



UNIMORE
UNIVERSITÀ DEGLI STUDI DI
MODENA E REGGIO EMILIA

RESIDENCE NEAR ELECTRICAL TRANSFORMER ROOMS AND RISK OF CHILDHOOD LEUKEMIA: AN ITALIAN POPULATION-BASED CASE-CONTROL STUDY

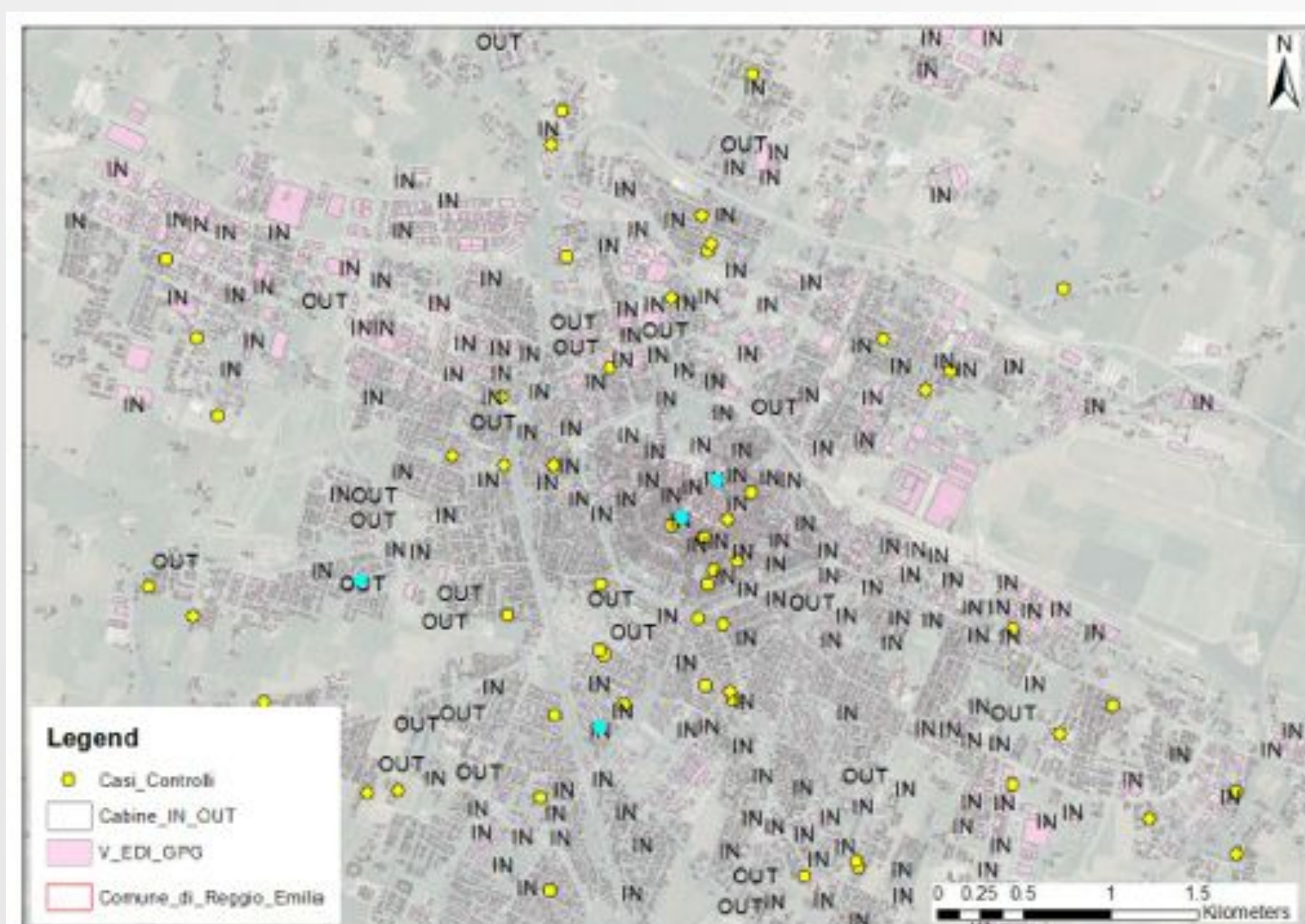


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Background and Aims

Some epidemiologic evidence supports an association between magnetic field (MF) exposure and childhood leukemia (CL). We conducted a population-based case-control study to evaluate CL risk near electrical transformer rooms investigating two large and contiguous territories of the Emilia-Romagna region.



Methods

We identified CL cases diagnosed from 1998 to 2013 in the Modena and Reggio-Emilia provinces (1,2 million inhabitants) through the Italian national childhood cancer register. For each case, we randomly selected four population controls matched for age, sex, province of residence and calendar year. Using Geographical Information System methodology we geocoded children's residence and indoor electrical transformers, drawing a 2 meters buffer around each cabin perimeter (estimated MF field intensity $\geq 3 \mu\text{T}$). We computed the odds ratio (OR) of CL in a logistic regression analysis model according to distance between the residence and the nearest transformer, using as cutpoints 30, 60 and 90 meters.

Table 1. Odds ratio of childhood leukemia associated with residence in buildings with built-in transformers according to distance (from the centroid of residence to the transformer contour +2m).

Meters	Unexposed cases/controls	Exposed cases/controls	OR	95% CI
<90	106/409	19/91	0.81	0.5-1.4
<60	114/447	11/53	0.81	0.4-1.6
<30	119/485	6/15	1.64	0.6-4.4

Table 2. Odds ratio of childhood leukemia associated with residence in buildings with built-in transformers according to distance by age group.

Meters	< 5 years old				≥ 5 years old			
	Unexposed cases/controls	Exposed cases/controls	OR	95% CI	Unexposed cases/controls	Exposed cases/controls	OR	95% CI
<90	53/193	7/47	0.53	0.22-1.26	53/216	12/44	1.12	0.55-2.21
<60	56/213	4/27	0.57	0.19-1.68	58/234	7/26	1.09	0.45-2.66
<30	58/230	2/10	0.79	0.16-3.79	61/255	4/5	3.20	0.86-11.92

Results

We included in the study 125 cases and 500 controls. 110 of them (19 cases and 91 controls) were residing less than 90 m from a transformer. OR of CL was 1.64 at <30 m (95% confidence interval 0.6-4.4), 0.81 at <60 m (0.4-1.6) and 0.81 at <90 m (0.5-1.4).

However, no apparent dose-response relation emerged in the subjects residing <30 m from a transformer (table 1). ORs were markedly higher in the 5-14 age group compared to the younger group (table 2).

Conclusions

Results of this study may suggest an association between MF exposure from indoor transformer and CL risk, particularly in the 5-14 age group, and finding which could be explained by a long induction period of the disease following low-

dose exposure. However, these results must be interpreted with caution owing to lack of dose-response relation in the most exposed group, risk of confounding and exposure misclassification, and the low statistical stability of the estimates.



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