

Supporting information for "On the use of adaptive spatial weight matrices from
disease mapping multivariate analyses"

Francisca Corpas-Burgos

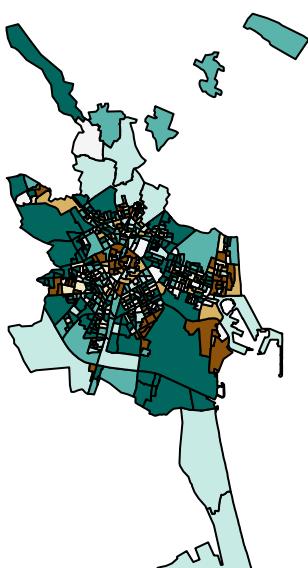
Miguel A. Martinez-Beneito

Fundación para el Fomento de la Investigación Sanitaria y Biomédica de la Comunidad
Valenciana (FISABIO). Av. Cataluña, 21-46020 Valencia, Spain.

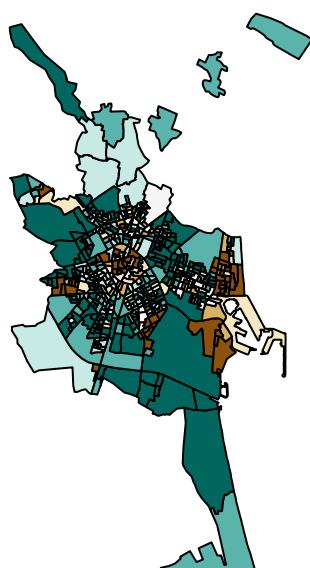
1. Standardized Mortality Ratios for studied mortality causes in Valencia estimated with the BYM (upper row) and Leroux (lower row) models and with spatial weights matrices of either unitary weights (left) or using the values obtained from the multivariate analysis of 14 diseases (all mortality causes of study except the evaluated cause) (right).

AIDS

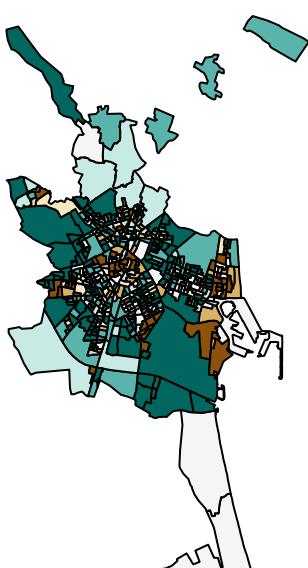
BYM model



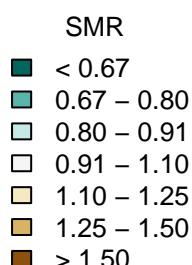
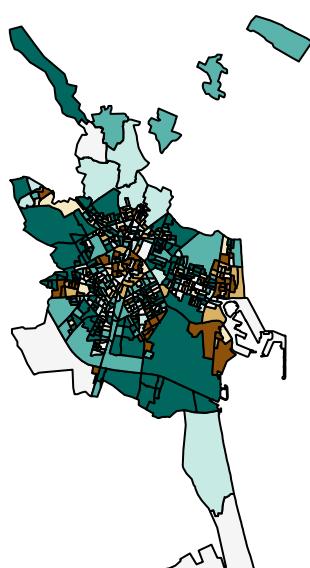
Adaptive BYM model



Leroux model

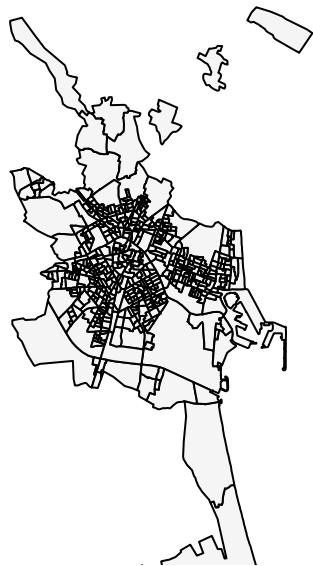


Adaptive Leroux model

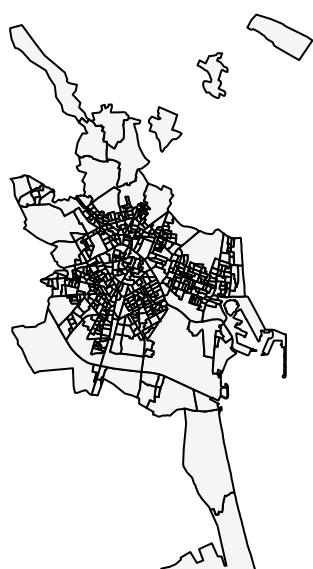


Stomach cancer

BYM model



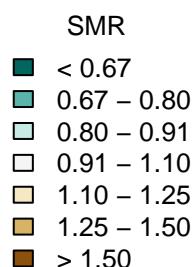
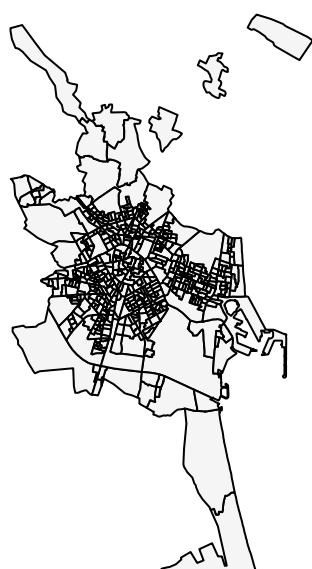
Leroux model



Adaptive BYM model

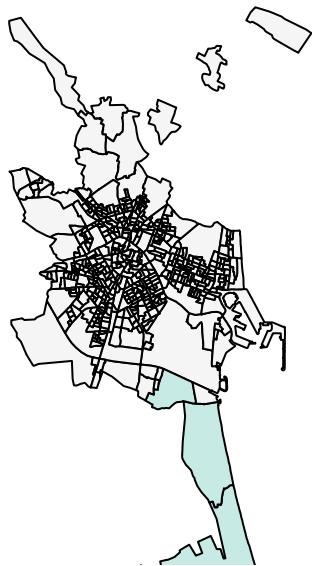


Adaptive Leroux model

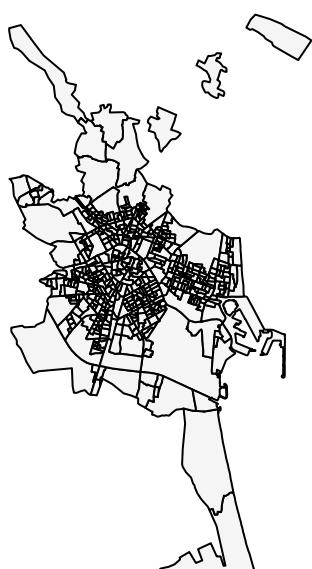


Colorectal cancer

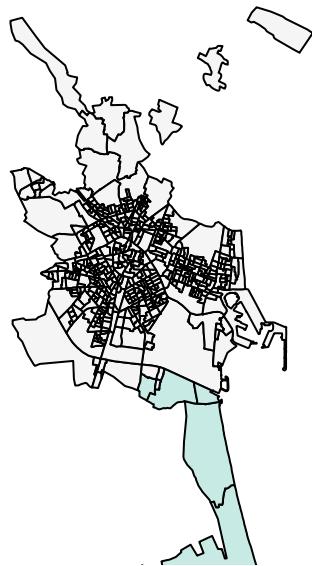
BYM model



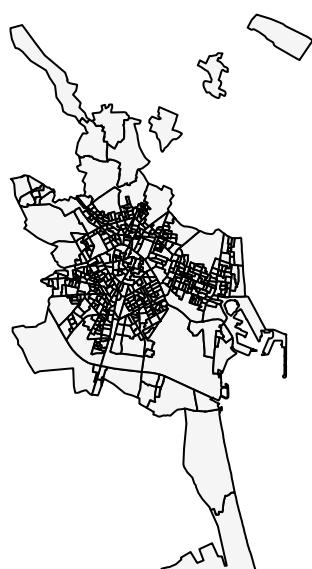
Leroux model



Adaptive BYM model



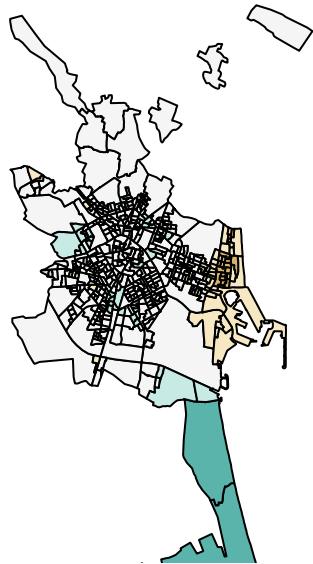
Adaptive Leroux model



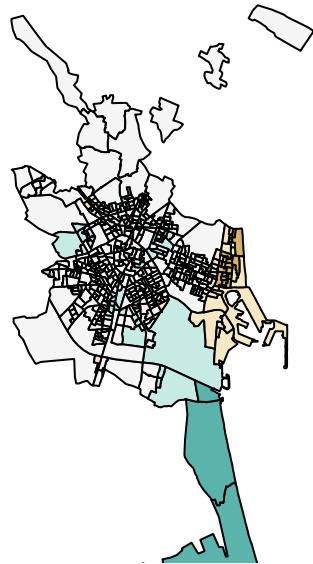
SMR	
■	< 0.67
■	0.67 – 0.80
■	0.80 – 0.91
□	0.91 – 1.10
□	1.10 – 1.25
■	1.25 – 1.50
■	> 1.50

Lung cancer

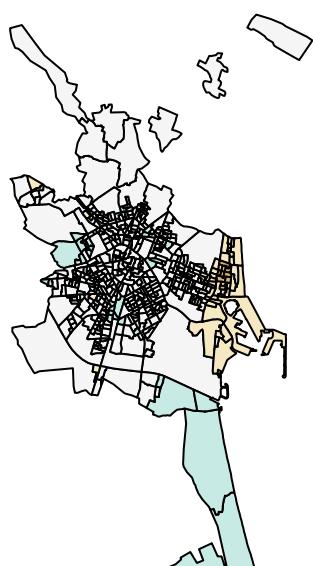
BYM model



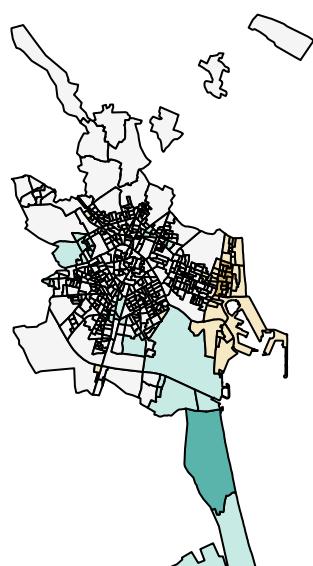
Adaptive BYM model



Leroux model



Adaptive Leroux model



Prostate cancer

BYM model



Leroux model



Adaptive BYM model

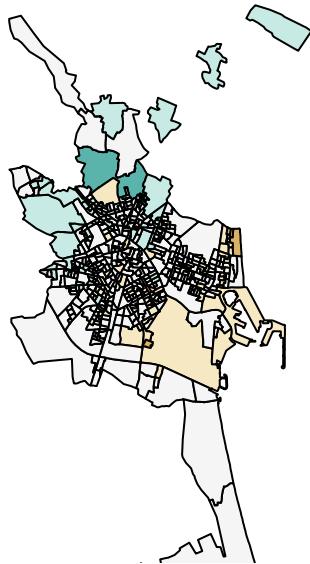


Adaptive Leroux model

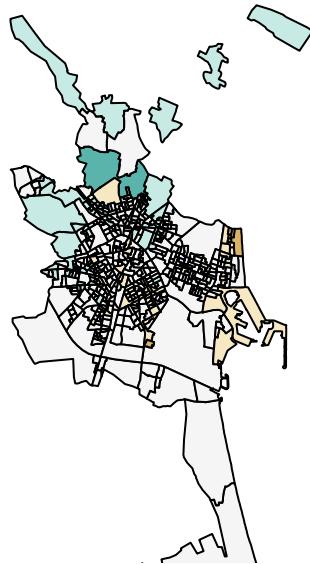


Bladder cancer

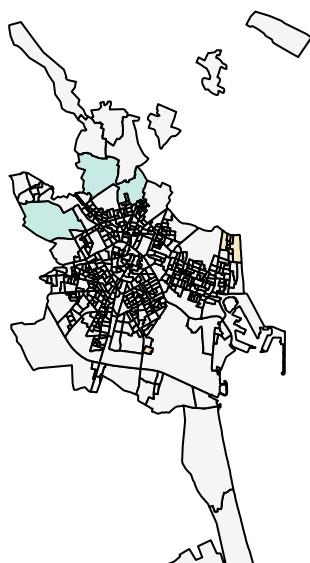
BYM model



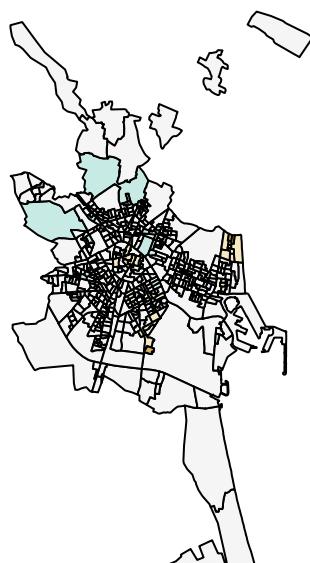
Adaptive BYM model



Leroux model



Adaptive Leroux model



Hematological cancer

BYM model



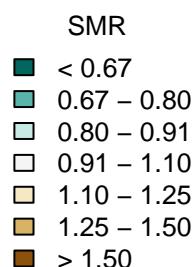
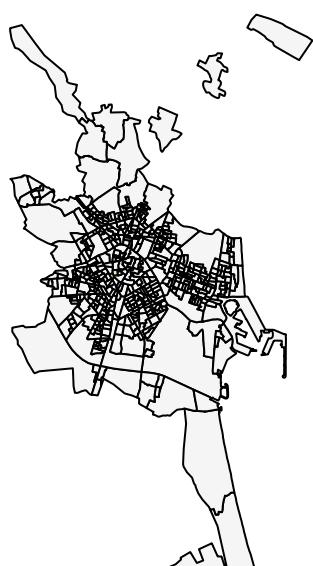
Adaptive BYM model



Leroux model

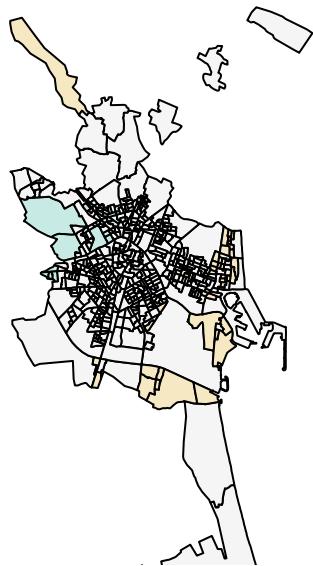


Adaptive Leroux model

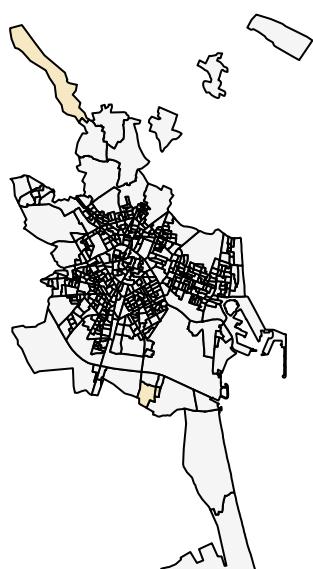


Mellitus diabetes

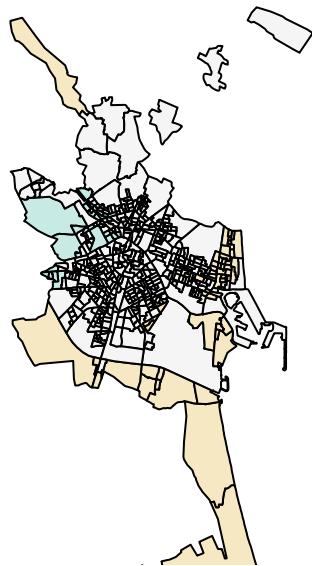
BYM model



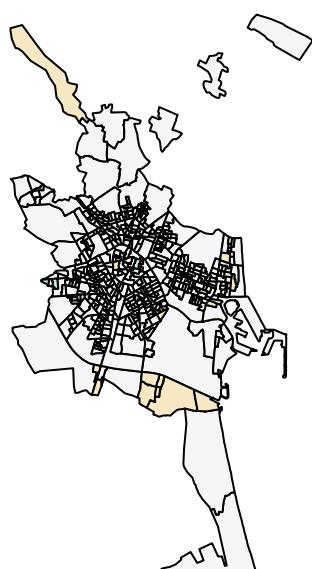
Leroux model



Adaptive BYM model

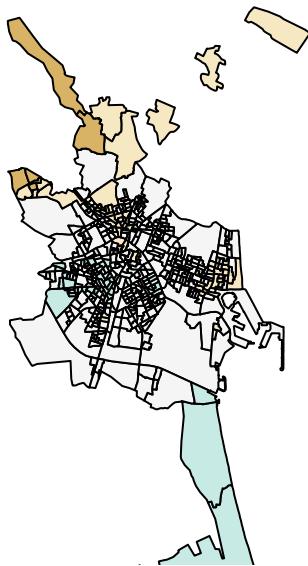


Adaptive Leroux model

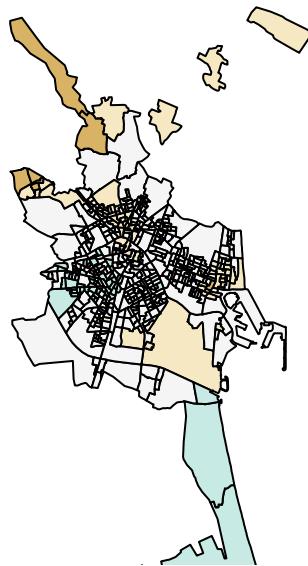


Dementia

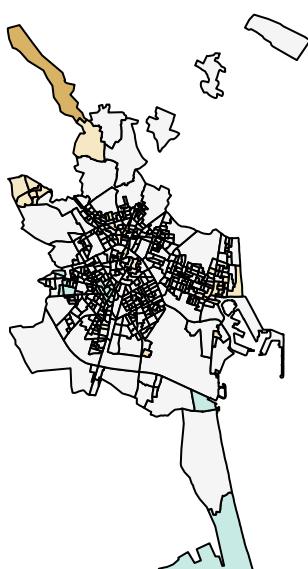
BYM model



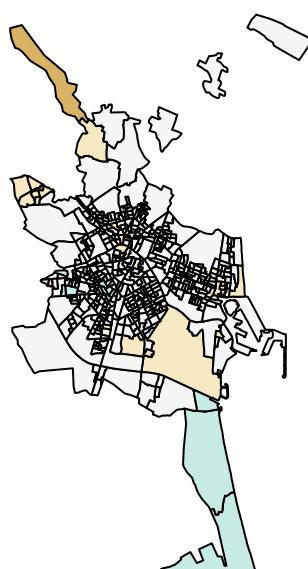
Adaptive BYM model



Leroux model

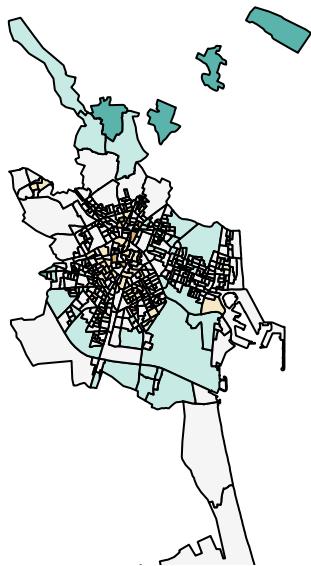


Adaptive Leroux model

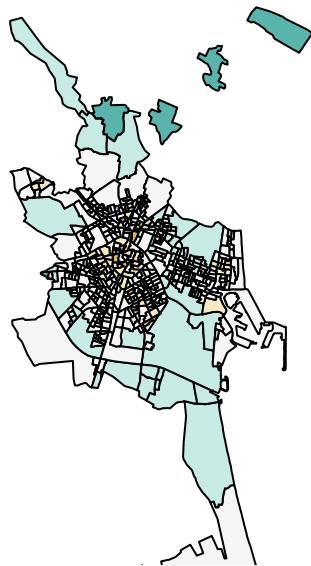


Ischemic heart disease

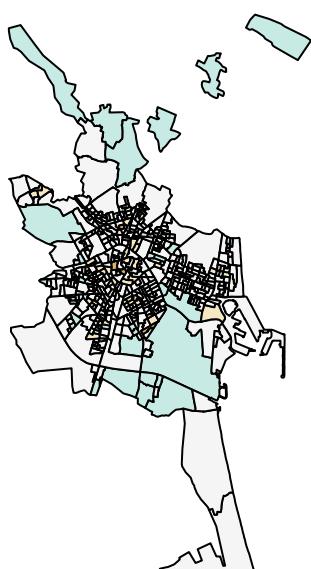
BYM model



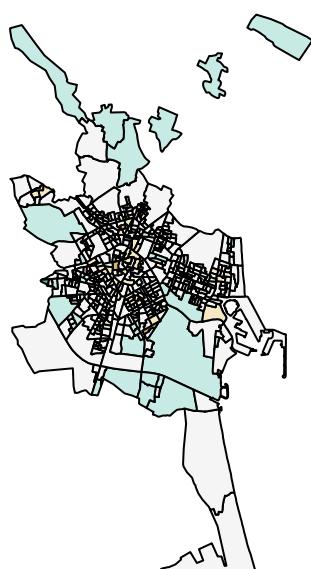
Adaptive BYM model



Leroux model

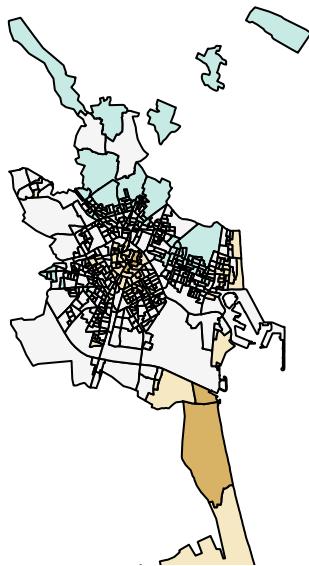
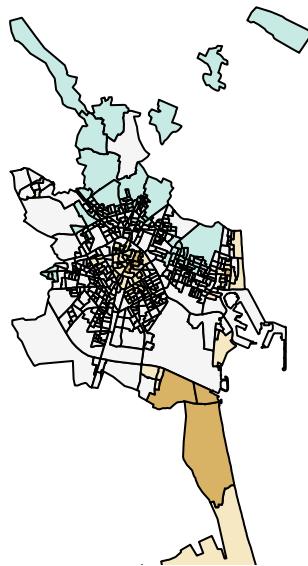
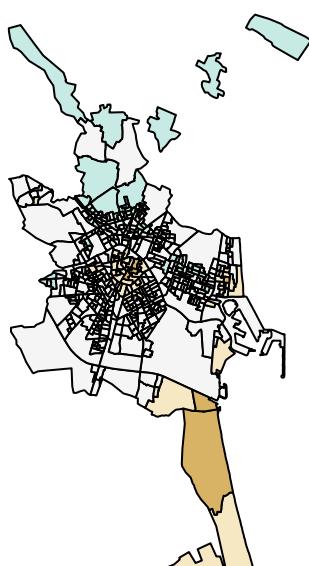
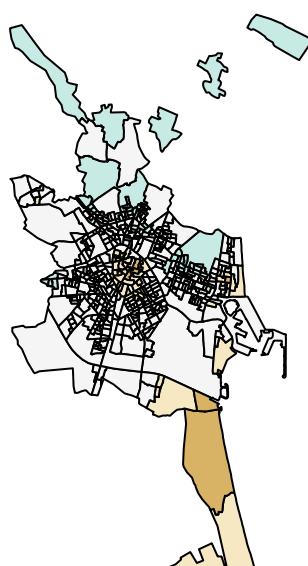


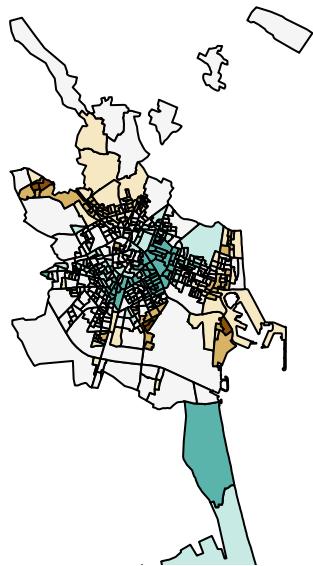
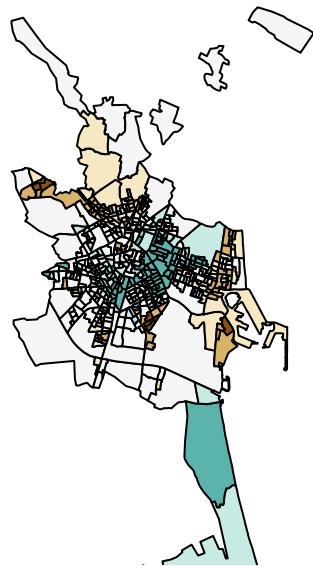
Adaptive Leroux model



SMR

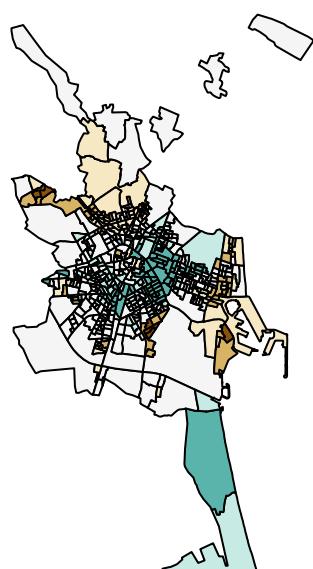
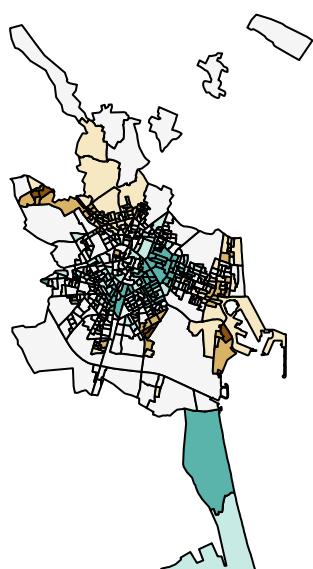
- < 0.67
- 0.67 – 0.80
- 0.80 – 0.91
- 0.91 – 1.10
- 1.10 – 1.25
- 1.25 – 1.50
- > 1.50

Ictus**BYM model****Adaptive BYM model****Leroux model****Adaptive Leroux model**

COPD**BYM model****Adaptive BYM model****Leroux model**

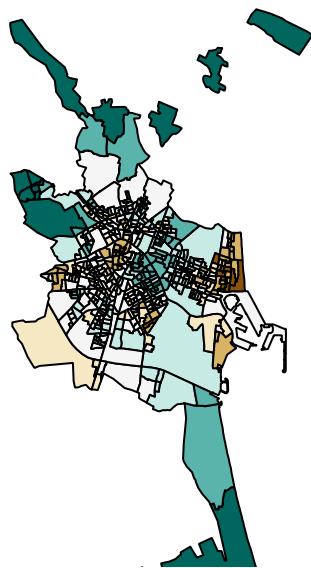
SMR

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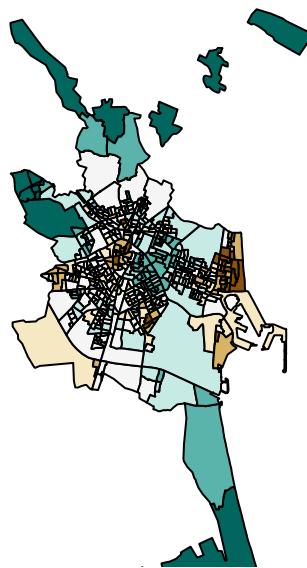
Adaptive Leroux model

Liver cirrhosis

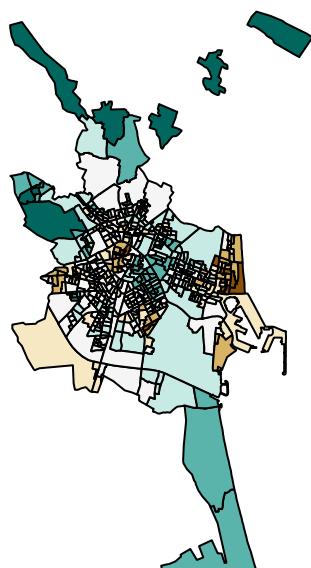
BYM model



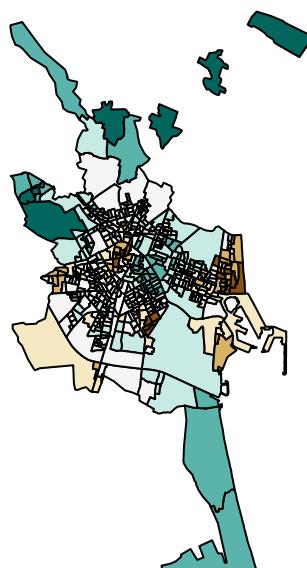
Adaptive BYM model



Leroux model

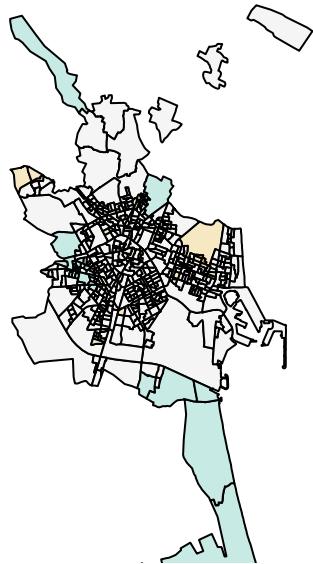


Adaptive Leroux model

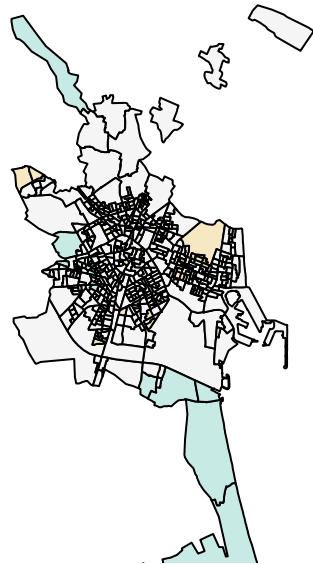


Suicides

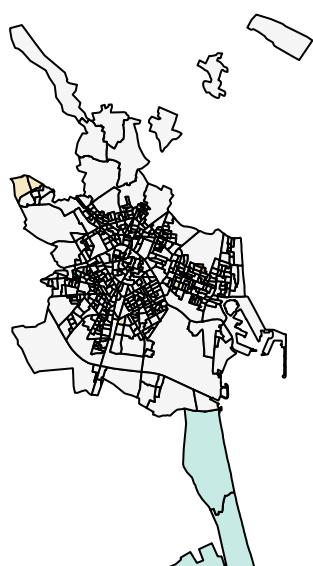
BYM model



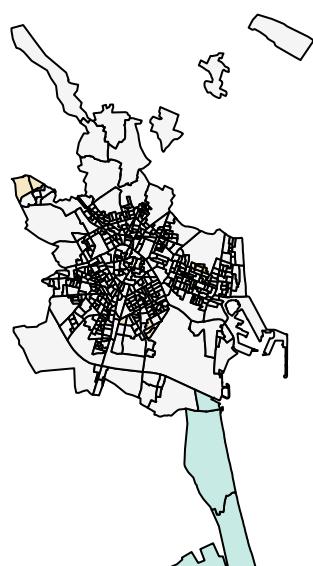
Adaptive BYM model



Leroux model

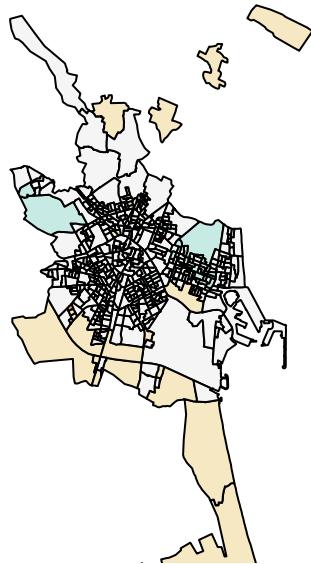


Adaptive Leroux model

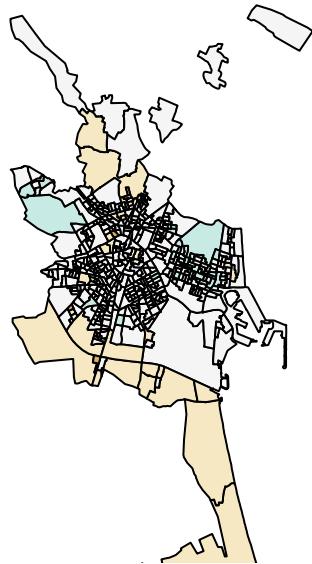


Traffic accidents

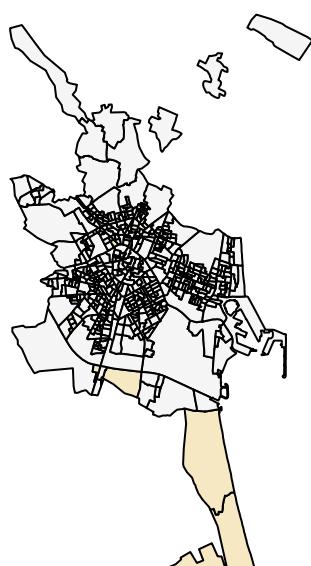
BYM model



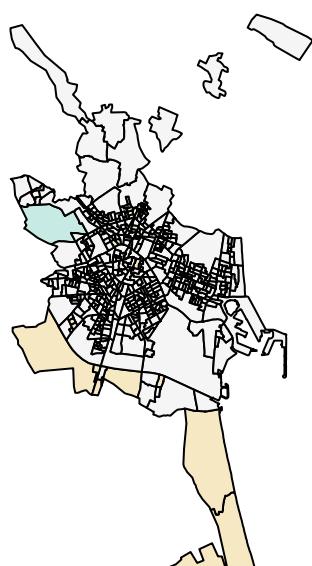
Adaptive BYM model



Leroux model



Adaptive Leroux model



2. Mean absolute difference for the risks of the adjacency and adaptive BYM models as a function of the magnitude of the corresponding spatial weights. The spatial weights matrix for each disease is that estimated with 14 diseases, excluding that particular disease.

	Low spatial weight (5%)	Medium spatial weight (90%)	High spatial weight (5%)
AIDS	0.218	0.087	0.099
Stomach cancer	0.007	0.006	0.008
Colorectal cancer	0.004	0.004	0.007
Lung cancer	0.013	0.006	0.008
Prostate cancer	0.006	0.004	0.003
Bladder cancer	0.007	0.008	0.011
Hematological cancer	0.005	0.005	0.007
Mellitus diabetes	0.009	0.008	0.017
Dementia	0.012	0.007	0.010
Ischemic heart disease	0.014	0.010	0.014
Ictus	0.011	0.006	0.016
COPD	0.037	0.011	0.014
Liver cirrhosis	0.031	0.016	0.021
Suicides	0.011	0.009	0.013
Traffic accidents	0.012	0.010	0.017
Median	0.011	0.008	0.013
Mean	0.027	0.013	0.018

3. Mean absolute difference for the risks of each spatial unit and the mean risk for their neighbors, for the adjacency and adaptive BYM models, as a function of the magnitude of the corresponding spatial weights. The spatial weights matrix for each disease is that estimated with 14 diseases, excluding that particular disease.

	Low spatial weight (5%)		High spatial weight (5%)	
	Adjacency BYM model	Adaptive BYM model	Adjacency BYM model	Adaptive BYM model
AIDS	1.641	1.692	0.433	0.368
Stomach cancer	0.019	0.021	0.016	0.016
Colorectal cancer	0.015	0.016	0.014	0.016
Lung cancer	0.037	0.048	0.025	0.024
Prostate cancer	0.012	0.015	0.013	0.012
Bladder cancer	0.061	0.063	0.052	0.051
Hematological cancer	0.022	0.024	0.020	0.020
Mellitus diabetes	0.021	0.026	0.020	0.021
Dementia	0.042	0.049	0.034	0.034
Ischemic heart disease	0.111	0.112	0.056	0.049
Ictus	0.032	0.039	0.027	0.027
COPD	0.096	0.133	0.060	0.060
Liver cirrhosis	0.110	0.134	0.084	0.079
Suicides	0.043	0.044	0.039	0.038
Traffic accidents	0.046	0.054	0.035	0.039
Median	0.042	0.048	0.034	0.034
Mean	0.154	0.165	0.062	0.057

4. Estimated spatial weights c_i for each municipality of Spain according to all 18 diseases in the data set. Choropleth map corresponds to either BYM model for the log-relative risks.

Adaptive BYM model

