

The Impact of Heat Stress on Labor Productivity

Research policy and data infrastructure needs

Matteo Pinna Pintor (LISER)

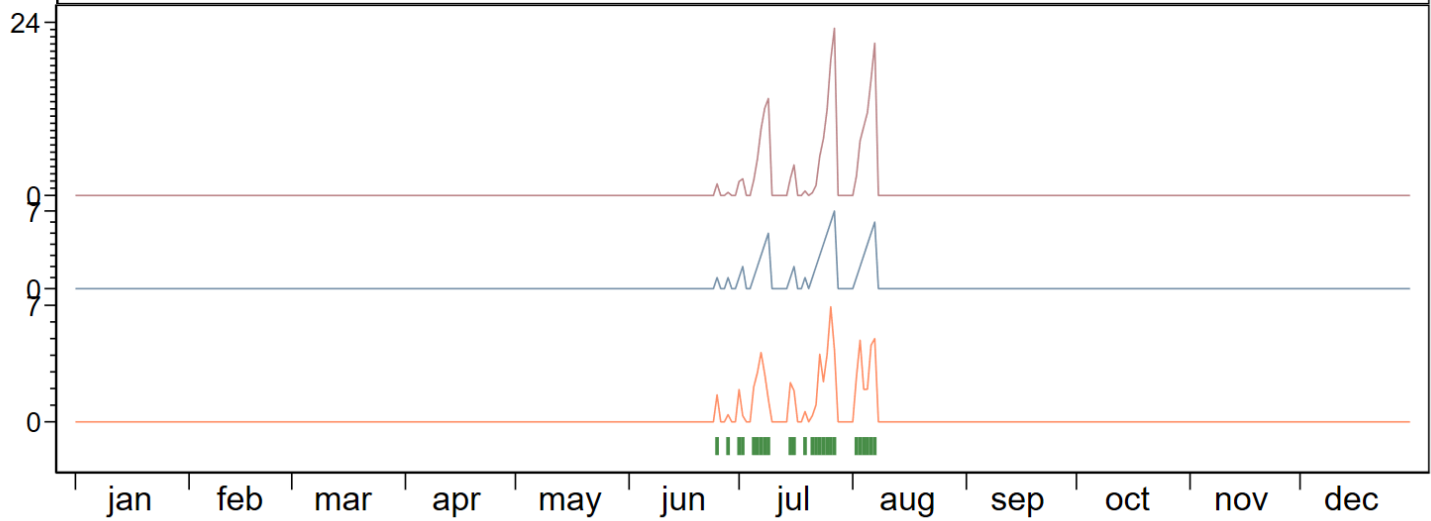
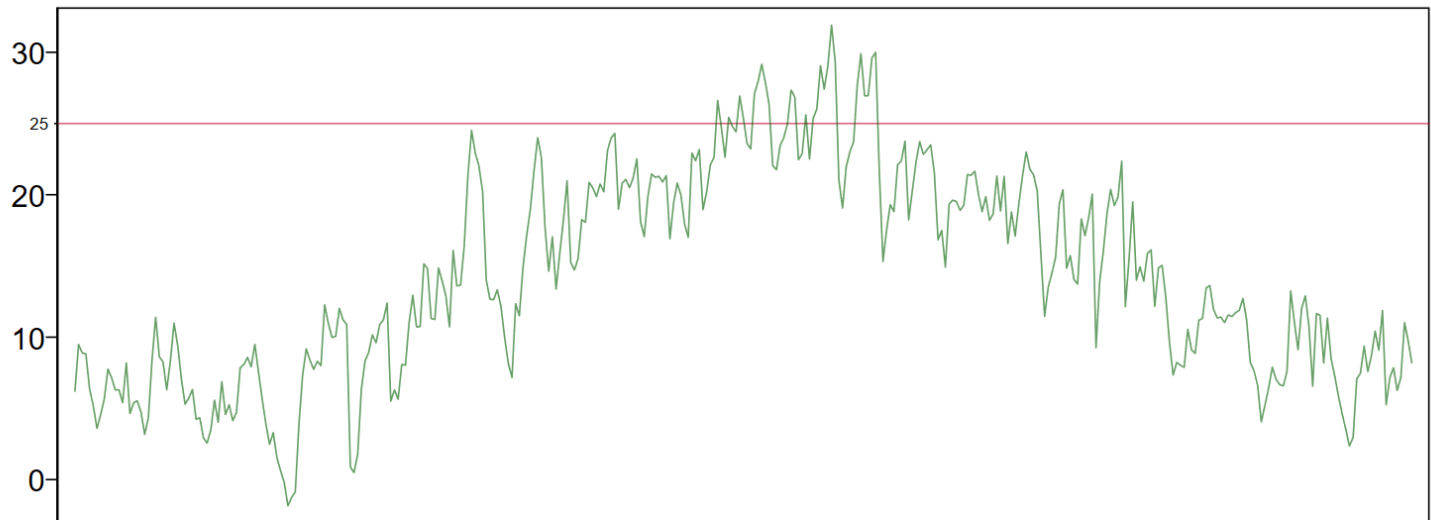
Introduction

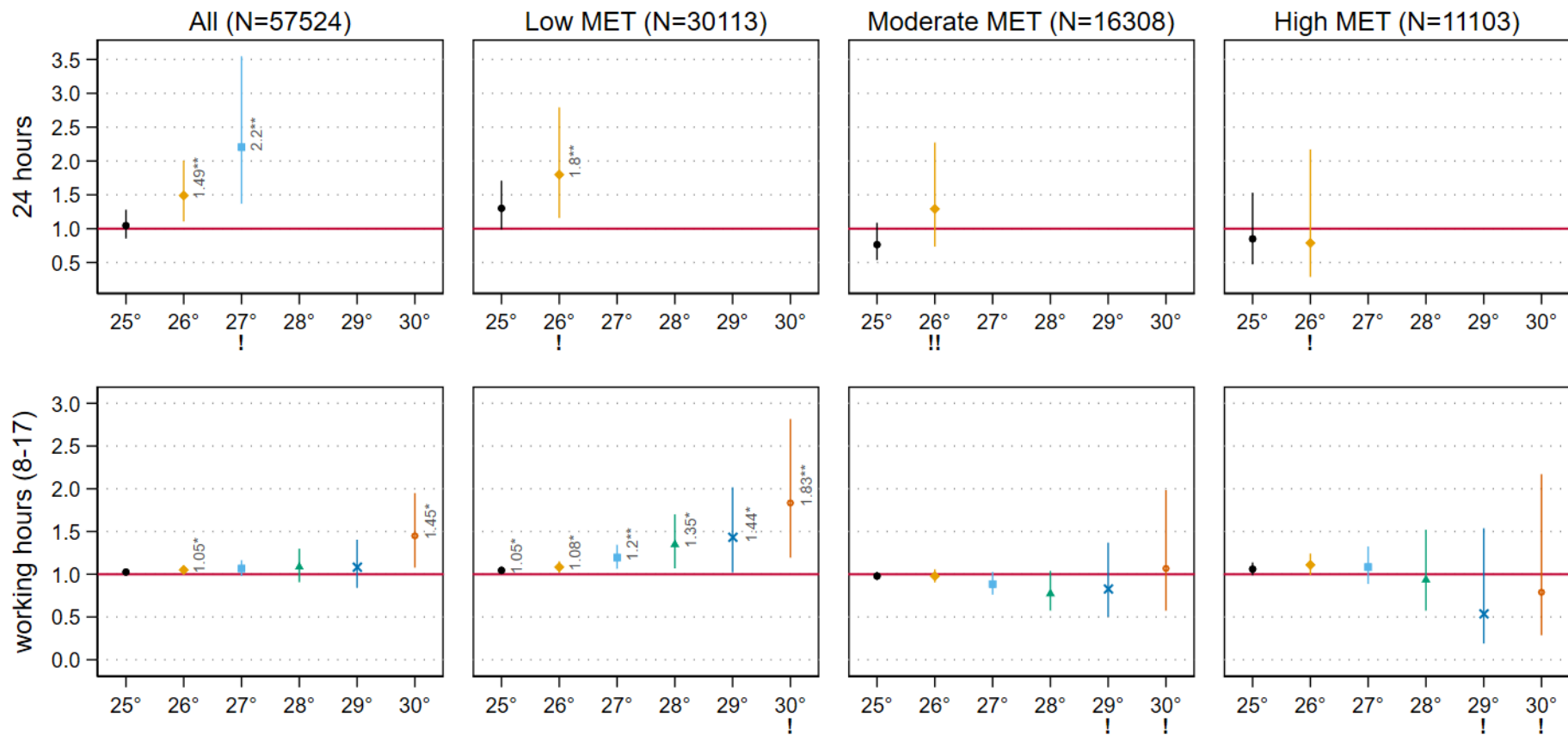
- Heatwaves increasingly recognized as major source of economic damage from climate change.
- Uncompensated heat stress leads not only to morbidity and mortality. Main compensation is to lower activity and effort, including at work.^(1–4)
- As social cost of carbon component, heat-related productivity loss “has not received sufficient attention” (Tol, 2018).⁽⁵⁾ Growing evidence,^(6, 7) but substantial gaps.

Missing: population-wide impacts of heat on effort at work, in temperate climates

Impacts of temperature on presenteeism in England and Wales

- Health and socio-economic data. ⁽⁸⁾
 - Understanding Society panel survey, England and Wales, 2010-2019.
 - Productivity measured by **PRESENTEEISM**: *“During the past 4 weeks, how much of the time have you [accomplished less than you would like] with your work or other regular daily activities as a result of your physical health?”*
- Heat data: ERA5-LAND database (ECMWF, Copernicus).⁽⁹⁾
 - Hourly mean temperature \approx 9 km resolution assigned to small areas
 - Working individuals linked to temperature during past 4 weeks in small area of residence.
 - Multiple heat exposure indicators assessed.
- Regression analyses comparing heat-exposed and ‘control’ individuals, adjusting for differences between regions, years, individual characteristics.
- Separate results for sedentary/physically demanding occupations⁽¹⁰⁾, men and women.





Summary

- Heat stress associated to 1.5 to 2.5 times higher incidence of presenteeism.
- Impact concentrated in sedentary jobs, precise dose-response for women vs. sudden/imprecise effect for men. Why?
 - Workers in sedentary jobs less able/trained to adapt?
 - Reporting effects (performance benchmarks)?

Even using a high-quality survey, observations and variables are insufficient to explore and understand further these results.

Recommendations

- Limited scope to estimate labor outcomes of heat stress with general-purpose data. Dedicated data infrastructure needed.
 - Heatwaves sparse in time/space: surveys require oversampling.
 - To capture short-term individual work output in high-income labor markets: self-reported losses (quantifiable, comparable) complemented with firm data (eg hourly absences).
 - Measure moderators: health relevant for thermoregulation, individual habits and investments, built environment.
 - Linkable to data on local climate, infrastructure, policies.

Long-term solution: occupational heat stress surveillance

- 1. Routine surveys of firms and workers immediately after a heat spell.**
- 2. *Ad hoc* surveys in vulnerable occupations (eg food delivery, construction)**
- 3. Evidence-based legislation on compensation, days off, breaks, cooling.**

THANKS FOR LISTENING

References

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