

Background

The COVID-19 pandemic extended existing inequalities. Difficulties in access to health care during the pandemic had effects on the opportune diagnosis and monitoring of diseases, leading to worsen health indicators. Cardiovascular risk metrics can help to prevent adverse health outcomes, such as death.

Objectives

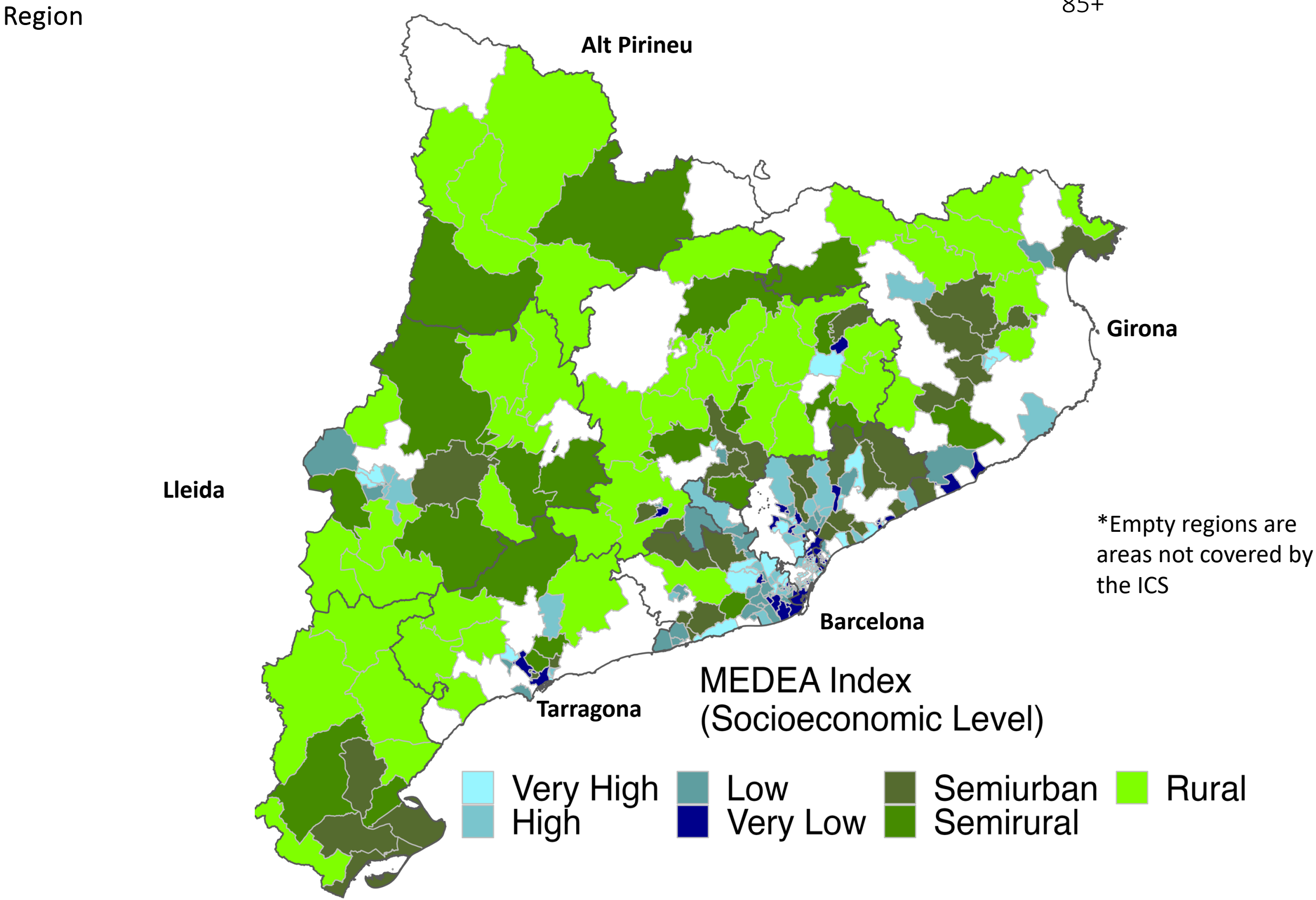
Using REGICOR records measure the evolution of the cardiovascular risk in the Catalanian population accounting for health factors and geography.

Methods

The main data source is routinely recorded primary care information obtained by the Institut Català de Salut (ICS) and in the Information System for Research in Primary Care (SIDIAP), from 2015 to 2022. It contains high-quality data on patient demographics, diagnoses, drug prescriptions, clinical evaluations, laboratory tests , etc. To account for biases the patient's inclusion criteria for this study were: i) Individuals active in the Catalanian health system up to December 31, 2022. ii) Individuals with at least one REGICOR marker calculated before and during the pandemic period. Also, a distinction among patients who developed cardiovascular diseases in the observation period and those who didn't is made.

Table 1 contains the description of the sample that met the inclusion. Information about cardiovascular diagnosis made to the patients in the sample can be found in Table 2. To characterize the economical distribution in the regions of Catalonia, the 2022 version of the MEDEA index is showed in Figure 1.

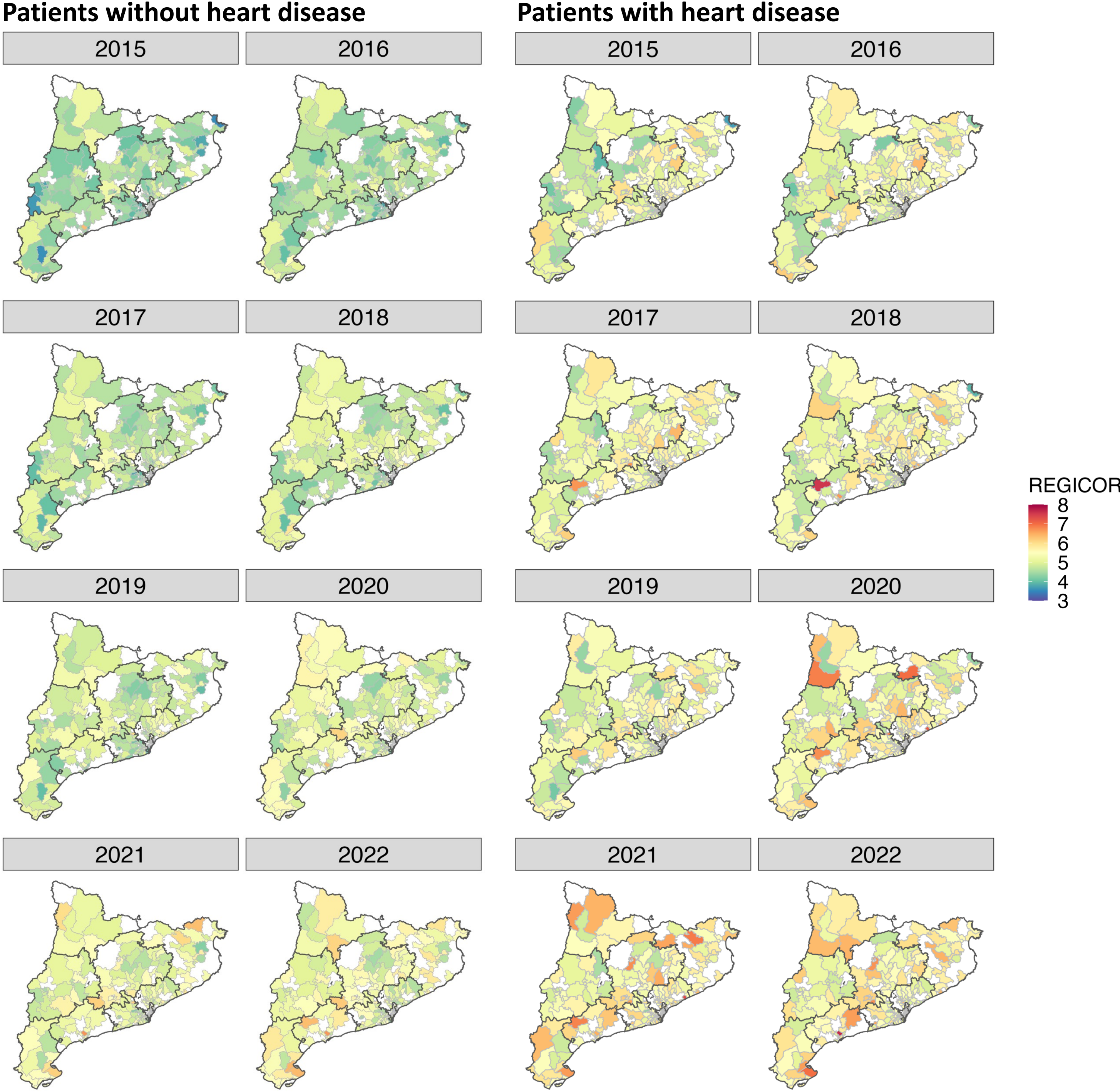
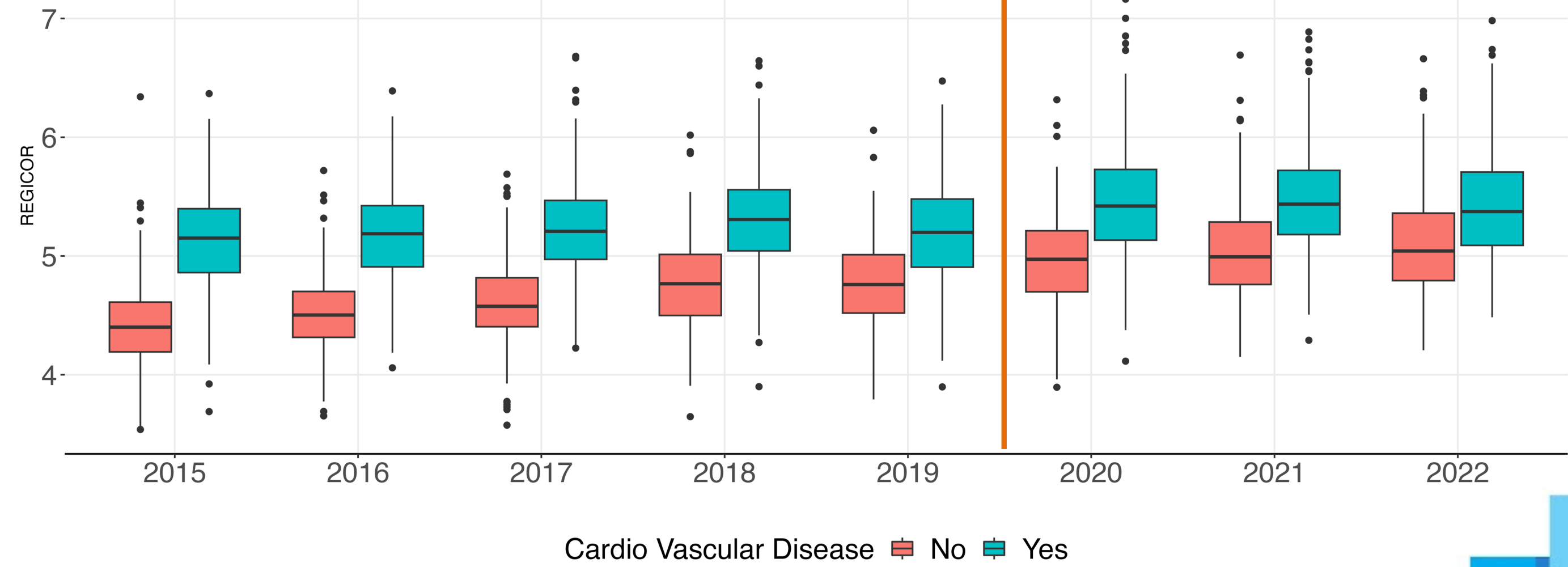
Table 1	Hearth Disease	No Hearth Disease	Table 2	
(N=417692)	(N=127553)	(N=290139)	Hearth Disease	(N=127553)
Gender : Male	71 100 (55.7%)	131 827 (45.4%)	Diagnosis Year	
Age Group			<2015	8 874 (7.0%)
35-44	2 387 (1.9%)	6 546 (2.3%)	2015	18 293 (14.3%)
45-54	16 310 (12.8%)	36 066 (12.4%)	2016	16 718 (13.1%)
55-64	39 597 (31.0%)	88 647 (30.6%)	2017	15 917 (12.5%)
65-74	55 655 (43.6%)	128 437 (44.3%)	2018	15 296 (12.0%)
75-84	13 599 (10.7%)	30 424 (10.5%)	2019	14 950 (11.7%)
85+	4 (0.0%)	16 (0.0%)	2020	9 146 (7.2%)
			2021	14 328 (11.2%)
Income Category (N=407506)			2022	14 031 (11.0%)
Groups exempt from contribution	25 387 (20.4%)	58 195 (20.6%)	Age at Diagnosis	
Pensioners - income < €18,000	27 532 (22.1%)	59 193 (20.9%)	0-15	5 (0.0%)
Pensioners - income range €18,000 - 100,000	29 104 (23.3%)	66 872 (23.6%)	16-24	24 (0.0%)
Pensioners - income > €100,000	475 (0.4%)	1 015 (0.4%)	25-34	479 (0.4%)
Workers - income < €18,000	24 233 (19.4%)	55 507 (19.6%)	35-44	8 036 (6.3%)
Workers - income range €18,000 - 100,000	16 821 (13.5%)	39 393 (13.9%)	45-54	28 705 (22.5%)
Others - income range €18,000 - 100,000	676 (0.5%)	1 737 (0.6%)	55-64	47 290 (37.1%)
Workers - income > €100,000	431 (0.3%)	934 (0.3%)	65-74	40 734 (31.9%)
			75-84	2 279 (1.8%)
			85+	1 (0.0%)



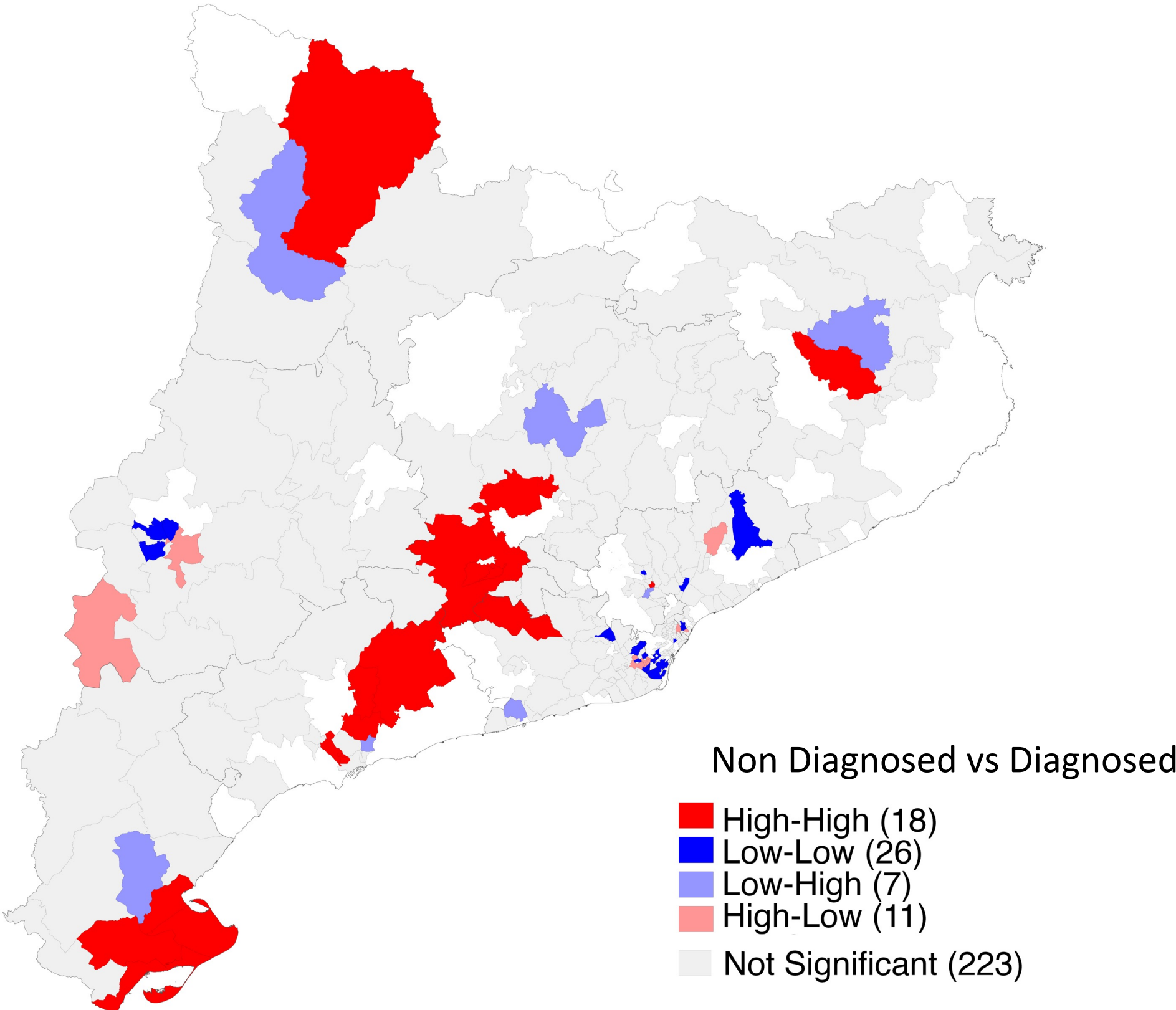
Results

The hypothesis of the increase in the risk of cardiovascular disease is explored both in time and space. Figure 2 shows the distribution of the average REGICOR scores calculated each year of observation. As displayed, the distribution of individuals without vascular disease tends to go up and year 2022 is where the less distance between the medians of both groups is seen.

Both space-time interaction of the average REGICOR index score is displayed for the group of individuals free of cardiovascular disease and those who were diagnosed.



Patients without heart disease have had in general lower levels of REGICOR than patients with heart disease. However, levels increased north and south of Catalonia more noticeably after 2020. These results hint the existence of geographical interactions in the REGICOR distribution. Anselin (1995), proposed the Local Indicators of Spatial Autocorrelation (LISA). They help to inspect the existence of significative spatial autocorrelation in the event under study. Figure 4 is the result of applying the univariate concept of LISA to a bivariate case where the 2022 records for diagnosed and non-diagnosed patients were analysed for clusters. Thus, providing locations of higher cardiovascular risk for the population.



Discussion:

Exploratory results corroborate the hypothesis of spatio-temporal interactions in the risk increase for cardiovascular diseases related to the pandemic period.

Technical considerations regarding the use and calculation of REGICOR must be considered, like gender and ethnic disparities in its predictive efficacy for example.

A Bayesian approach using INLA to implement a non-separable spatio-temporal modelling is under investigation for a large set of variables and patients. Inseparability has been an often-omitted assumption about COVID-19 behavior in the literature.

References:

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