

A geographical analysis of cancer incidence in the province of Girona, 2000-2020

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Introduction

Exposure to environmental contamination from heavy metals and battery chemicals has been identified as a risk factor for multiple types of cancer.

The Girona Cancer Registry was contacted to evaluate the impact on cancer incidence of a factory in Sant Julià de Llor/Bonmatí that has been recycling lead and other battery components since 1964 that has been associated with lung, stomach, and brain neoplasms.

Objective

The aim of this study is to determine whether the municipality of Sant Julià de Llor/Bonmatí and its neighboring municipalities have a higher incidence risk of cancer.

Methods

All new cases in the province of Girona diagnosed during 2000-2020 were analyzed. Specific analysis for anatomical sites of lung, stomach and brain were conducted.

The observed and expected cases for each site, municipality, age group and sex, were modeled using generalized regression models with zero-inflated Poisson distribution. The relative risks (RR) and exceedance probabilities (EP) were estimated.

Results

- A total of 97,206 cancer cases were included (58.0% males; median [interquartile range] of 68 [59-79] years).
- Out of the total cancer cases there were 7,908 lung, 2,433 stomach and 1,186 brain neoplasms.
- The overall results showed no higher incidence risk in Sant Julià de Llor/Bonmatí, where the factory is located, with a RR and EP of 0.94 and 0.16, respectively.
- The overall results shows that adjacent municipalities demonstrated RR of 1.06, 1.10 and 1.19 with an EP of 0.8 or higher.
- Results by cancer anatomical sites reported no higher RR of cancer incidence for lung, stomach and brain neoplasms.

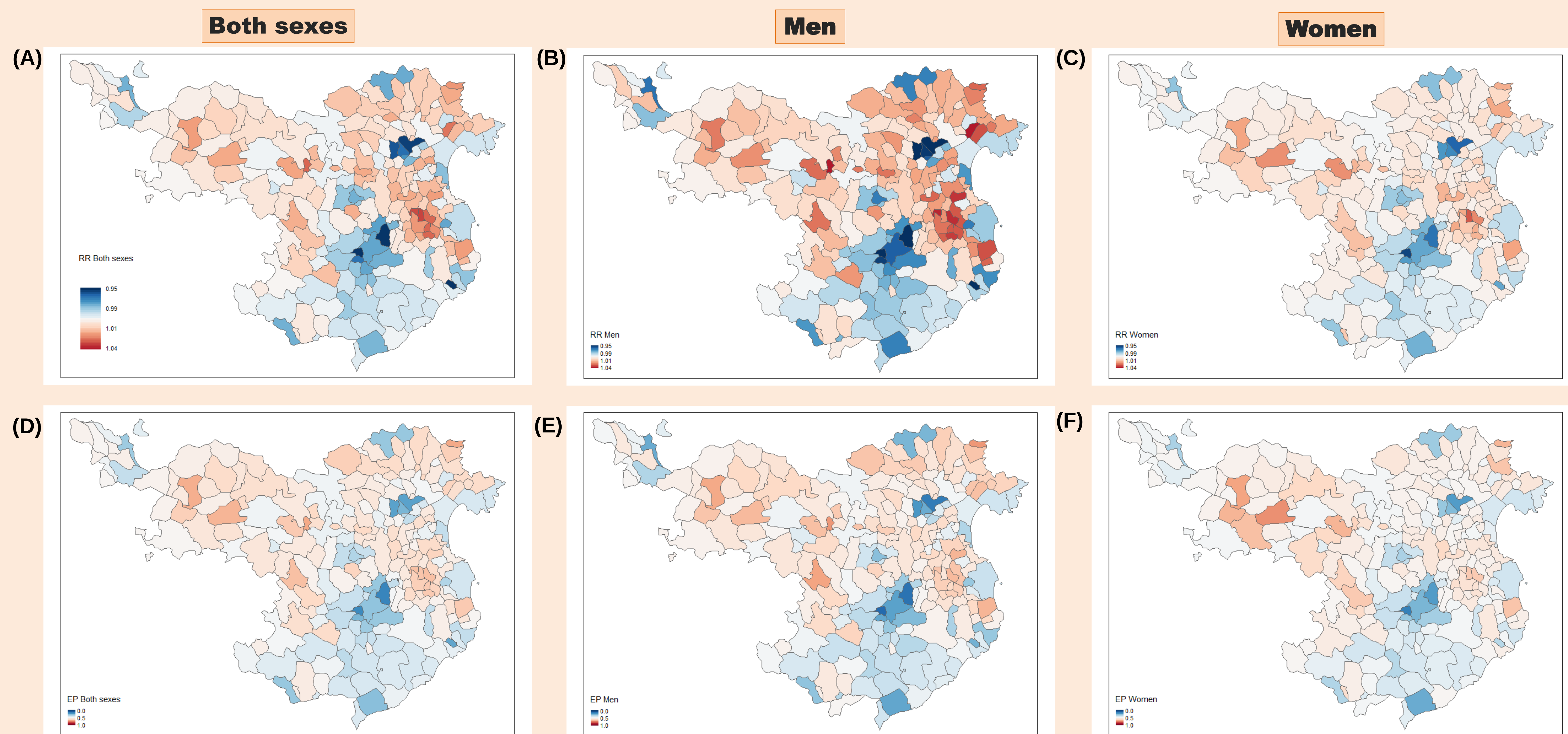


Figure 1: Geographical analysis of cancer incidence in the province of Girona by municipalities. (A) Relative risks for both sexes. (B) Relative risks for men. (C) Relative Risks for women. (D) Exceedance probabilities for both sexes. (E) Exceedance probabilities for men. (F) Exceedance probabilities for women.

Conclusions

The study revealed increased overall cancer risk in municipalities near the factory, but not in the municipality of the factory's location. Further investigation is required to determine if the increased risk is linked to lead and battery chemicals or other etiological risk factors, and to explore other potential cancer sites that may explain the higher risk observed.

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