature effects on blood markers in two potentially susceptible groups probably indicating varying underlying biological mechanisms. Our results might provide a link between temperature and cardiovascular events.

**Keywords:** air temperature, coagulation, inflammation