

## Population density and risk of Amyotrophic Lateral Sclerosis: an Italian population-based study

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### Background

Amyotrophic lateral sclerosis (ALS) is a neurodegenerative disorder with still unknown aetiology. As an increased risk of ALS has been reported in areas with high population density, the aim of the study was to test this hypothesis in our population.

### Methods

The study was performed in two Italian provinces, Modena and Reggio Emilia, using a case-control population-based design. We identified all newly-diagnosed ALS cases in this area from the Emilia-Romagna Region ALS Registry. We also randomly selected four controls for each case matched by sex, age, and province of residence. To assess municipal population density we used the 2001 national census data, available at the National Institute of Statistics (ISTAT). We carried out two data analysis, based on using quintile distribution and on a categorical one, using the Emilia-Romagna regional average density as cutpoint. We used logistic conditional regression analysis to compute odds ratio (ORs) and its 95% confidence interval (CI) according to population density.

### Results

Overall, we identified 387 ALS cases (235 and 152 cases from Modena and Reggio Emilia respectively) and 1504 controls. ORs in increasing population density quintiles were 1.00, 0.64 (95% CI 0.44–0.93), 0.78 (0.57–1.07), 0.91 (0.66–1.27) and 0.49 (0.23–1.03), with P value for trend of 0.490. The second statistical analysis yielded an OR of 0.68 (0.49–0.93,  $p = 0.016$ ). Comparable results were obtained using population data from previous national census.

### Conclusions

In contrast with previous studies, in our population preliminary results seem to suggest a decreased risk of ALS for living in municipalities with higher population density. Further analyses is needed to improve the methodology used in the present study, such as the use of a greater spatial resolution to analyse the association between ALS incidence and population density.

### Key message

- Preliminary results seem to suggest a decreased risk of ALS for living in municipalities with higher population density