

Urban heat, building design and health: a case of study in Valparaíso

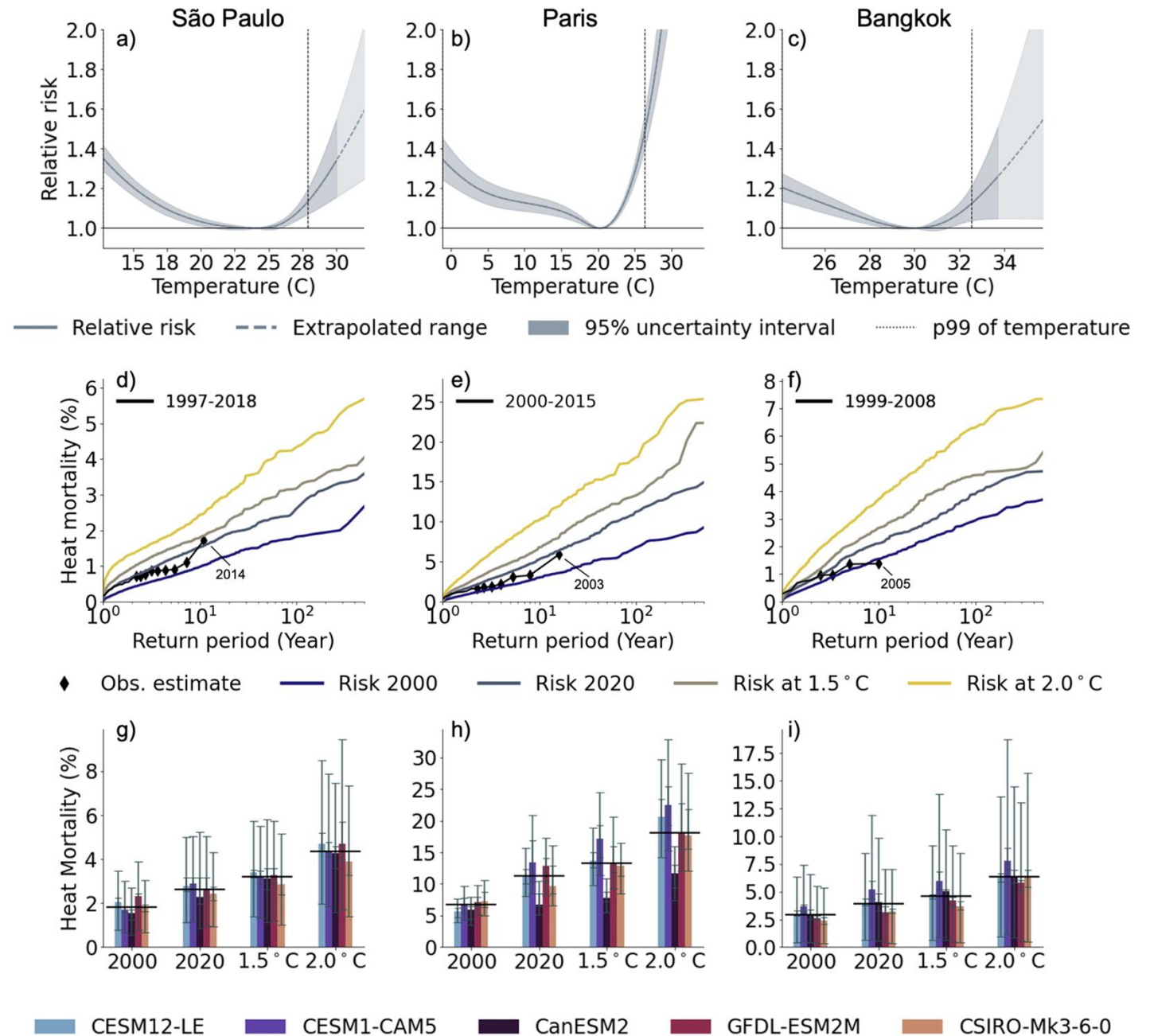
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Heat as a risk for people health

Lüthi, S., Fairless, C., Fischer, E.M. *et al.* Rapid increase in the risk of heat-related mortality. *Nat Commun* **14**, 4894 (2023).

<https://doi.org/10.1038/s41467-023-40599-x>

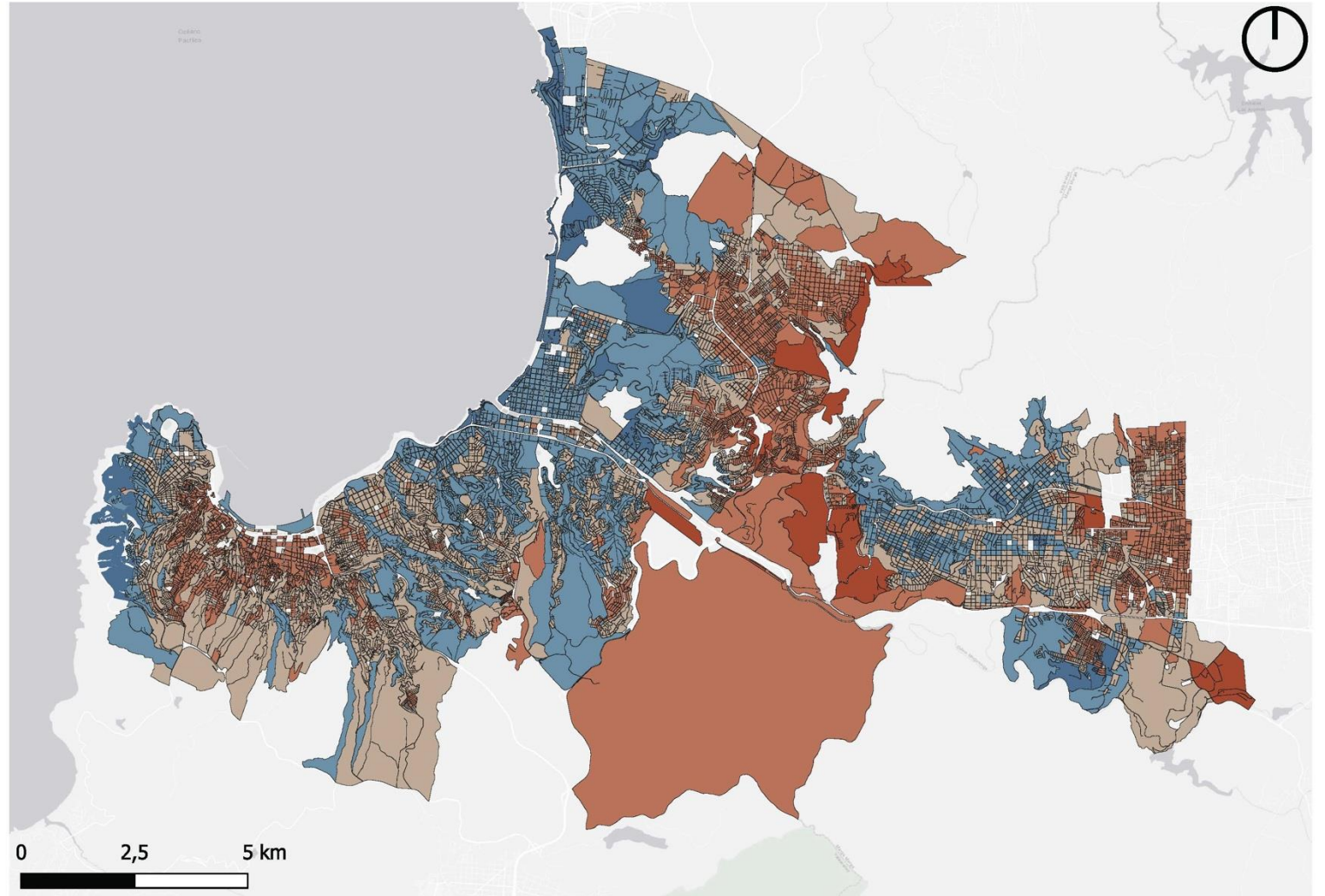


Project IAI-SG-CEH objectives

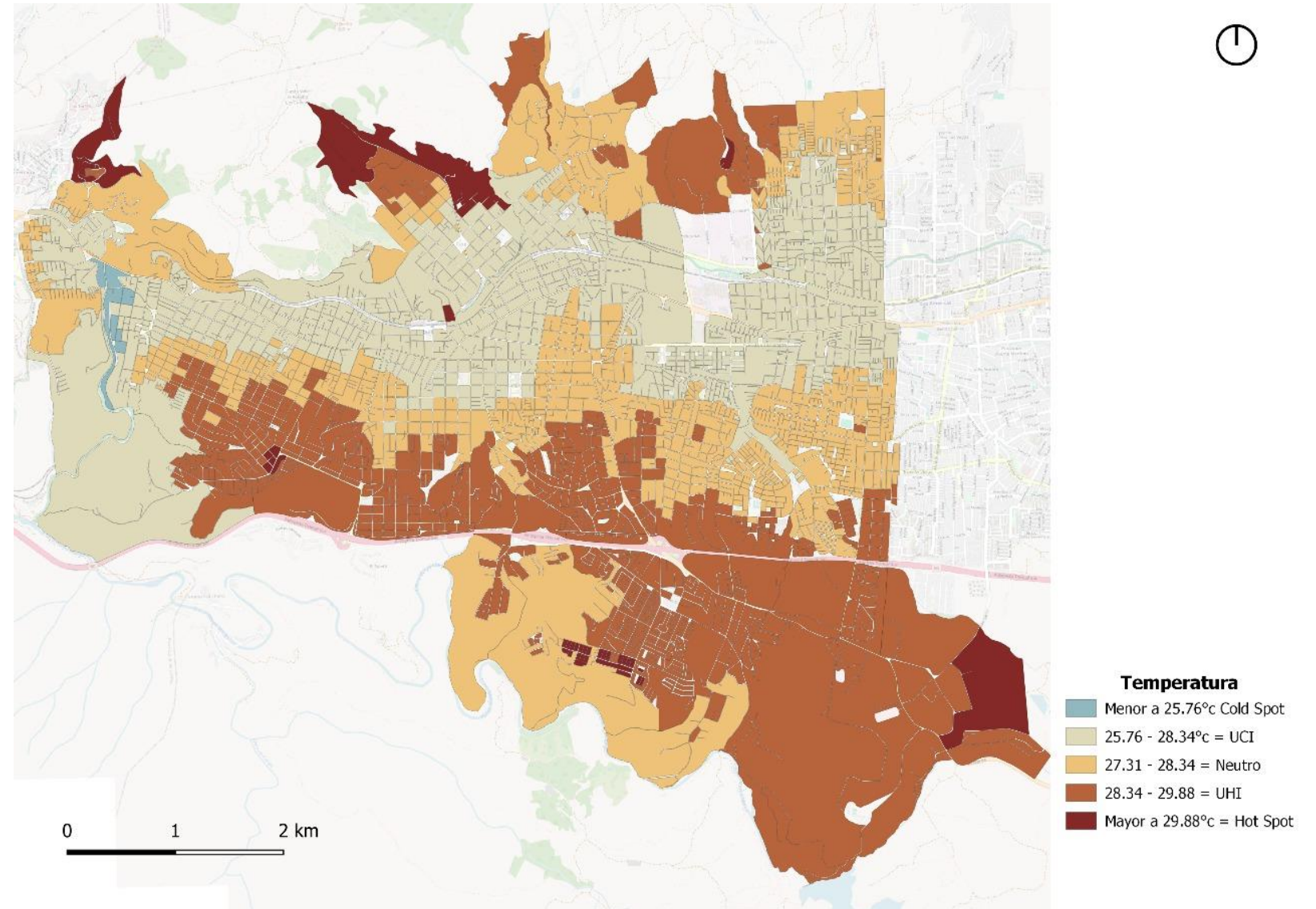
- To determine UHI intensity in Valparaíso Metropolitan Region
- To determine health facilities attentions during summer 2024 and 2025
- To analyse data and correlations
- To realize interviews with communities living in hottest sectors
- To monitor buildings with and without standards of energy efficiency



Surface Urban Heat Island intensity in Valparaíso, Chile (2023- 2025)

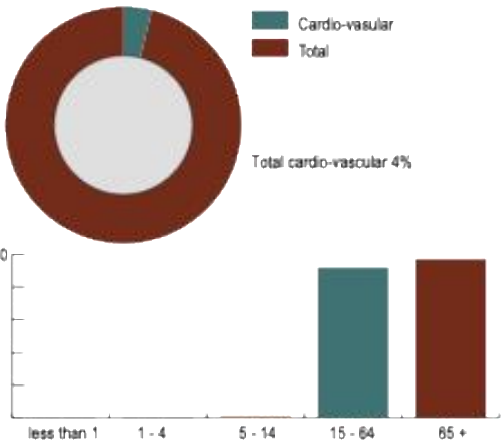


Median of max air temperature for summer 2025 in Quilpué

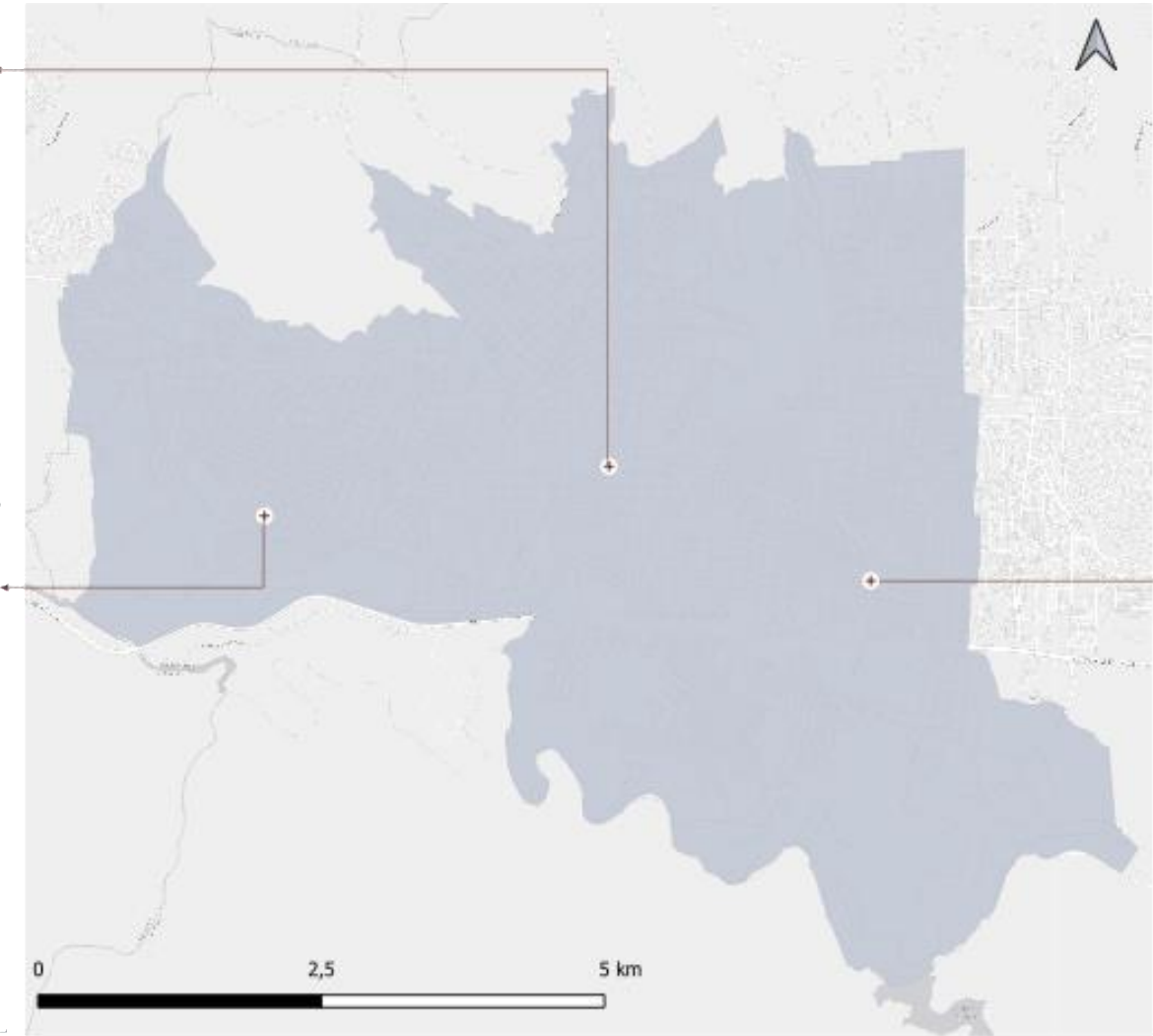
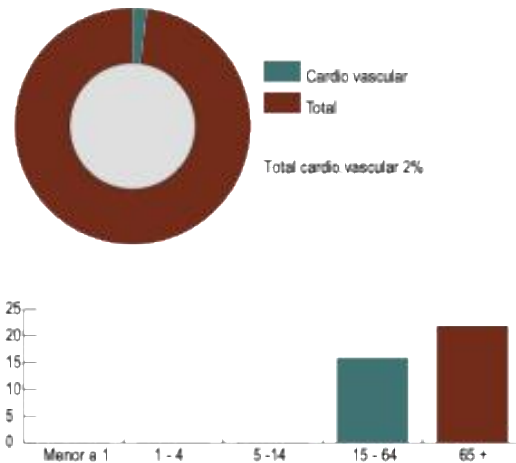


Health facilities Quilpue

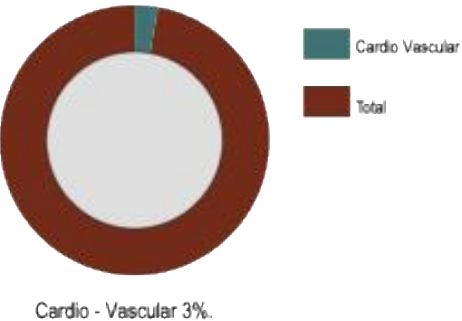
Hospital Quilpue



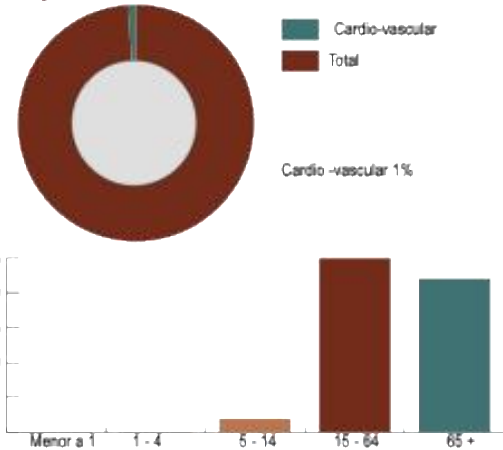
Sapu Pompella



Total data

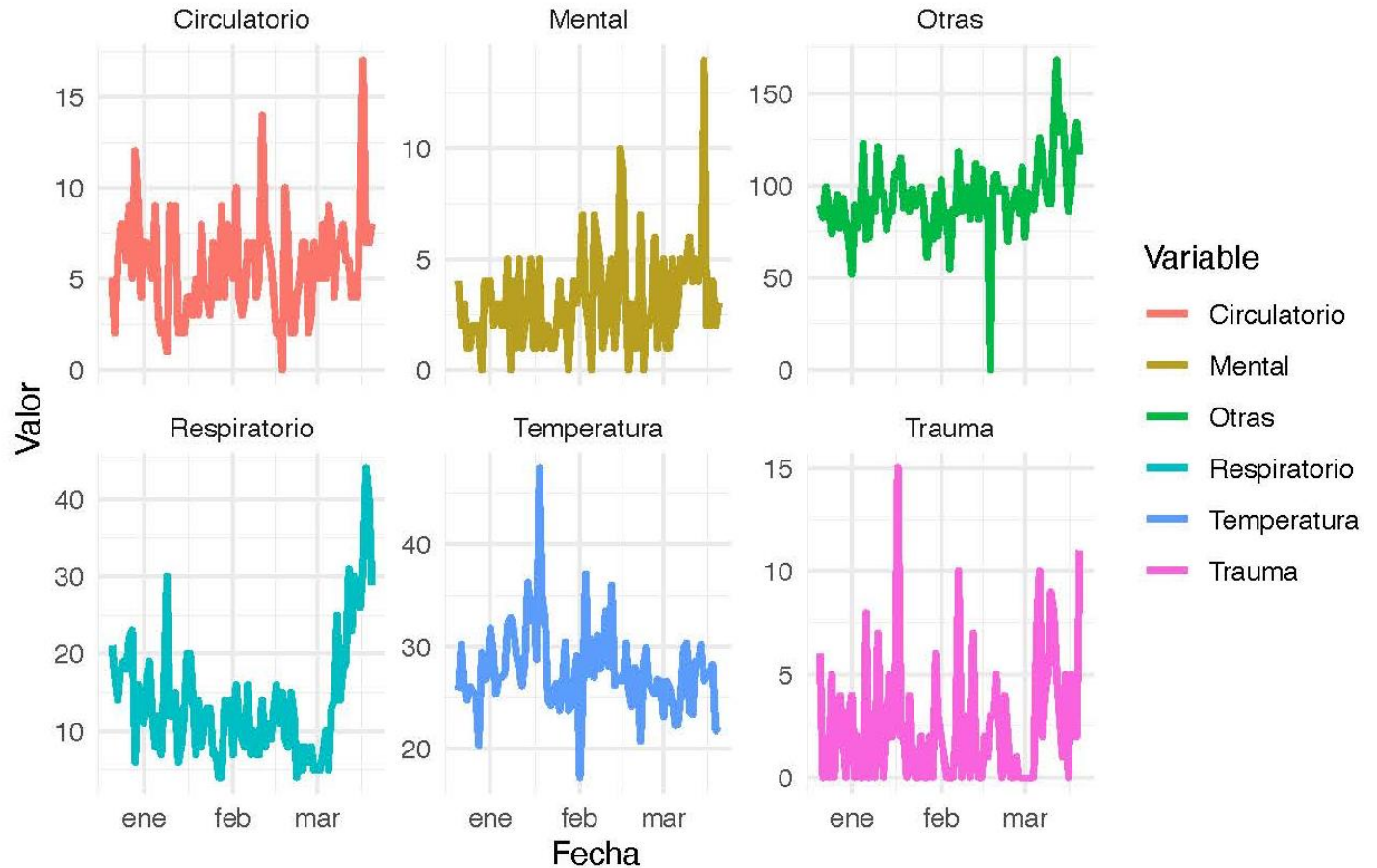
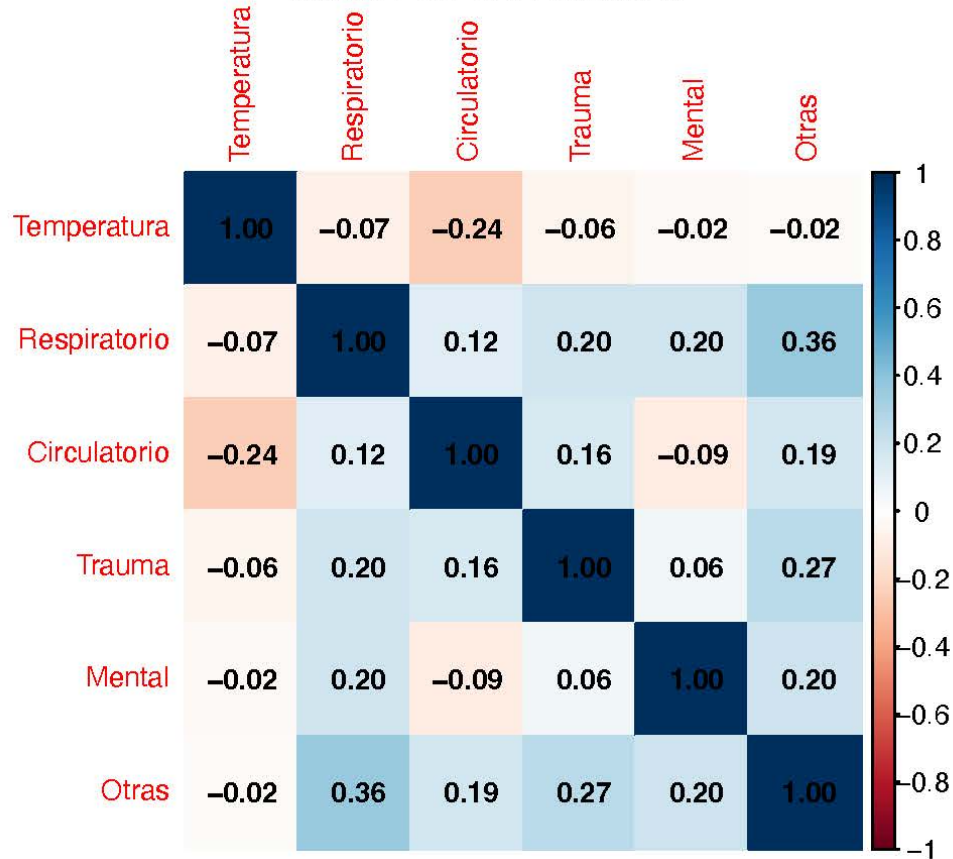


Sapu Belloto Sur

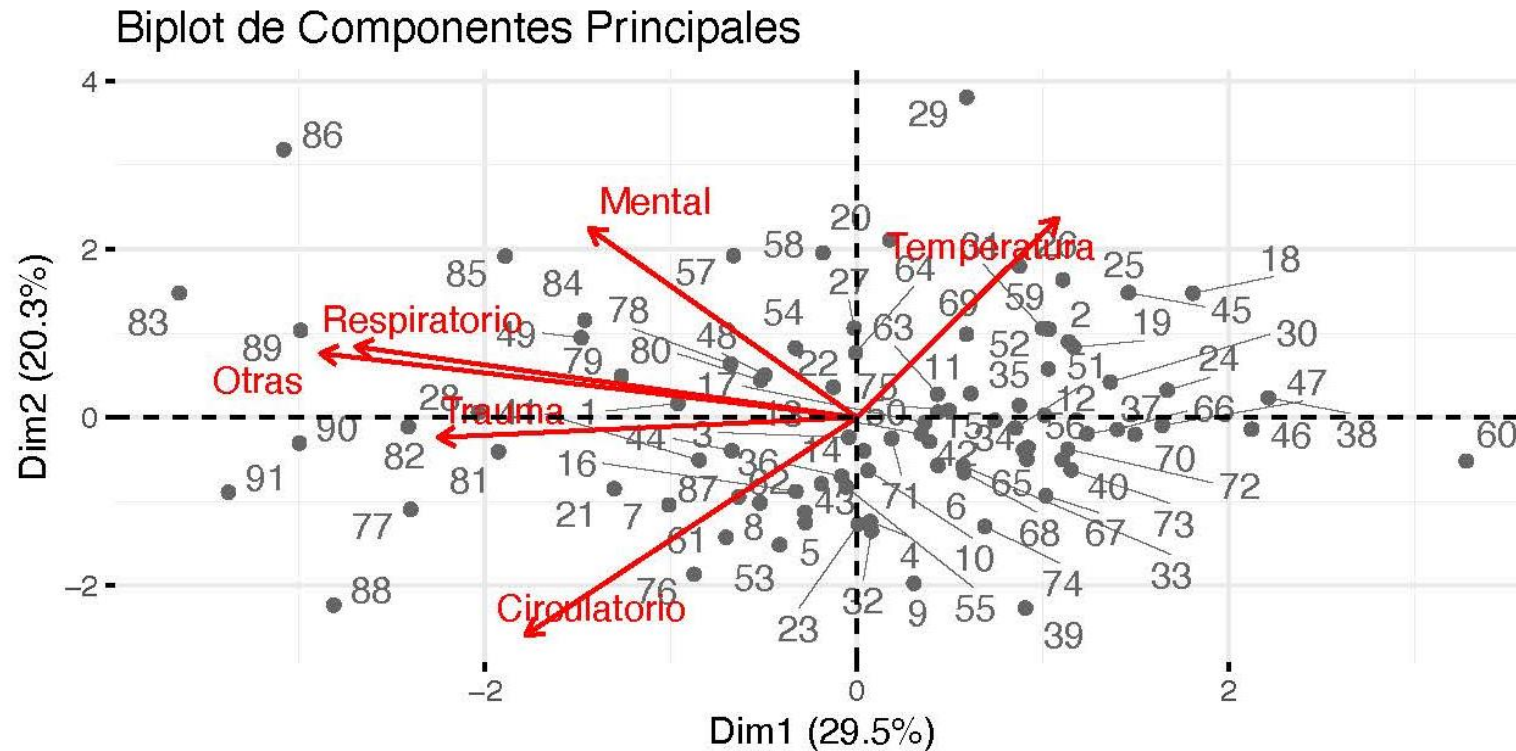


Temperature and health attentions 2025 (summer) and correlation matrix

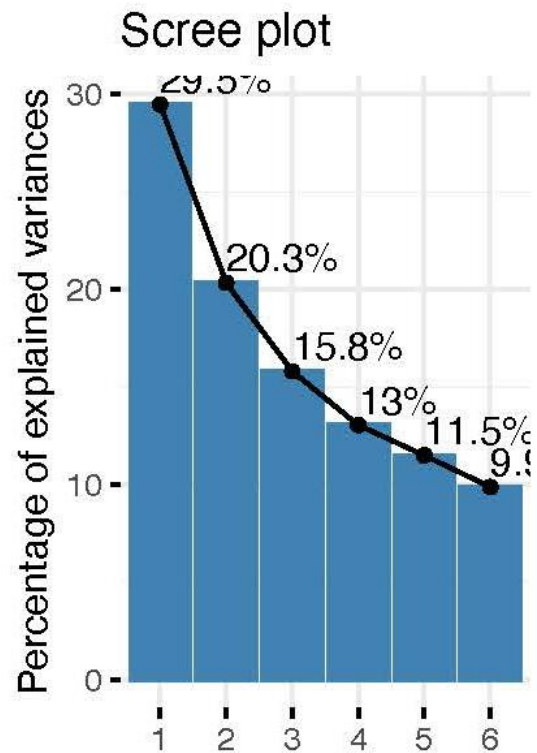
Matriz de correlación



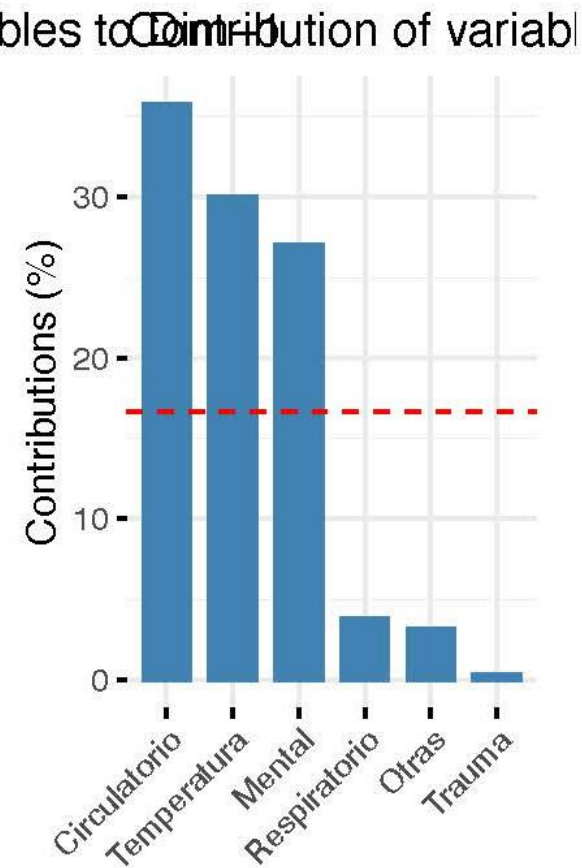
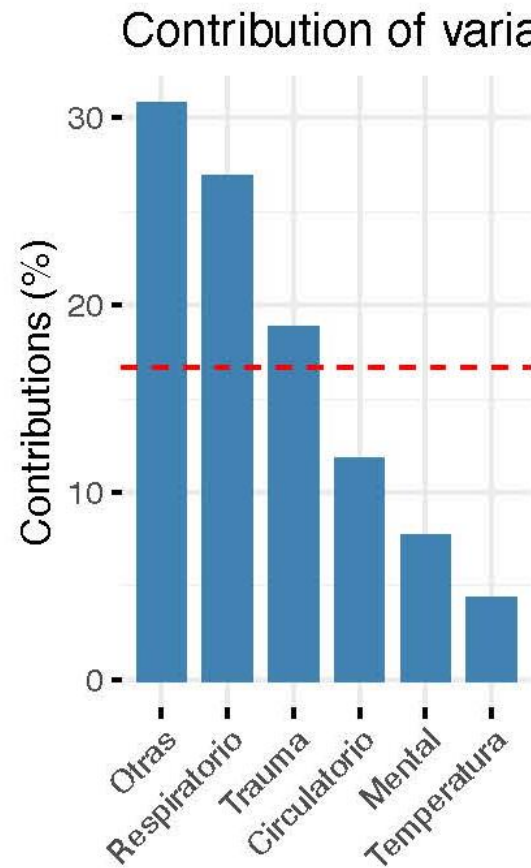
Principal Component Analysis



Dimensions



Dimension

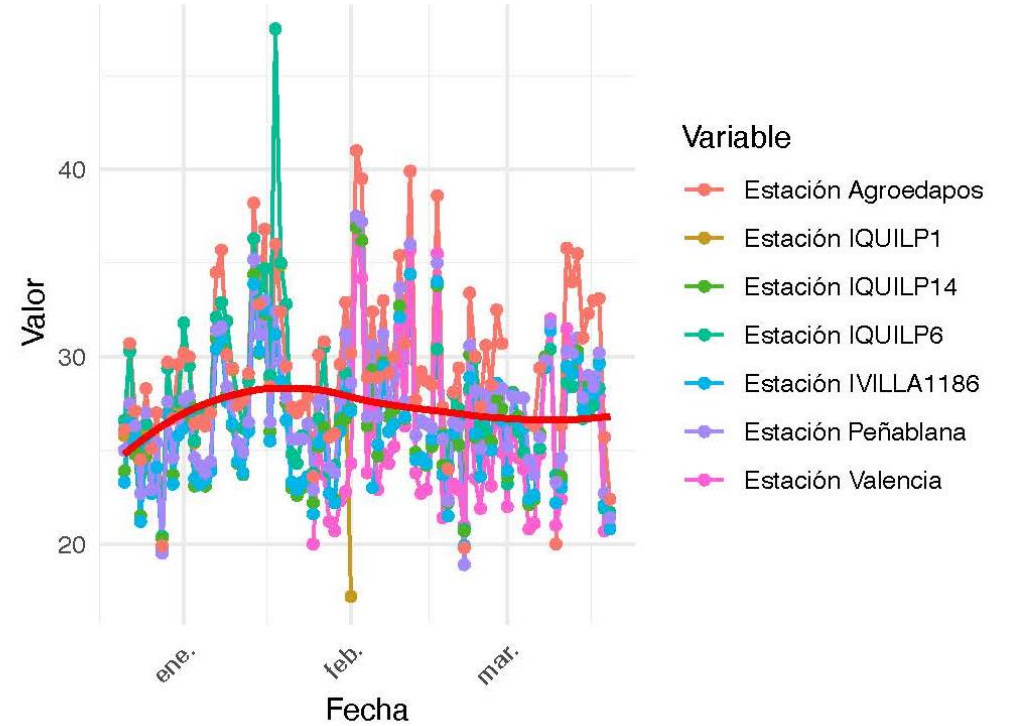
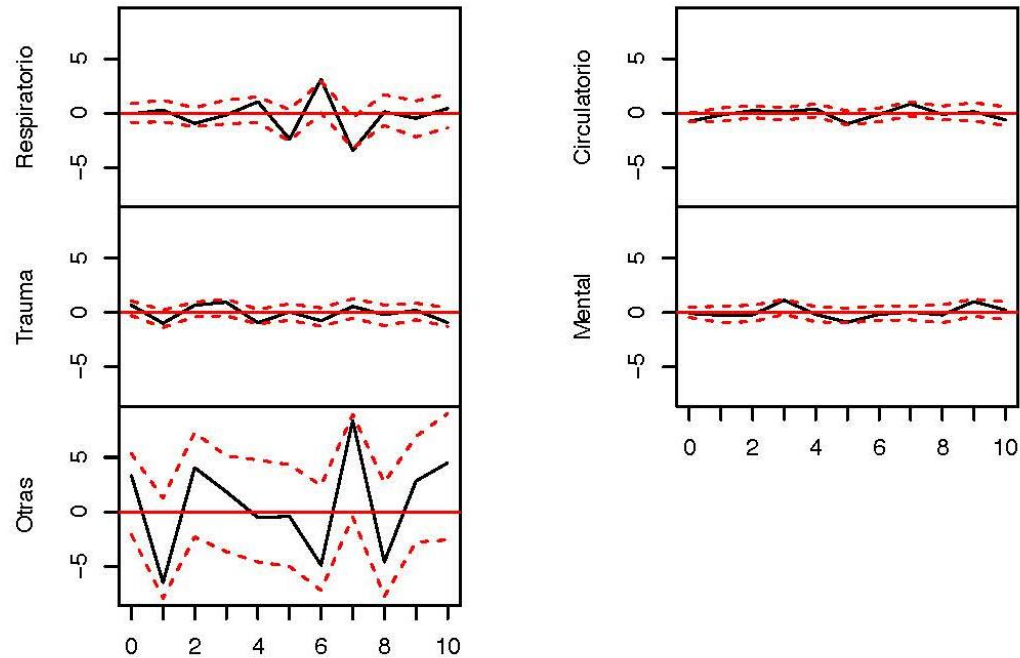


Conclusions (partial)

- A relation among cardio-vascular diseases and temperature exists, but it seems to be negative (inside the same dimension 1 of Pca)
- A relation among respiratory diseases and temperature exists and it is negative
- A relation among mental disorders and high temperatures appears

What could happen under heat waves?

Orthogonal Impulse Response from Temperatura



Conclusions (partial)

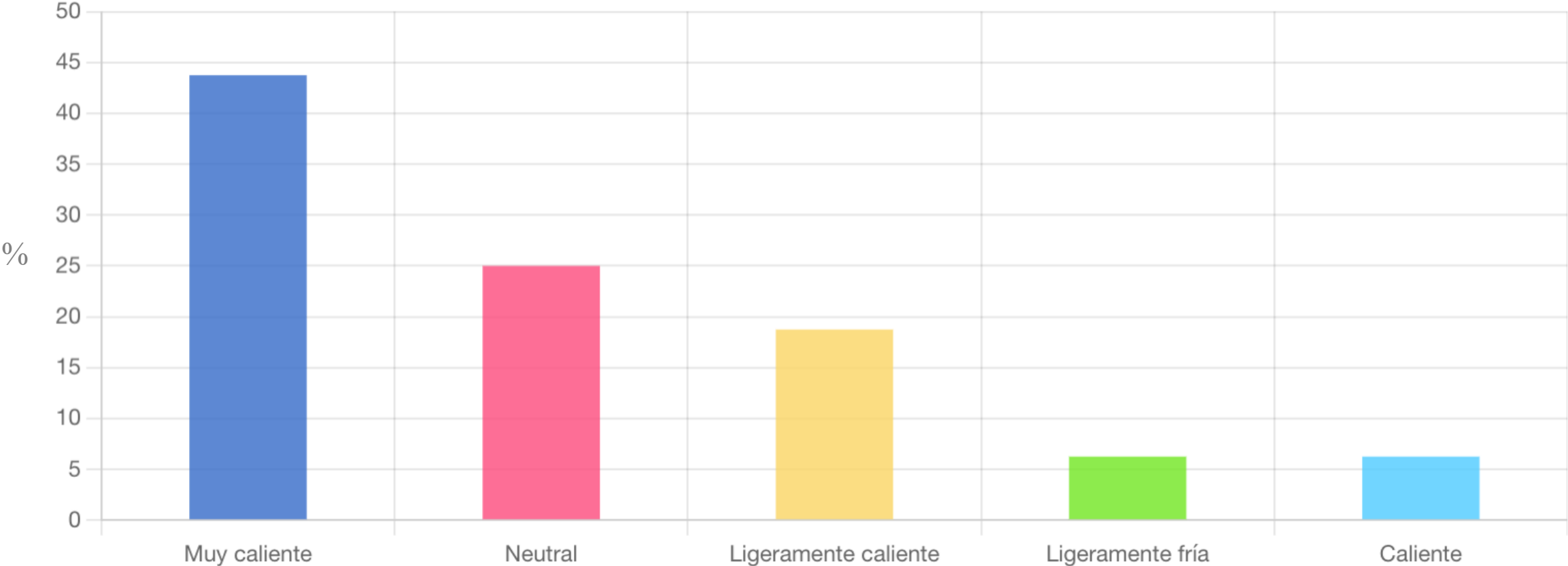
- Respiratory : weak response not significant
- Circulatory: some response but it seems that hospitalizations depend more on sustained thermal conditions than on impulses of temperature
- Mental health: some response suggesting a possible emotional response to thermal changes
- Traumas and other causes: no clear response

Workshops with communities of inhabitants



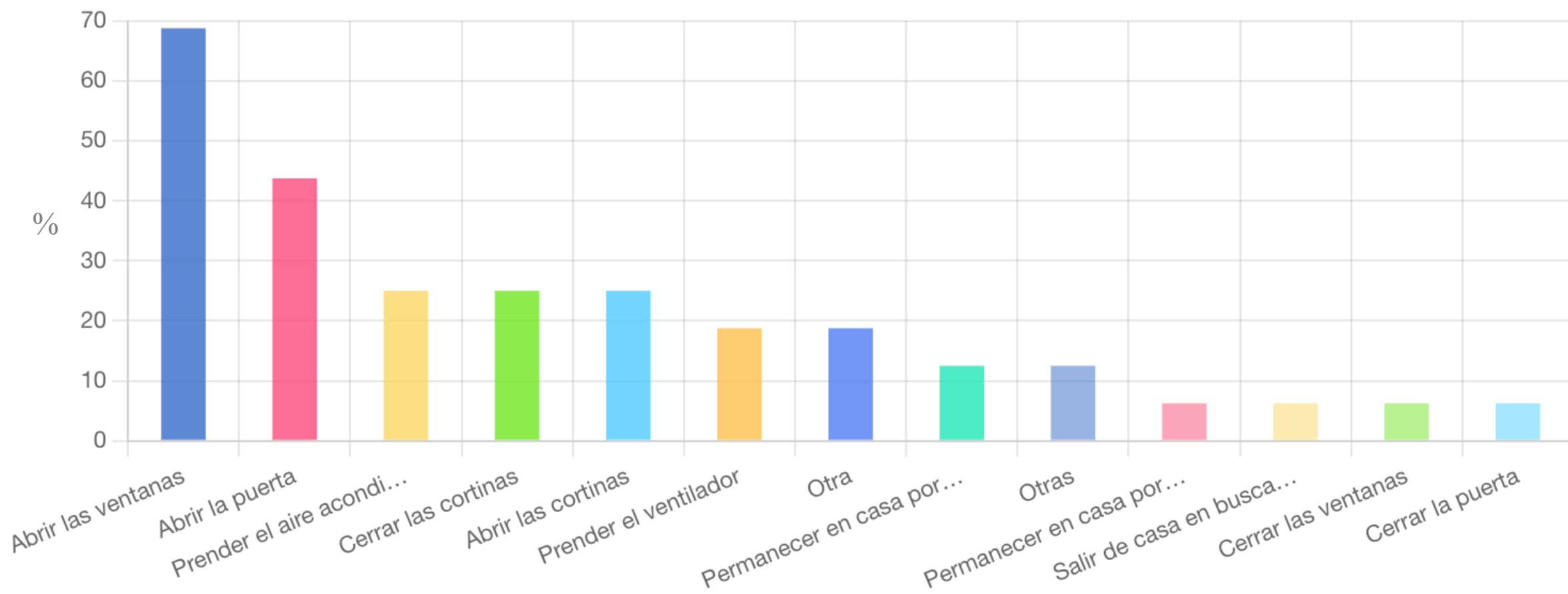
Integración de la Respuesta en Salud en la Evaluación Energético- Ambiental de Edificios para Reducir el Riesgo de Exposición al Calor Urbano: Caso de estudio Chile

Pregunta: Durante el verano la temperatura en su casa generalmente es



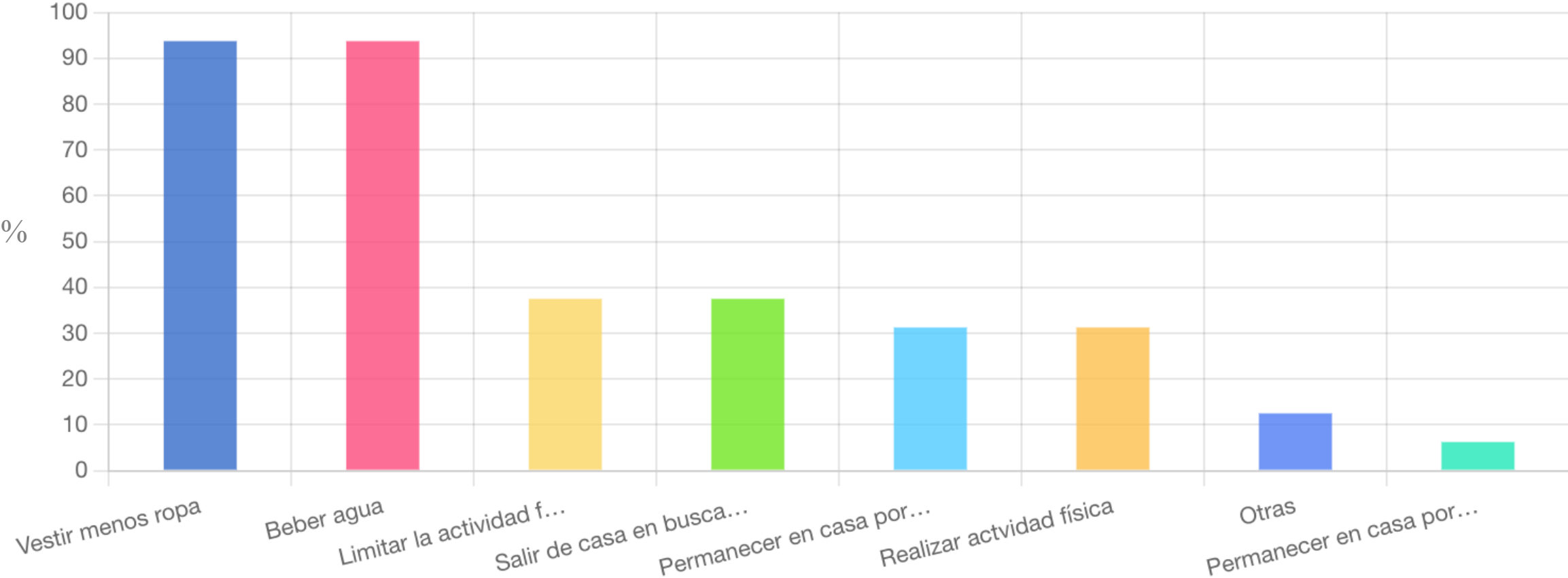
Integración de la Respuesta en Salud en la Evaluación Energético- Ambiental de Edificios para Reducir el Riesgo de Exposición al Calor Urbano: Caso de estudio Chile

Pregunta: Marque las estrategias que aplica para modificar la temperatura al interior durante el DIA en verano



Integración de la Respuesta en Salud en la Evaluación Energético- Ambiental de Edificios para Reducir el Riesgo de Exposición al Calor Urbano: Caso de estudio Chile

Pregunta: Marque las estrategias que aplica para modificar la sensación térmica durante el DIA en verano



Future of the Project

- Analyze more detailed data (e.g. by specific disease)
- Obtain data by sector of residence
- Define buildings to be monitored and apply more questionnaires