

# RISK OF AMYOTROPHIC LATERAL SCLEROSIS AND PASSIVE LONG-TERM RESIDENTIAL EXPOSURE TO PESTICIDES: A POPULATION BASED STUDY

F. Violi <sup>1,2</sup>, T. Filippini <sup>1,2</sup>, C. Malagoli <sup>1</sup>, J. Mandrioli <sup>3</sup>, C. Signorelli <sup>4</sup>, A. Odone <sup>4</sup>, M. Ferrante <sup>5</sup>, M. Fiore <sup>5</sup>, C. Ledda <sup>5</sup>, C. Mauceri <sup>5</sup>, F. Patti <sup>5</sup>, S. Costanzini <sup>6</sup>, S. Fabbi <sup>6</sup>, S. Teggi <sup>6</sup>, M. Vinceti <sup>1</sup>

## Background and aims

**Amyotrophic lateral sclerosis (ALS)** is a progressive neurodegenerative disease of the motor neuron. Its etiology is still largely unknown, but environmental factors may have an important role. Among these environmental risk factors, **we assessed the possible role of agricultural pesticides.**

## Methods

We carried out a **population case-control study**:

- in the Northern Italy provinces of Modena, Reggio Emilia and Parma
- in the Southern Italy province of Catania.

For each subject **the historical residence** was identified and geocoded within a

**Geographical Information System (GIS) database.**

To evaluate **passive exposures** to neurotoxic pesticides, we added to the GIS a **land use regression model related to 1976, focusing on an area of 100 meters around the subjects residences.**

In that area, **we computed the land percentage dedicated to different cultivations** (vineyards, orchards, extensive arable farming and crops) for which potentially neurotoxic pesticides had been used **to assess passive exposure** to these chemicals.

## Results

We computed the odds ratio of the disease associated with different land use through a **conditional logistic regression model**, dichotomizing subjects' exposure according to any specific pesticide use in the surrounding area.

- **703** ALS cases
- **254** cases did not change residence over the entire study period

For each ALS case diagnosed in that area **from 1998 to 2011**, four controls matched by **sex, age and province of residence** were randomly selected from the general population.

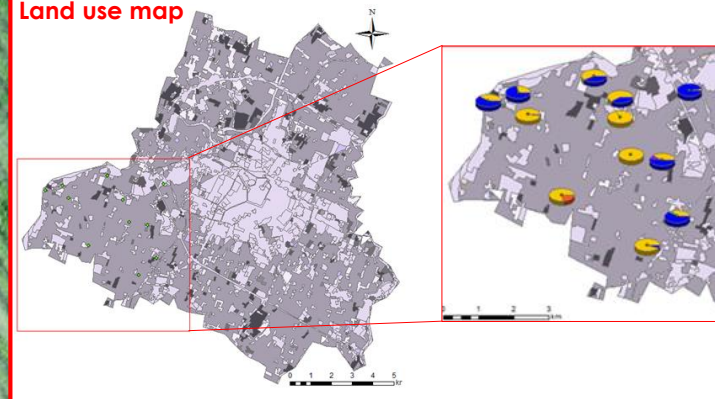
- **2737** matched controls
- **997** controls did not change residence over the entire study period

## ORs

- **0.74** (95% CI 0.50-1.11, p=0.148) for vineyards
- **1.07** (95% CI 0.73-1.58, p=0.716) for orchards
- **1.00** (95% CI 0.78-1.28, p=0.978) for extensive arable farming and crops.



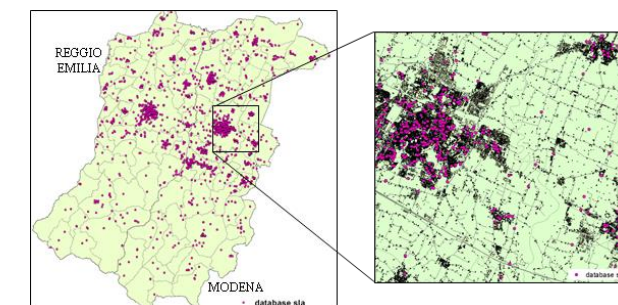
Land use map



## Conclusions

These results **do not support an association** between passive exposure to neurotoxic pesticides and ALS risk.

Despite the suggested role of pesticides as potential risk factors for ALS, **our study did not show an association between passive long-term residential exposure to these chemicals and the risk of ALS.**



1. CREAGEN-Research Center in Environmental, Genetic and Nutritional Epidemiology- University of Modena and Reggio Emilia
2. Specialization School in Hygiene and Preventive Medicine- University of Modena and Reggio Emilia
3. Dep. of Biomedical, Metabolic and Neural Sciences- University of Modena and Reggio Emilia
4. Dep. of Biomedical, Biotechnological and Translational Sciences- University of Parma
5. Dep. "G.F.Ingrassia", Hygiene and Public Health- University of Catania
6. LARMA- University of Modena and Reggio Emilia