

Annex B.

Additional results to the paper:

“Some findings on zero-inflated and hurdle Poisson models for disease mapping”

Francisca Corpas-Burgos

Fundación para el Fomento de la Investigación Sanitaria y Biomedica
de la Comunidad Valenciana (FISABIO), Valencia, Spain

Gonzalo García-Donato

Departamento de Análisis Económico y Finanzas,
Universidad de Castilla la Mancha, Albacete, Spain

Miguel A. Martinez-Beneito

Fundación para el Fomento de la Investigación Sanitaria y Biomedica
de la Comunidad Valenciana (FISABIO), Valencia, Spain and
CIBER de Epidemiología y Salud Pública (CIBERESP), Madrid, Spain

Table 1: Observed and predicted zeroes for models in Section 2.

Table 1: Observed zeroes for each data set and posterior predicted zeroes for each model. Values in the Obs. zeroes column correspond to the real observed zeroes for each data set. For the 3 columns on the right, numbers correspond to the posterior predictive median for this same quantity for each model run and the corresponding unilateral 95% posterior predictive interval. Bold fonts denote those combinations of models and data sets evidencing zero excesses according to their predictive intervals.

Sex & Cause	Obs. zeroes	BYM	ZIP	Hurdle
(Men, All tumours)	4	2 [0,5]	3 [0,5]	5 [0,11]
(Women, All tumours)	7	6 [0,10]	6 [0,10]	8 [0,15]
(Men, Mouth)	216	196 [0,211]	199 [0,215]	216 [0,242]
(Men, Stomach)	105	91 [0,103]	92 [0,104]	105 [0,127]
(Women, Stomach)	150	137 [0,151]	138 [0,152]	150 [0,173]
(Men, Colorectal)	73	58 [0,68]	59 [0,69]	74 [0,93]
(Women, Colorectal)	74	72 [0,82]	73 [0,83]	74 [0,93]
(Men, Colon)	96	79 [0,91]	84 [0,96]	96 [0,119]
(Women, Colon)	98	91 [0,102]	92 [0,104]	99 [0,119]
(Men, Rectum)	201	180 [0,196]	183 [0,199]	202 [0,228]
(Women, Rectum)	234	223 [0,239]	225 [0,242]	235 [0,262]
(Men, Liver)	156	138 [0,153]	139 [0,153]	157 [0,182]
(Women, Liver)	188	176 [0,191]	178 [0,193]	188 [0,214]
(Women, Vesicle)	243	239 [0,255]	241 [0,256]	244 [0,270]
(Men, Pancreas)	179	163 [0,178]	165 [0,181]	179 [0,205]
(Women, Pancreas)	194	180 [0,196]	184 [0,201]	194 [0,220]

Sex & Cause	Obs. zeroes	BYM	ZIP	Hurdle
(Men, Larynx)	214	186 [0,203]	187 [0,203]	214 [0,240]
(Men, Lung)	34	25 [0,32]	25 [0,33]	34 [0,47]
(Women, Lung)	199	188 [0,203]	189 [0,205]	199 [0,224]
(Women, Breast)	80	73 [0,85]	74 [0,85]	80 [0,101]
(Women, Uterus)	188	187 [0,201]	188 [0,204]	188 [0,215]
(Women, Ovary)	201	195 [0,210]	195 [0,211]	202 [0,227]
(Men, Prostate)	62	51 [0,60]	53 [0,63]	63 [0,81]
(Men, Bladder)	123	104 [0,117]	105 [0,119]	124 [0,146]
(Men, Lymphatic)	176	168 [0,183]	170 [0,184]	176 [0,201]
(Women, Lymphatic)	213	185 [0,201]	191 [0,207]	213 [0,240]
(Men, Leukemia)	196	179 [0,193]	182 [0,197]	196 [0,222]
(Women, Leukemia)	210	223 [0,240]	226 [0,241]	209 [0,236]
(Men, Diabetes)	97	82 [0,94]	83 [0,95]	97 [0,121]
(Women, Diabetes)	56	46 [0,56]	49 [0,59]	56 [0,74]
(Men, Hypertensive)	171	157 [0,171]	159 [0,175]	172 [0,197]
(Women, Hypertensive)	116	104 [0,117]	107 [0,120]	117 [0,136]
(Men, Ischemic)	8	8 [0,12]	8 [0,12]	8 [0,17]
(Women, Ischemic)	21	16 [0,22]	16 [0,22]	22 [0,34]
(Men, Cerebrovascular)	9	9 [0,13]	9 [0,13]	9 [0,17]
(Women, Cerebrovascular)	7	7 [0,11]	7 [0,10]	8 [0,16]
(Men, Atherosclerosis)	131	128 [0,144]	130 [0,144]	131 [0,155]
(Women, Atherosclerosis)	103	95 [0,109]	99 [0,113]	104 [0,125]
(Men, Other Cardiovascular)	16	12 [0,16]	12 [0,17]	17 [0,28]
(Women, Other Cardiovascular)	7	7 [0,11]	7 [0,11]	7 [0,15]
(Men, Pneumonia)	85	80 [0,93]	81 [0,93]	86 [0,107]
(Women, Pneumonia)	84	86 [0,97]	87 [0,98]	85 [0,105]
(Men, COPD)	27	21 [0,27]	21 [0,28]	27 [0,40]
(Women, COPD)	104	87 [0,99]	90 [0,102]	105 [0,127]
(Men, Cirrhosis)	104	93 [0,106]	95 [0,106]	104 [0,126]
(Women, Cirrhosis)	184	169 [0,184]	171 [0,186]	185 [0,211]

Mortality causes with bold font stand for those causes with zero excesses according to BYM.

Table 2: Observed and predicted zeroes for models in Section 4.

Table 2: Observed zeroes for each data set and posterior predicted zeroes for each model. Values in the Obs. zeroes column correspond to the real observed zeroes for each data set. For the 5 columns on the right, numbers correspond to the posterior predictive median for this same quantity for each model run and the corresponding unilateral 95% posterior predictive interval. Bold fonts denote those combinations of models and data sets evidencing zero excesses according to their predictive intervals.

Sex & Cause	Obs. zeroes	BYM	FE	NFE	HGeo	ZGeo
(Men, All tumours)	4	2 [0,5]	4 [0,8]	4 [0,9]	4 [0,9]	3 [0,7]
(Women, All tumours)	7	6 [0,10]	7 [0,12]	7 [0,12]	6 [0,12]	8 [0,12]
(Men, Mouth)	216	196 [0,211]	216 [0,235]	216 [0,234]	215 [0,234]	210 [0,228]
(Men, Stomach)	105	91 [0,103]	105 [0,121]	105 [0,123]	102 [0,119]	102 [0,117]
(Women, Stomach)	150	137 [0,151]	150 [0,169]	150 [0,169]	149 [0,168]	148 [0,163]
(Men, Colorectal)	73	58 [0,68]	73 [0,87]	73 [0,88]	70 [0,85]	71 [0,85]
(Women, Colorectal)	74	72 [0,82]	74 [0,89]	74 [0,89]	74 [0,88]	77 [0,89]
(Men, Colon)	96	79 [0,91]	95 [0,113]	96 [0,111]	98 [0,113]	90 [0,106]
(Women, Colon)	98	91 [0,102]	98 [0,114]	98 [0,115]	93 [0,110]	101 [0,114]
(Men, Rectum)	201	180 [0,196]	201 [0,220]	201 [0,220]	199 [0,220]	199 [0,215]

Sex & Cause	Obs. zeroes	BYM	FE	NFE	HGeo	ZGeo
(Women, Rectum)	234	223 [0,239]	234 [0,255]	234 [0,255]	235 [0,255]	231 [0,248]
(Men, Liver)	156	138 [0,153]	157 [0,173]	157 [0,175]	152 [0,171]	155 [0,171]
(Women, Liver)	188	176 [0,191]	188 [0,208]	188 [0,206]	185 [0,204]	188 [0,205]
(Women, Vesicle)	243	239 [0,255]	243 [0,263]	243 [0,262]	241 [0,261]	248 [0,265]
(Men, Pancreas)	179	163 [0,178]	180 [0,197]	179 [0,199]	177 [0,196]	179 [0,195]
(Women, Pancreas)	194	180 [0,196]	194 [0,214]	193 [0,213]	196 [0,215]	191 [0,207]
(Men, Larynx)	214	186 [0,203]	214 [0,234]	214 [0,233]	206 [0,226]	214 [0,229]
(Men, Lung)	34	25 [0,32]	34 [0,45]	33 [0,45]	33 [0,44]	30 [0,39]
(Women, Lung)	199	188 [0,203]	198 [0,218]	200 [0,218]	198 [0,217]	196 [0,213]
(Women, Breast)	80	73 [0,85]	80 [0,94]	80 [0,95]	78 [0,93]	81 [0,93]
(Women, Uterus)	188	187 [0,201]	187 [0,208]	189 [0,209]	190 [0,210]	193 [0,208]
(Women, Ovary)	201	195 [0,210]	201 [0,220]	200 [0,221]	196 [0,217]	208 [0,224]
(Men, Prostate)	62	51 [0,60]	62 [0,76]	62 [0,75]	64 [0,77]	58 [0,71]
(Men, Bladder)	123	104 [0,117]	124 [0,141]	123 [0,141]	122 [0,139]	120 [0,135]
(Men, Lymphatic)	176	168 [0,183]	175 [0,195]	176 [0,194]	174 [0,194]	179 [0,195]
(Women, Lymphatic)	213	185 [0,201]	213 [0,232]	213 [0,232]	211 [0,232]	208 [0,225]
(Men, Leukemia)	196	179 [0,193]	196 [0,217]	196 [0,216]	195 [0,216]	192 [0,210]
(Women, Leukemia)	210	223 [0,240]	210 [0,230]	210 [0,231]	211 [0,230]	231 [0,247]
(Men, Diabetes)	97	82 [0,94]	97 [0,114]	97 [0,113]	95 [0,111]	95 [0,109]
(Women, Diabetes)	56	46 [0,56]	56 [0,70]	56 [0,69]	58 [0,72]	52 [0,63]
(Men, Hypertensive)	171	157 [0,171]	171 [0,191]	170 [0,192]	172 [0,190]	167 [0,183]
(Women, Hypertensive)	116	104 [0,117]	116 [0,133]	116 [0,133]	118 [0,136]	113 [0,128]
(Men, Ischemic)	8	8 [0,12]	7 [0,14]	8 [0,14]	7 [0,13]	9 [0,14]
(Women, Ischemic)	21	16 [0,22]	20 [0,29]	20 [0,30]	20 [0,29]	20 [0,27]
(Men, Cerebrovascular)	9	9 [0,13]	9 [0,15]	9 [0,15]	9 [0,15]	10 [0,14]
(Women, Cerebrovascular)	7	7 [0,11]	7 [0,12]	7 [0,12]	6 [0,11]	8 [0,12]
(Men, Atherosclerosis)	131	128 [0,144]	131 [0,151]	130 [0,149]	137 [0,156]	133 [0,148]
(Women, Atherosclerosis)	103	95 [0,109]	103 [0,121]	103 [0,119]	114 [0,132]	100 [0,113]
(Men, Other Cardiovascular)	16	12 [0,16]	16 [0,24]	16 [0,23]	16 [0,24]	14 [0,20]
(Women, Other Cardiovascular)	7	7 [0,11]	7 [0,12]	7 [0,12]	6 [0,11]	8 [0,12]
(Men, Pneumonia)	85	80 [0,93]	84 [0,98]	84 [0,100]	83 [0,98]	88 [0,99]
(Women, Pneumonia)	84	86 [0,97]	84 [0,100]	83 [0,100]	86 [0,103]	89 [0,101]
(Men, COPD)	27	21 [0,27]	27 [0,37]	27 [0,37]	28 [0,37]	25 [0,33]
(Women, COPD)	104	87 [0,99]	104 [0,121]	104 [0,120]	105 [0,122]	100 [0,115]
(Men, Cirrhosis)	104	93 [0,106]	104 [0,121]	103 [0,120]	103 [0,121]	101 [0,115]
(Women, Cirrhosis)	184	169 [0,184]	184 [0,205]	184 [0,204]	184 [0,203]	180 [0,199]

Mortality causes with bold font stand for those causes with zero excesses according to BYM.

Table 3: Model selection criteria (DIC) for models in Section 4.

Table 3: DICs for all models and data sets with their corresponding deviances and number of effective parameters.

Disease	BYM			FE			NFE			HGeo			ZGeo		
	D	pD	DIC	D	pD	DIC	D	pD	DIC	D	pD	DIC	D	pD	DIC
(Men, All tumours)	3623.3	265.1	3888.4	3629.7	267.1	3896.8	3624.5	267.9	3892.4	3623.2	265.8	3889	3626.4	266.8	3893.2
(Women, All tumours)	3333.8	173.5	3507.3	3338.9	175.1	3513.9	3335.5	175.4	3510.9	3333.8	173.7	3507.5	3334.7	172.5	3507.2
(Men, Mouth)	1575	70.4	1645.5	1605.8	58.2	1664	1578.2	66.4	1644.5	1594.2	58.1	1652.3	1583.6	69.2	1652.8
(Men, Stomach)	2112.5	100.7	2213.2	2126.9	96.7	2223.7	2116	98.1	2214.1	2120.2	95.4	2215.6	2114.5	100	2214.5
(Women, Stomach)	1854.2	54.1	1908.3	1867.3	52.1	1919.3	1854.9	54	1908.8	1858.7	50.8	1909.5	1856.9	53.9	1910.8
(Men, Colorectal)	2343.3	87.9	2431.1	2355.6	85.3	2440.9	2342.3	84.7	2427	2344.1	83.9	2428	2344.7	86.6	2431.3
(Women, Colorectal)	2260.9	80.4	2341.3	2269.7	81.2	2350.8	2261.8	81.2	2343	2263.8	79.9	2343.6	2263.8	81.2	2345
(Men, Colon)	2200.5	73.6	2274.1	2208.8	68.2	2277	2199.8	72.9	2272.7	2200.2	67	2267.2	2205.1	73.5	2278.6
(Women, Colon)	2110.6	63.6	2174.3	2114.8	66	2180.8	2114.6	61	2175.5	2111.8	63.2	2175	2114.2	62.5	2176.7
(Men, Rectum)	1580.5	60.1	1640.6	1584.6	49.8	1634.4	1585.4	53.4	1638.8	1589	49	1637.9	1578.3	54.7	1633
(Women, Rectum)	1458.2	52.5	1510.6	1481.6	43.6	1525.2	1461.8	50.6	1512.4	1470.2	42.8	1513	1465.1	52.6	1517.8
(Men, Liver)	1843.7	123.6	1967.3	1865.4	111.8	1977.3	1848.6	116.5	1965.1	1862.1	109.6	1971.7	1848.3	117.4	1965.7
(Women, Liver)	1649	67.8	1716.7	1670.3	61.9	1732.2	1651.6	66	1717.6	1659.4	59.4	1718.9	1656.7	66.9	1723.5
(Women, Vesicle)	1376.7	45.2	1421.8	1385.9	41.2	1427.1	1378.1	45.9	1424	1383.3	39.3	1422.6	1378.2	45.3	1423.5
(Men, Pancreas)	1701.1	56.6	1757.8	1702.9	51.9	1754.8	1704.2	53.1	1757.2	1704.9	50.6	1755.5	1699.1	54.1	1753.2
(Women, Pancreas)	1644.4	33.4	1677.7	1656.5	24.9	1681.4	1647.4	30.9	1678.3	1654.5	24.4	1678.9	1645.8	32.4	1678.2
(Men, Larynx)	1596.3	90.9	1687.2	1616.5	79	1695.5	1598.3	80.6	1678.8	1612.7	78.5	1691.2	1596.5	83.3	1679.8
(Men, Lung)	2869.3	190.1	3059.3	2889.2	186.2	3075.4	2871.5	188.7	3060.2	2884.4	185	3069.4	2871.8	188.7	3060.5
(Women, Lung)	1590.2	66	1656.1	1613	56.1	1669.1	1595.3	62.2	1657.4	1605.9	55.7	1661.6	1594.5	63.7	1658.2
(Women, Breast)	2333.8	95.9	2429.7	2341	93.8	2434.9	2336.3	95.5	2431.8	2341.5	92.3	2433.7	2333.9	95.6	2429.5
(Women, Uterus)	1645.2	66.2	1711.4	1662.8	59.2	1722	1645	68.6	1713.5	1656.3	58.3	1714.6	1650.4	68	1718.4
(Women, Ovary)	1554.9	27.9	1582.8	1559.7	27.3	1586.9	1556.5	27	1583.5	1560.7	26.1	1586.9	1552.1	27.3	1579.5
(Men, Prostate)	2489.2	106.8	2596.1	2500	103.3	2603.3	2487.2	108	2595.3	2494	101.7	2595.7	2492.2	108.1	2600.2
(Men, Bladder)	2041.9	105.8	2147.8	2066.6	94.9	2161.5	2045.4	101.2	2146.6	2060.4	93.7	2154.1	2045.9	102.1	2148.1
(Men, Lymphatic)	1668.9	47.2	1716.1	1678.9	43.4	1722.3	1672.2	45.3	1717.5	1679	41.7	1720.8	1668.9	45.7	1714.6
(Women, Lymphatic)	1548.3	31.4	1579.7	1548.9	24.1	1573	1544.6	26.5	1571.1	1548.5	23.7	1572.2	1544.3	28.9	1573.2
(Men, Leukemia)	1608.8	25.1	1633.9	1619.4	22.7	1642.1	1607.8	23.5	1631.3	1611.3	21.3	1632.7	1611.6	25	1636.6
(Women, Leukemia)	1447.5	18.9	1466.5	1446.8	21.7	1468.5	1444.4	21.4	1465.8	1445	20.4	1465.4	1455.6	19.5	1475.1
(Men, Diabetes)	2165.2	115.7	2280.9	2181.9	109.2	2291.1	2168.9	112.5	2281.4	2173.4	109.9	2283.3	2172.9	113	2286
(Women, Diabetes)	2545.6	167.6	2713.1	2565.9	159.1	2725	2547.9	166.8	2714.7	2559.8	158.2	2718	2549.7	165.2	2714.9
(Men, Hypertensive)	1748.9	76.9	1825.7	1774	66.6	1840.6	1749.3	75.1	1824.4	1762.8	65.7	1828.5	1754.4	76.7	1831.1
(Women, Hypertensive)	2064.8	162.5	2227.3	2099.3	146.4	2245.7	2073.7	159.9	2233.5	2094.7	145.1	2239.7	2072.3	161.2	2233.5

Disease	BYM			FE			NFE			HGeo			ZGeo		
	D	pD	DIC	D	pD	DIC	D	pD	DIC	D	pD	DIC	D	pD	DIC
(Men, Ischemic)	3217.4	250.9	3468.3	3223.8	253.6	3477.4	3218.4	252.4	3470.8	3219.1	251.7	3470.8	3218.6	251.4	3470
(Women, Ischemic)	2999	272.8	3271.9	3006.8	271	3277.9	3000.5	272.3	3272.8	3004.3	268.4	3272.7	3000.4	271	3271.4
(Men, Cerebrovascular)	3208	274.9	3482.9	3215.7	276.2	3491.9	3206.1	276.3	3482.4	3210.9	273.7	3484.6	3207.1	274.9	3482
(Women, Cerebrovascular)	3323.8	310.3	3634	3331.5	315.1	3646.6	3325.9	312.5	3638.4	3326	312.9	3638.9	3326.4	310.6	3637
(Men, Atherosclerosis)	1945.2	258.6	2203.8	2006.2	220.8	2227.1	1948.1	253.2	2201.4	2007.8	220	2227.7	1959.2	254.3	2213.5
(Women, Atherosclerosis)	2184.2	299.3	2483.5	2256.3	260.6	2516.9	2189.7	296.5	2486.2	2270	261	2531	2188.1	296	2484.1
(Men, Other Cardiovascular)	3132.1	251.4	3383.5	3143.1	250.2	3393.3	3130.6	252.2	3382.8	3137.6	247.5	3385.2	3132.7	250.7	3383.4
(Women, Other Cardiovascular)	3299.6	304.5	3604.1	3298.3	306.5	3604.8	3301.6	306.2	3607.7	3298	304.6	3602.6	3298	304.6	3602.6
(Men, Pneumonia)	2187.6	117.9	2305.5	2195.1	114.3	2309.4	2193.1	116.2	2309.3	2195.4	114.2	2309.6	2189.4	116.8	2306.2
(Women, Pneumonia)	2172.1	134.6	2306.7	2186.4	127.6	2314.1	2172.9	135.2	2308.1	2185.2	126.4	2311.6	2173.8	134.8	2308.6
(Men, COPD)	2857.5	189.3	3046.8	2871.4	187.2	3058.6	2860.2	188.9	3049.1	2866.2	185.8	3052	2859.2	188.2	3047.4
(Women, COPD)	2177.5	159.6	2337.1	2205.2	142.1	2347.4	2183.8	157.5	2341.2	2198.7	141.2	2339.9	2188.9	153.9	2342.8
(Men, Cirrhosis)	2124	157.7	2281.7	2150.7	148.4	2299.1	2131.6	156.3	2287.8	2141.5	147.9	2289.4	2128.4	156.7	2285.1
(Women, Cirrhosis)	1675.5	150.7	1826.2	1709.9	127.5	1837.5	1683.2	144.6	1827.8	1701.8	128	1829.8	1686	146.4	1832.4

5 Mortality causes with bold font stand for those causes with zero excesses according to BYM.

Table 4: Estimates of γ parameters.

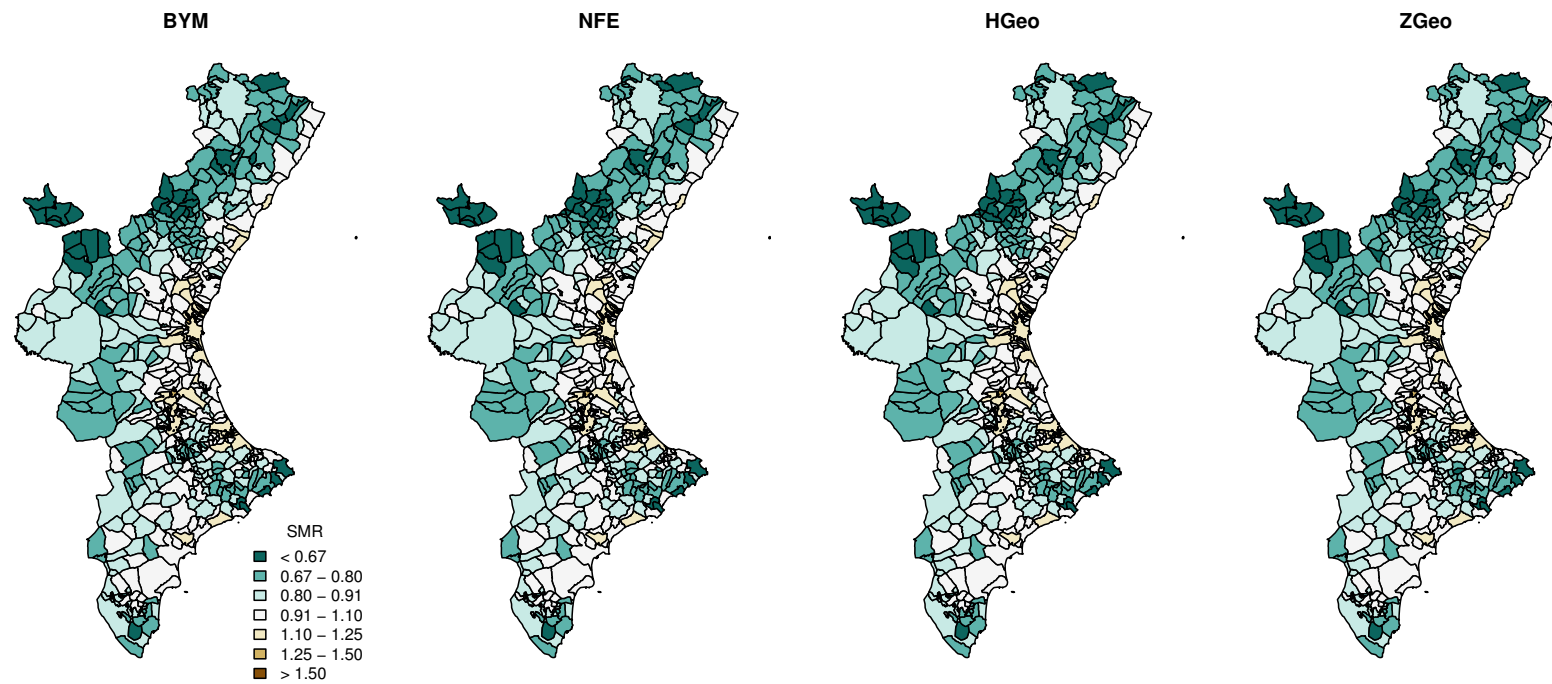
Table 4: Posterior means and 95% credible intervals for parameter γ in the model NFE for each data set.

Sex & Cause	γ
(Men, All tumours)	-0.57 [-1.78 - 0.8]
(Women, All tumours)	-0.08 [-0.98 - 0.97]
(Men, Mouth)	-0.38 [-0.64 - -0.11]
(Men, Stomach)	-0.34 [-0.61 - -0.01]
(Women, Stomach)	-0.23 [-0.51 - 0.02]
(Men, Colorectal)	-0.44 [-0.77 - -0.1]
(Women, Colorectal)	-0.05 [-0.36 - 0.28]
(Men, Colon)	-0.4 [-0.71 - -0.11]
(Women, Colon)	-0.16 [-0.45 - 0.13]
(Men, Rectum)	-0.37 [-0.63 - -0.13]
(Women, Rectum)	-0.19 [-0.44 - 0.06]
(Men, Liver)	-0.4 [-0.67 - -0.12]
(Women, Liver)	-0.2 [-0.46 - 0.05]
(Women, Vesicle)	-0.07 [-0.32 - 0.2]
(Men, Pancreas)	-0.28 [-0.55 - -0.01]
(Women, Pancreas)	-0.23 [-0.49 - 0.02]
(Men, Larynx)	-0.55 [-0.82 - -0.29]
(Men, Lung)	-0.56 [-1.02 - -0.1]
(Women, Lung)	-0.23 [-0.49 - 0.05]
(Women, Breast)	-0.19 [-0.51 - 0.11]
(Women, Uterus)	-0.03 [-0.26 - 0.22]
(Women, Ovary)	-0.09 [-0.34 - 0.14]
(Men, Prostate)	-0.35 [-0.72 - -0.01]
(Men, Bladder)	-0.45 [-0.76 - -0.16]
(Men, Lymphatic)	-0.14 [-0.38 - 0.12]
(Women, Lymphatic)	-0.47 [-0.74 - -0.22]
(Men, Leukemia)	-0.28 [-0.51 - -0.02]
(Women, Leukemia)	0.22 [-0.01 - 0.46]
(Men, Diabetes)	-0.38 [-0.69 - -0.06]
(Women, Diabetes)	-0.36 [-0.73 - 0.01]
(Men, Hypertensive)	-0.25 [-0.51 - 0.01]
(Women, Hypertensive)	-0.27 [-0.56 - 0.05]
(Men, Ischemic)	0.1 [-0.67 - 1.04]
(Women, Ischemic)	-0.43 [-0.98 - 0.15]
(Men, Cerebrovascular)	0 [-0.77 - 0.86]
(Women, Cerebrovascular)	-0.02 [-0.92 - 0.94]
(Men, Atherosclerosis)	-0.08 [-0.4 - 0.27]
(Women, Atherosclerosis)	-0.23 [-0.57 - 0.1]
(Men, Other Cardiovascular)	-0.49 [-1.09 - 0.16]
(Women, Other Cardiovascular)	0.06 [-0.86 - 1.12]
(Men, Pneumonia)	-0.11 [-0.44 - 0.21]
(Women, Pneumonia)	0.05 [-0.29 - 0.37]
(Men, COPD)	-0.45 [-0.95 - 0.06]
(Women, COPD)	-0.43 [-0.71 - -0.13]
(Men, Cirrhosis)	-0.28 [-0.57 - 0.04]
(Women, Cirrhosis)	-0.33 [-0.61 - -0.04]

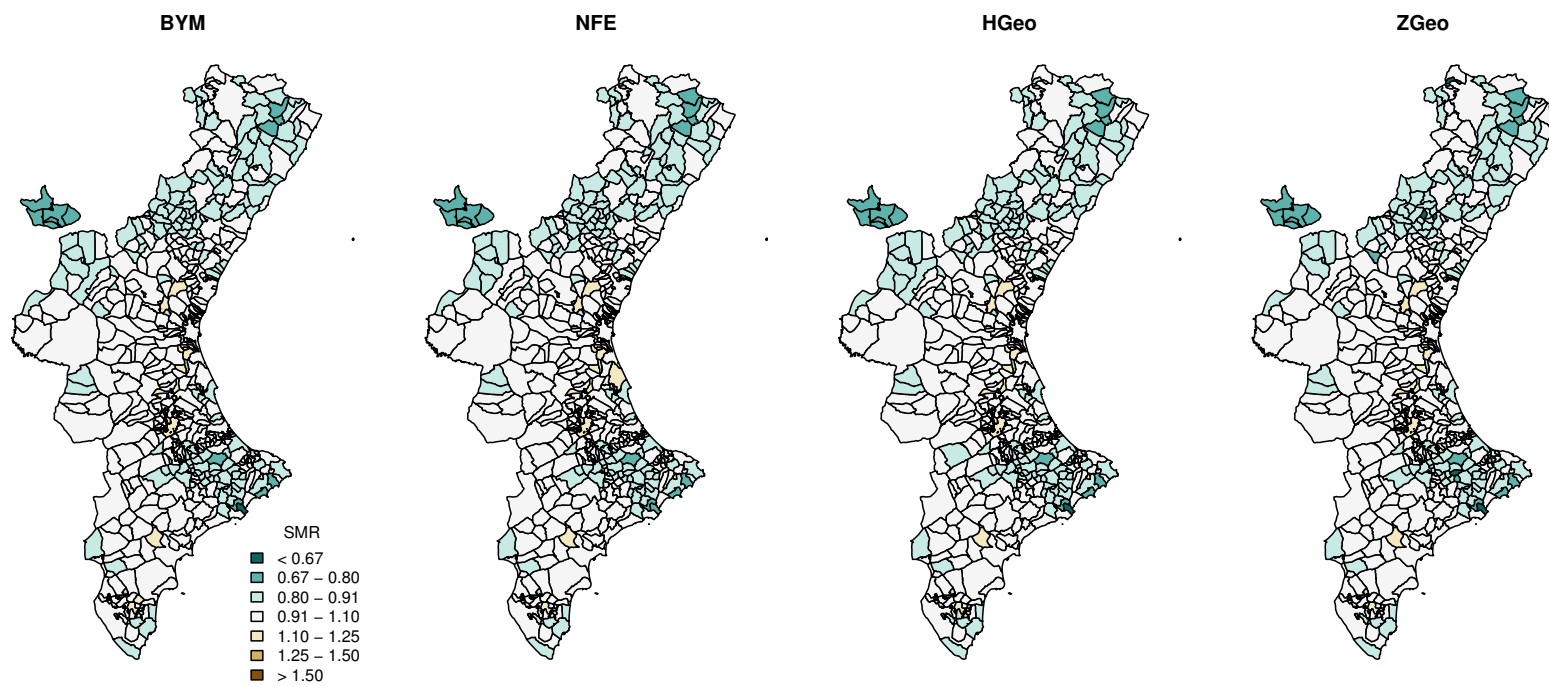
Mortality causes with bold font stand for those causes with zero excesses according to BYM.

Figure 1: Choropleth maps for all models in Section 4 for all causes.

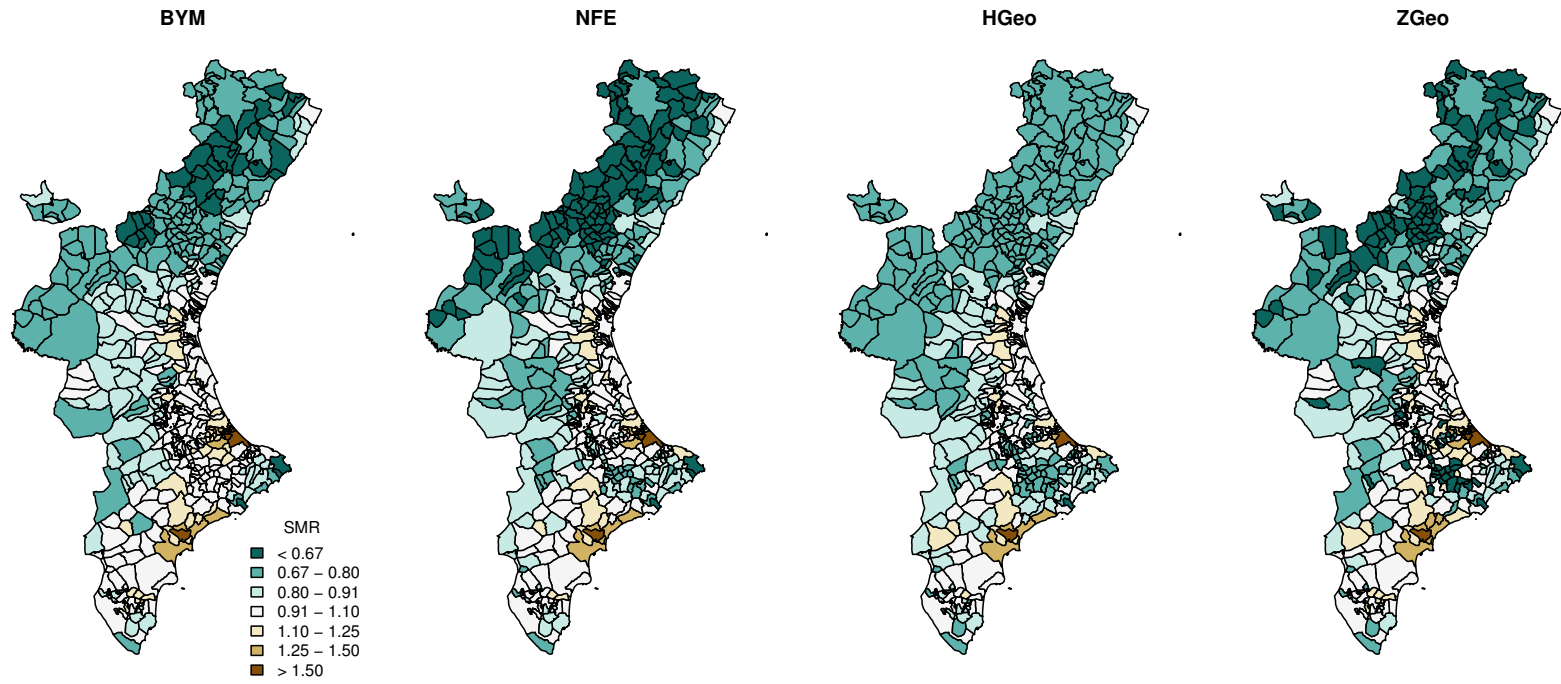
(Men, All tumours)



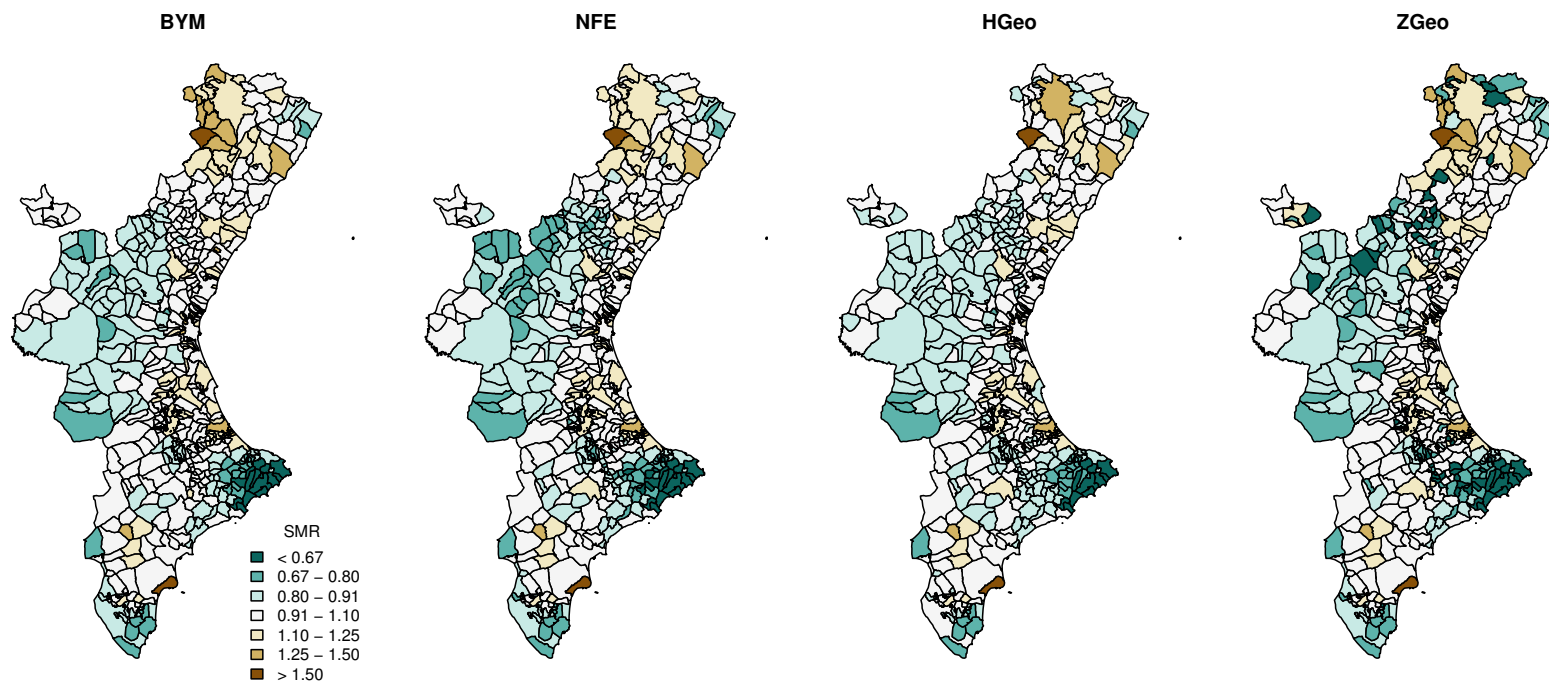
(Women, All tumours)



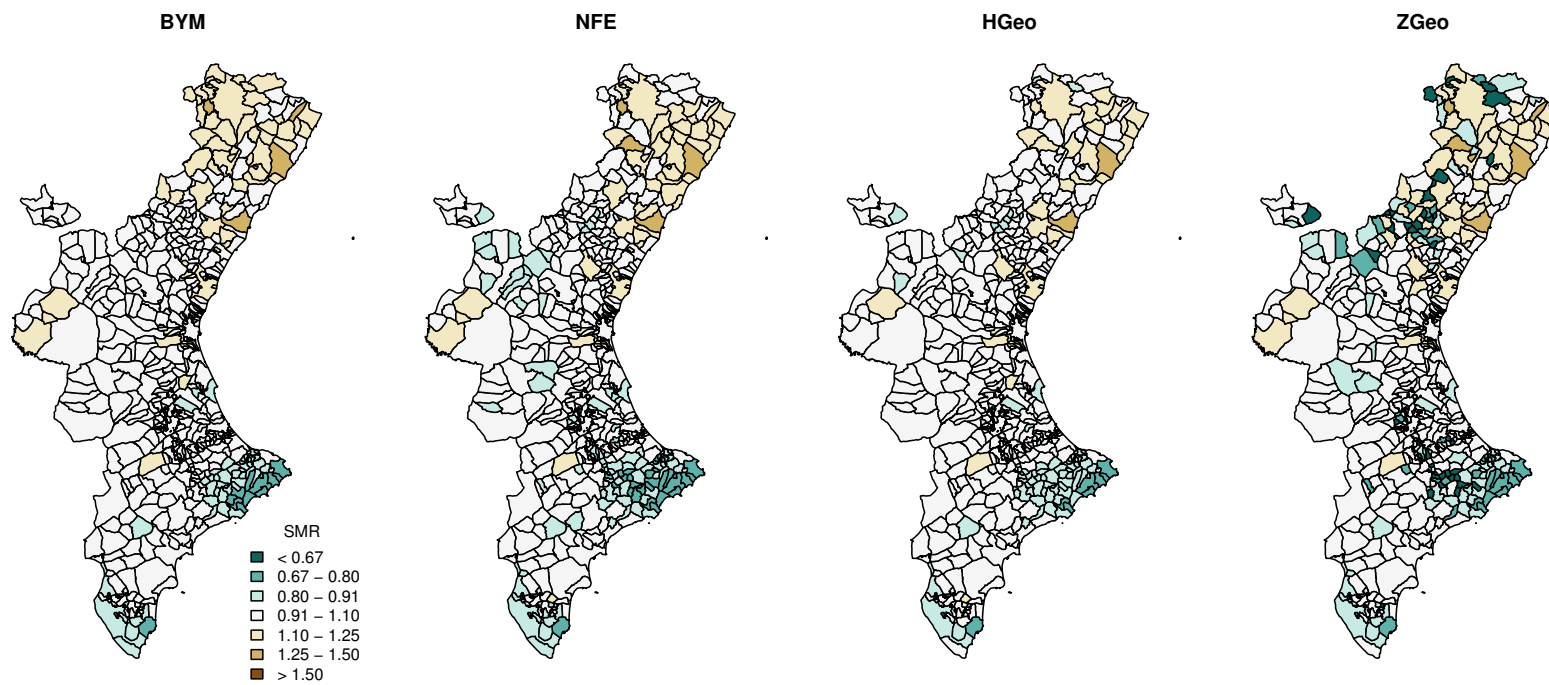
(Men, Mouth)



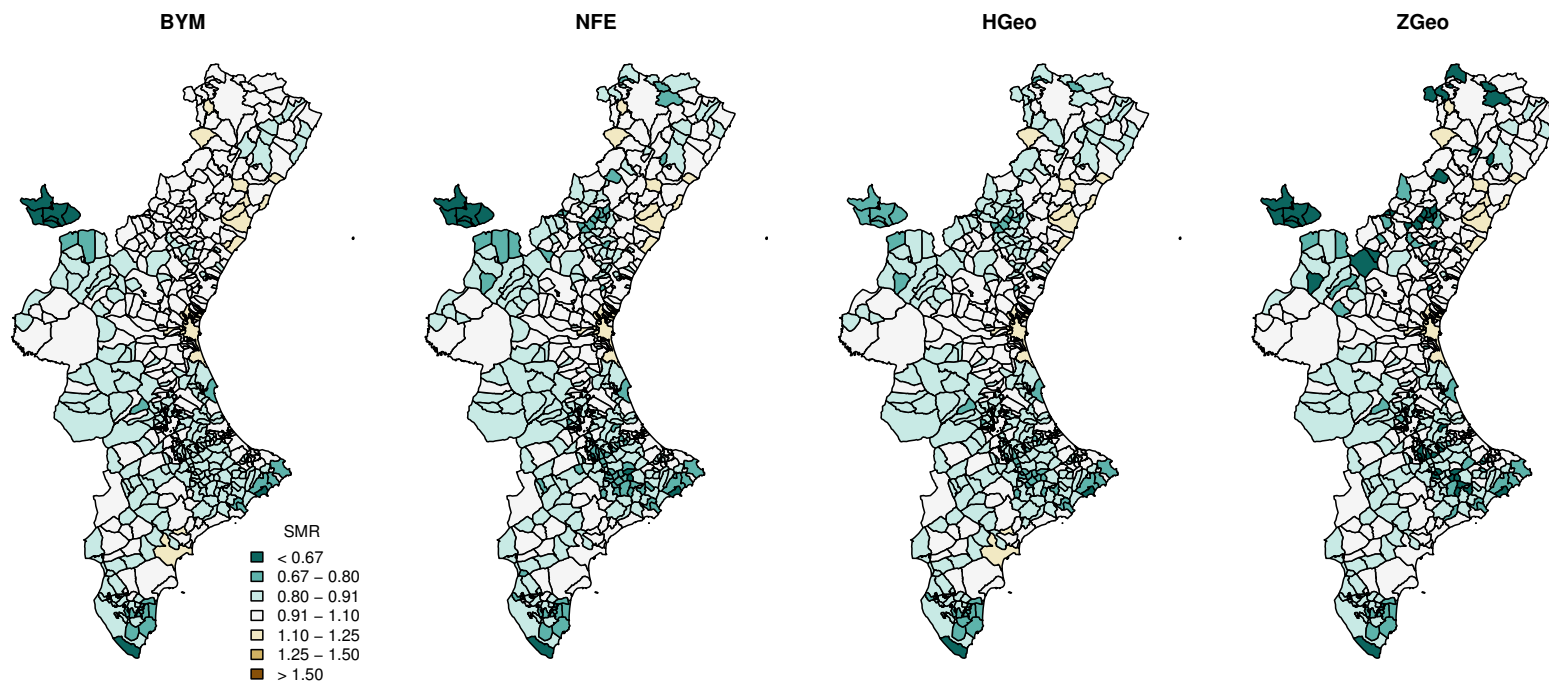
(Men, Stomach)



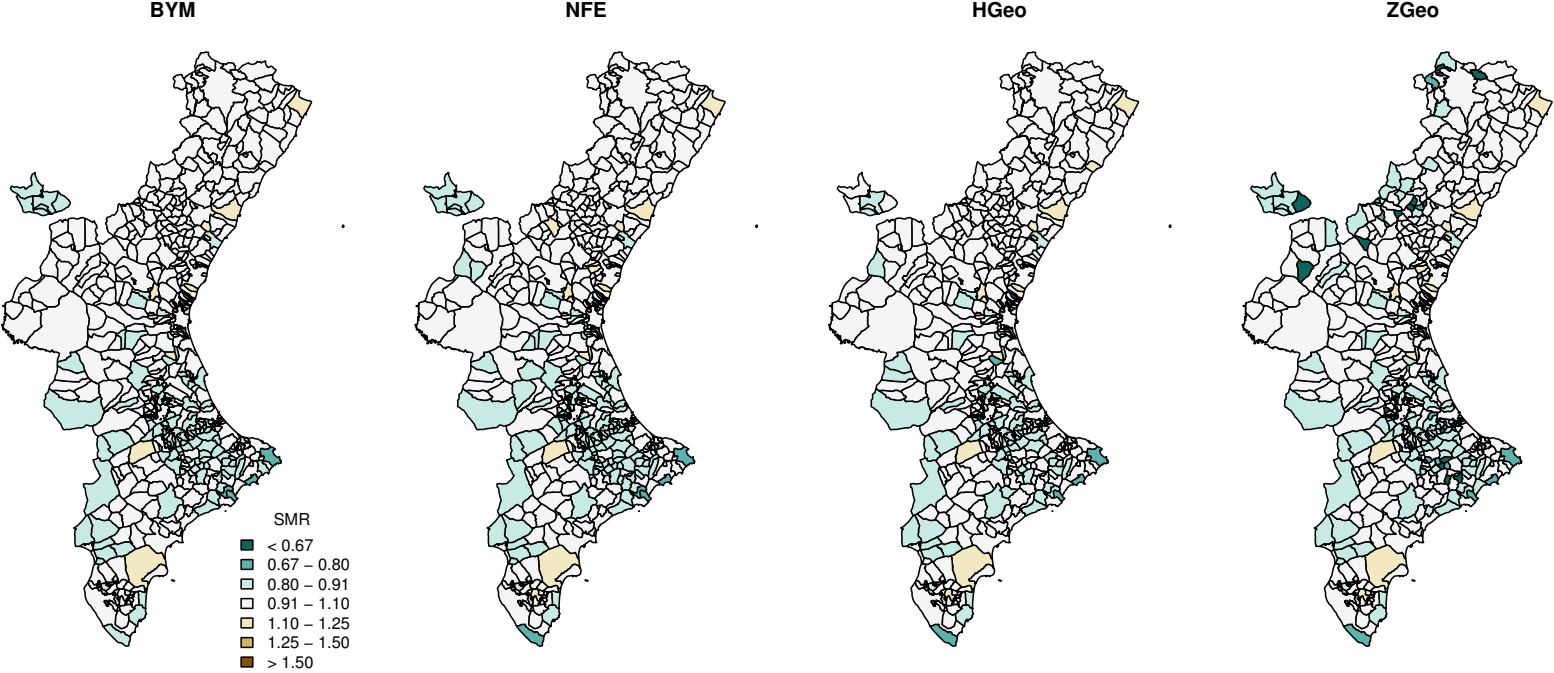
(Women, Stomach)



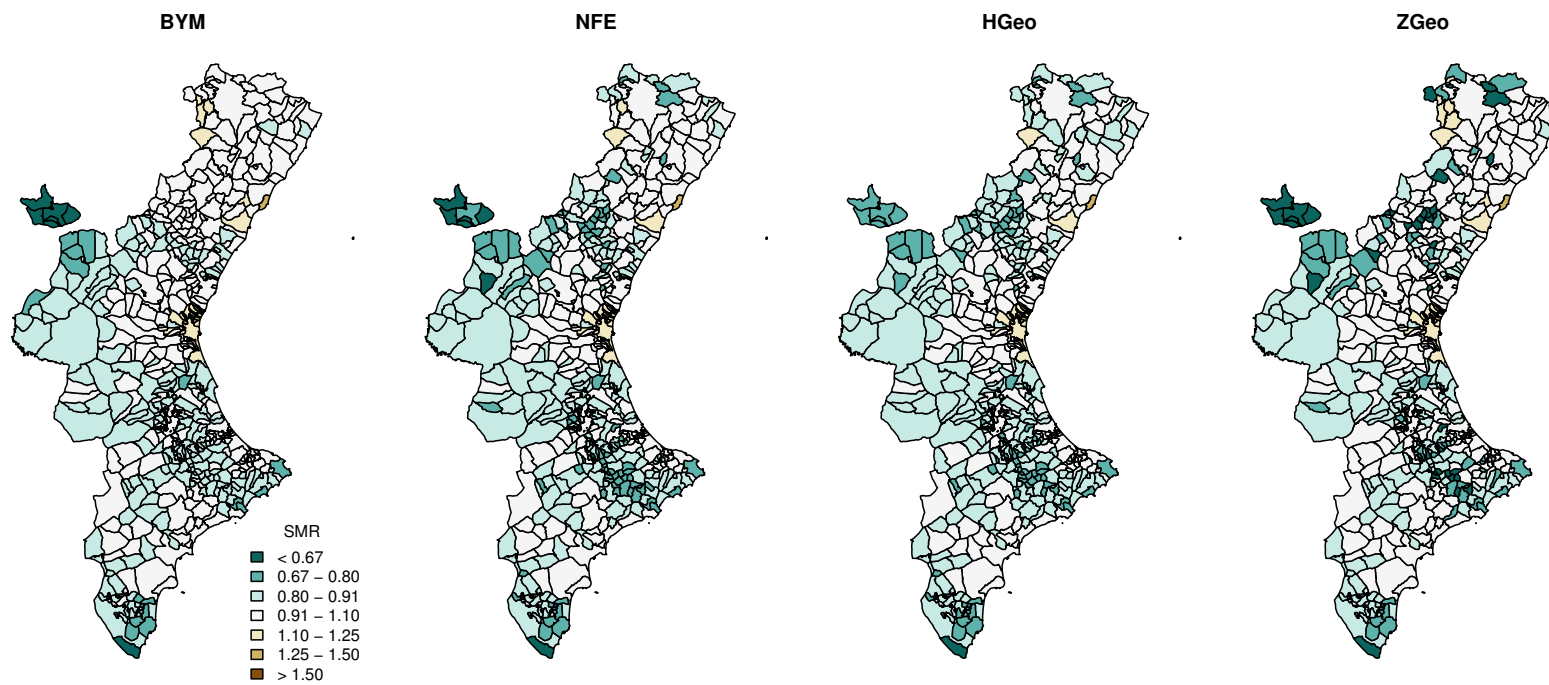
(Men, Colorectal)



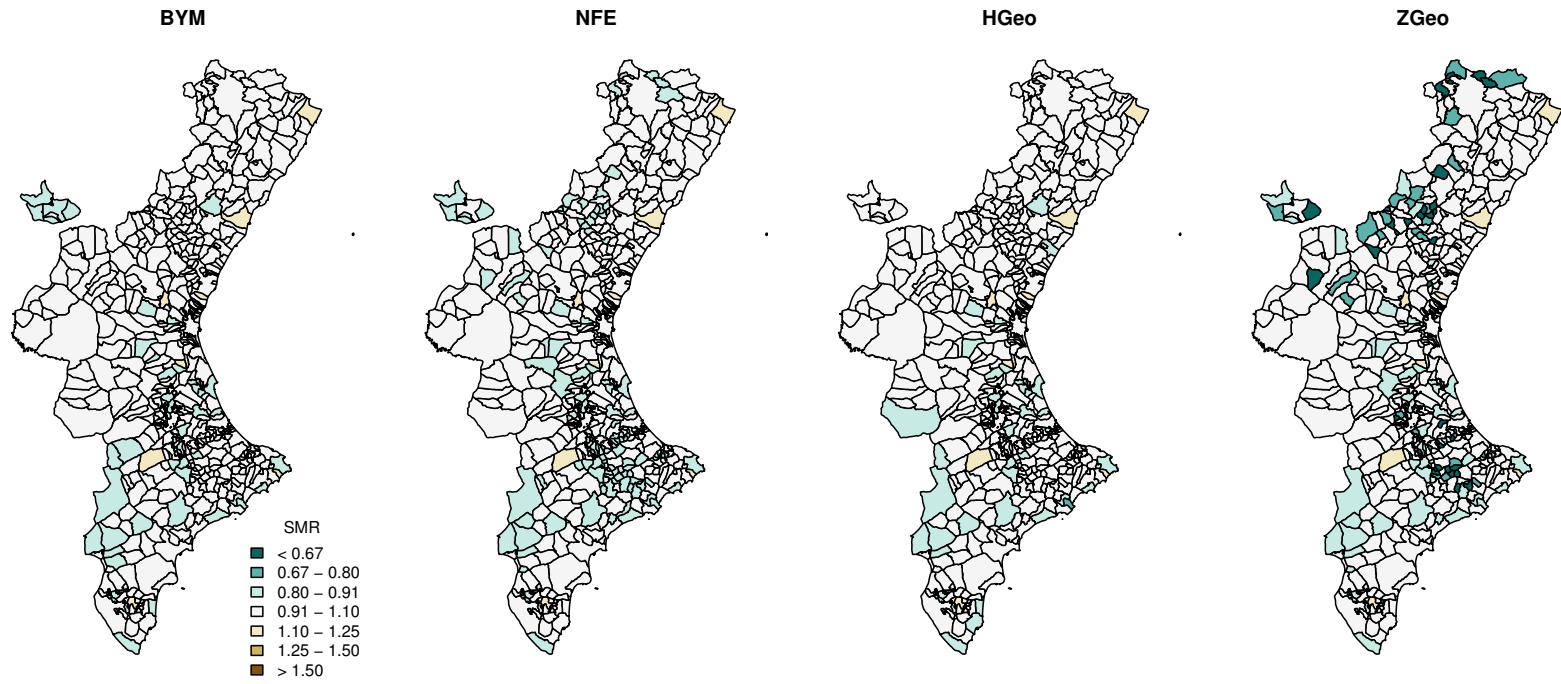
(Women, Colorectal)



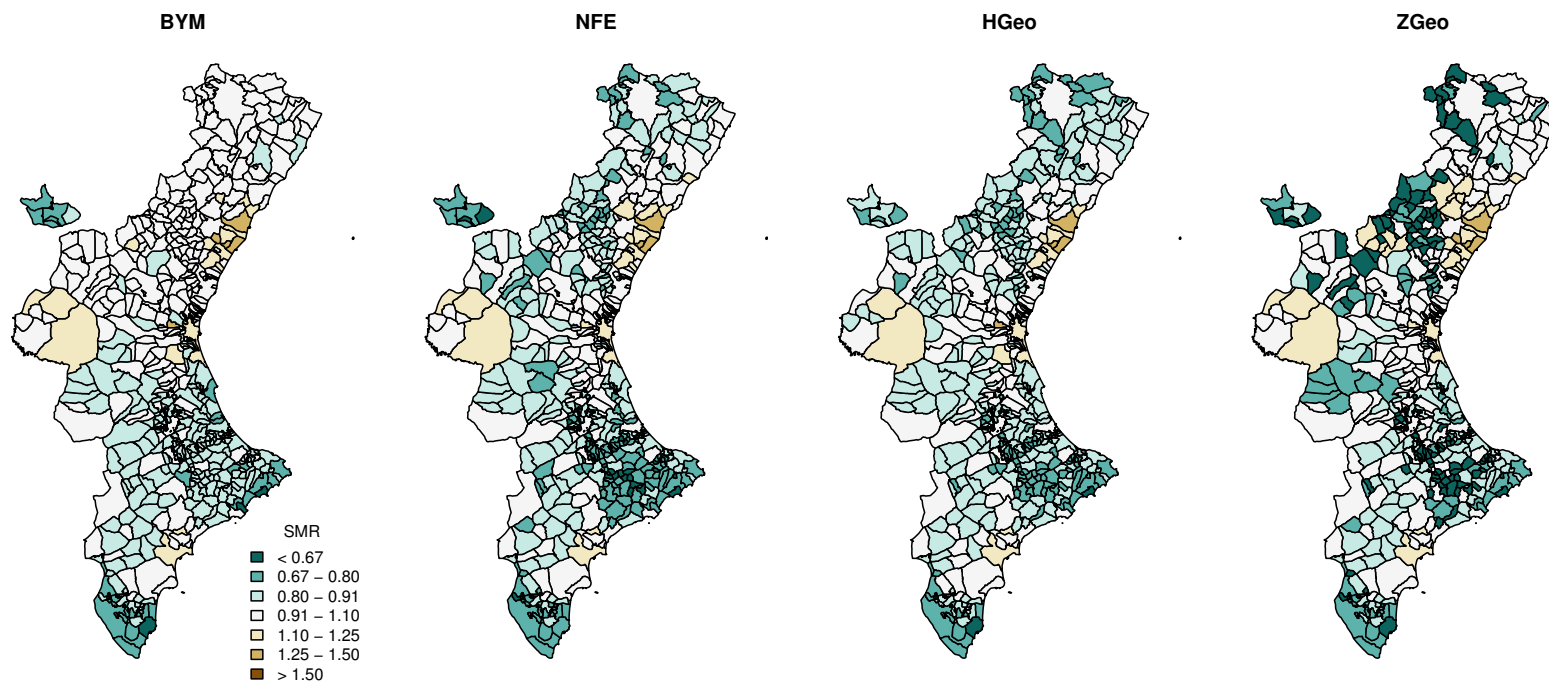
(Men, Colon)



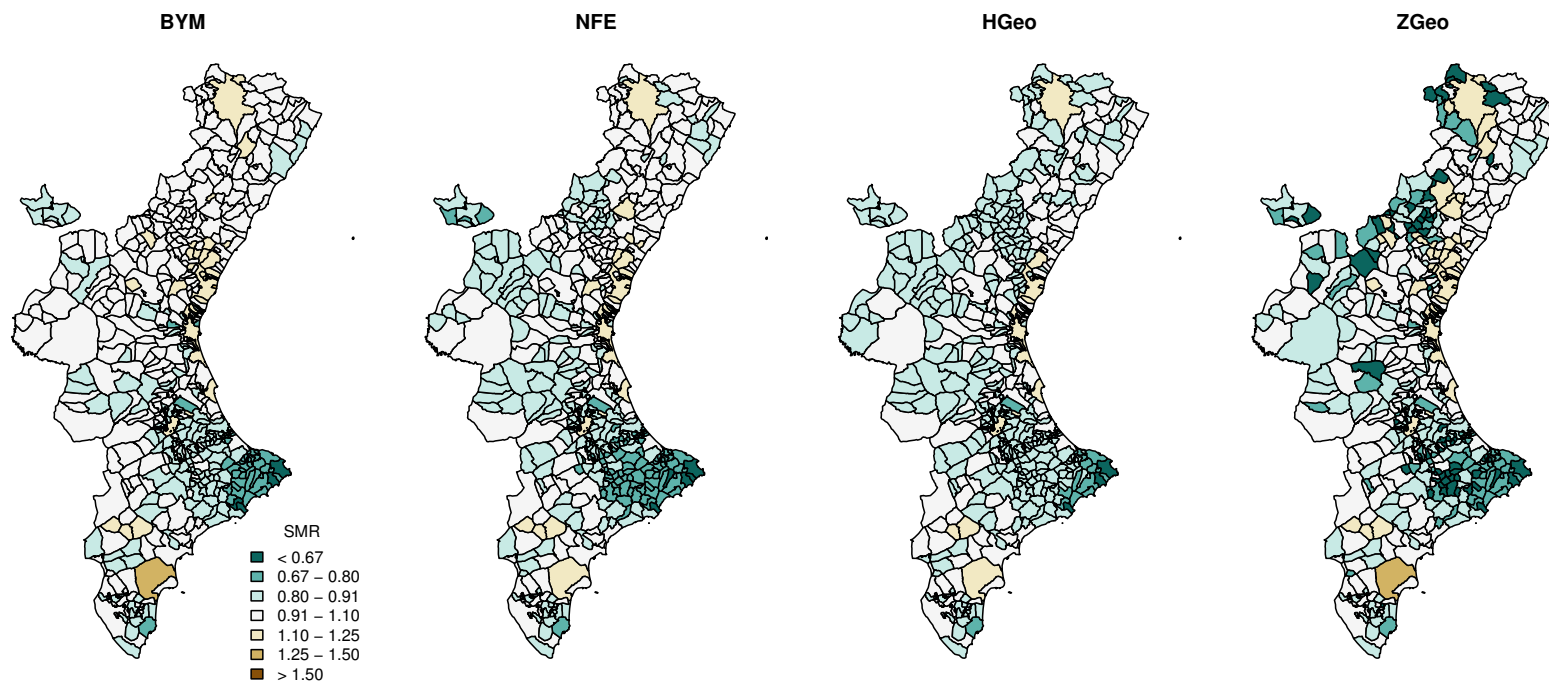
(Women, Colon)



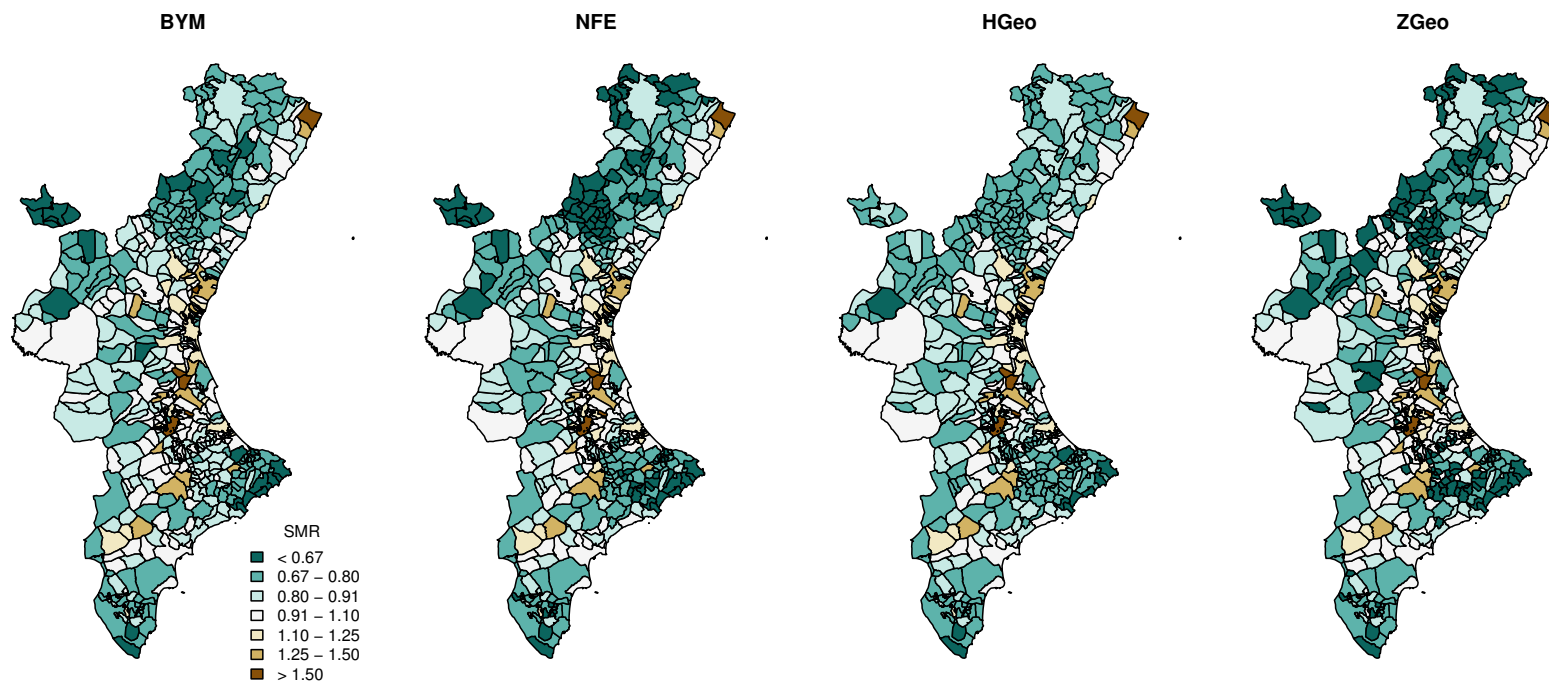
(Men, Rectum)



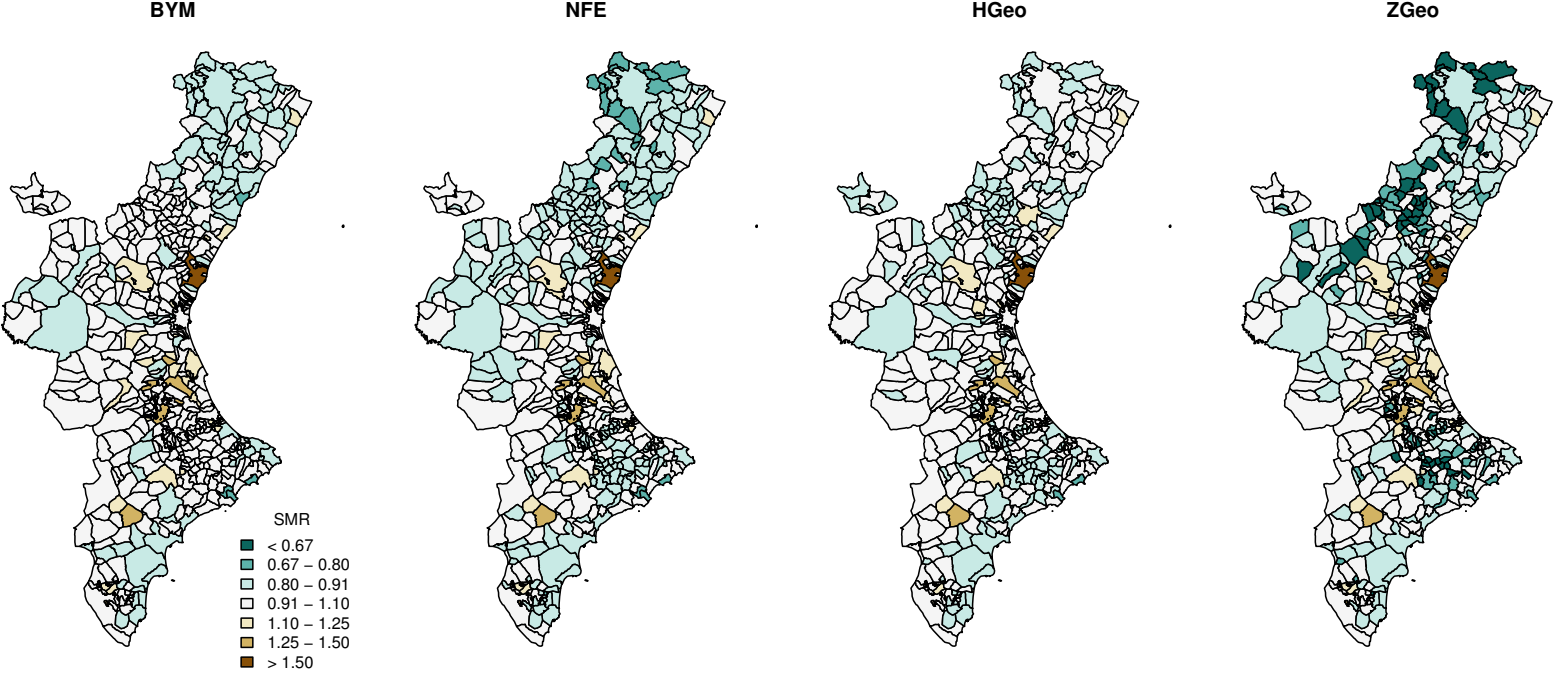
(Women, Rectum)



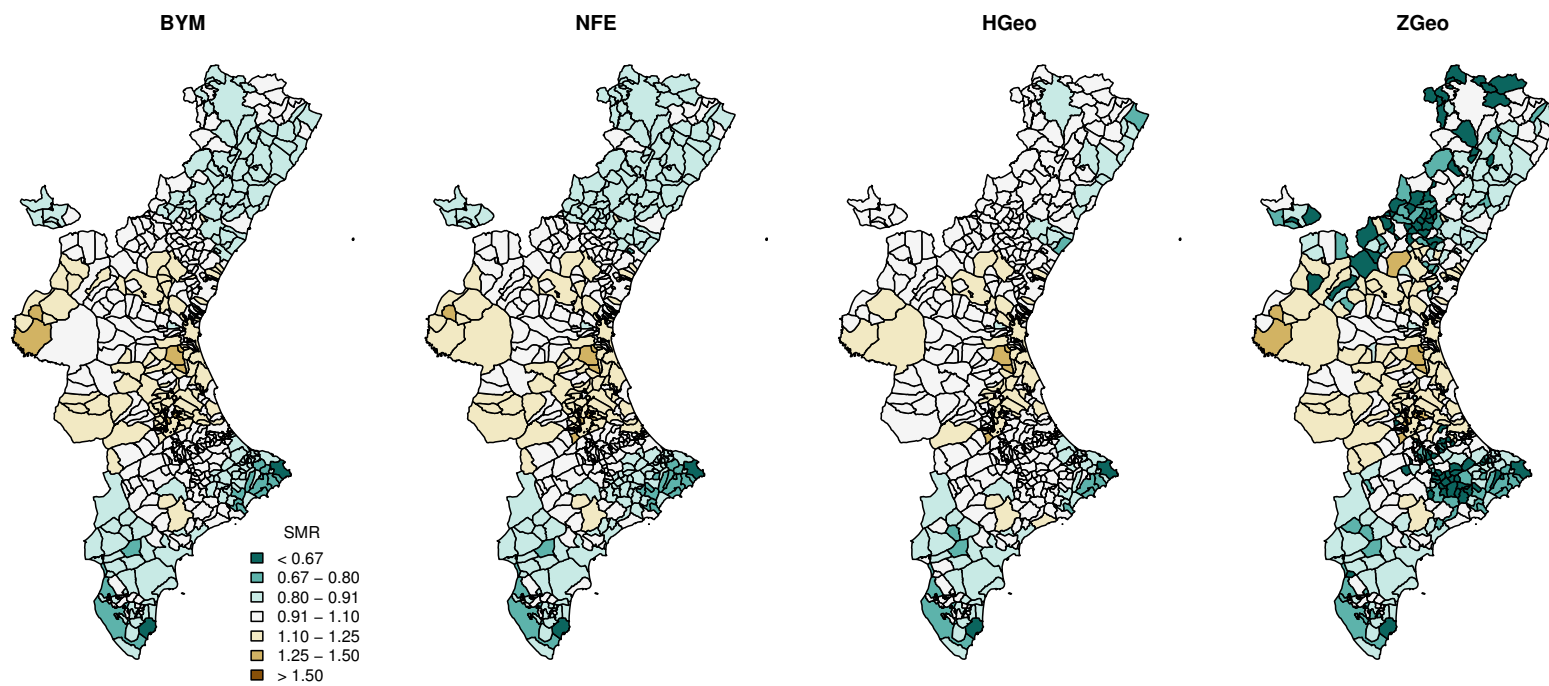
(Men, Liver)



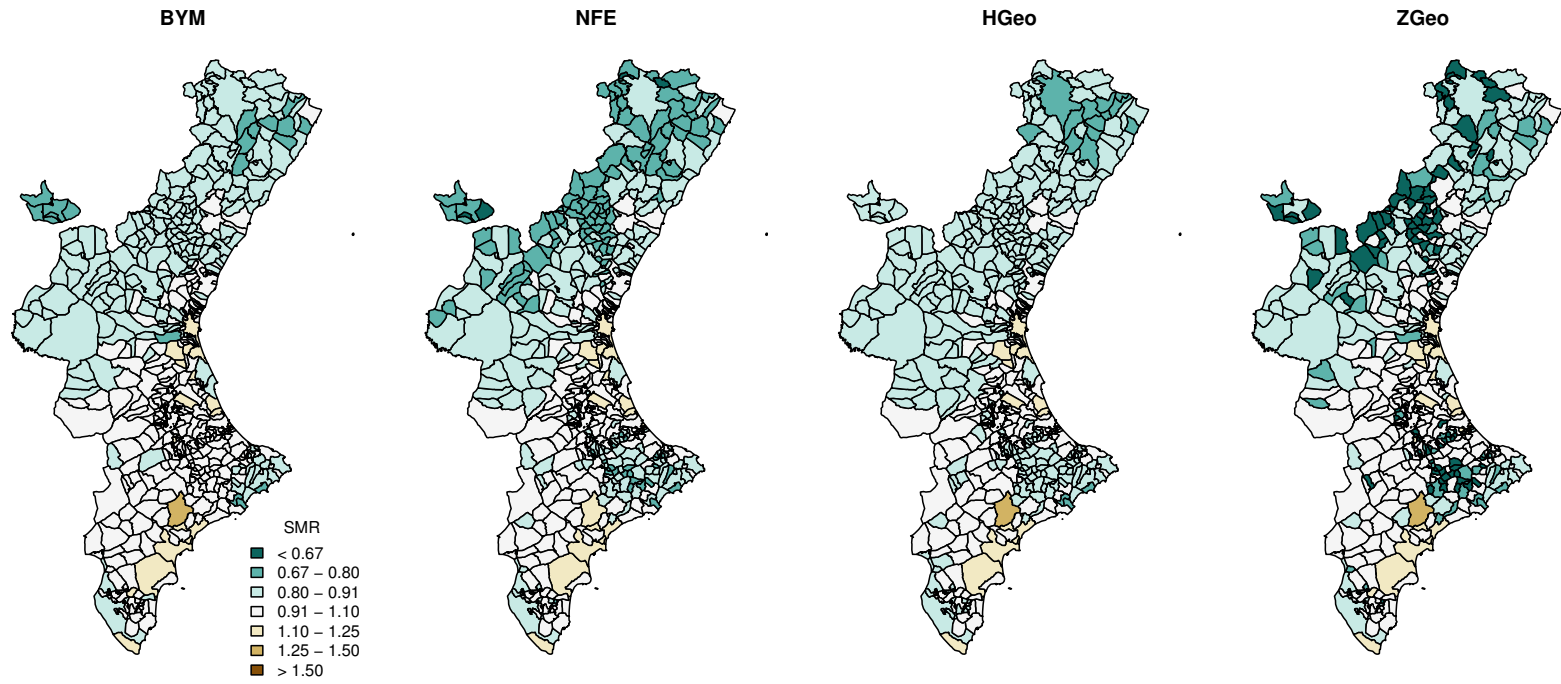
(Women, Liver)



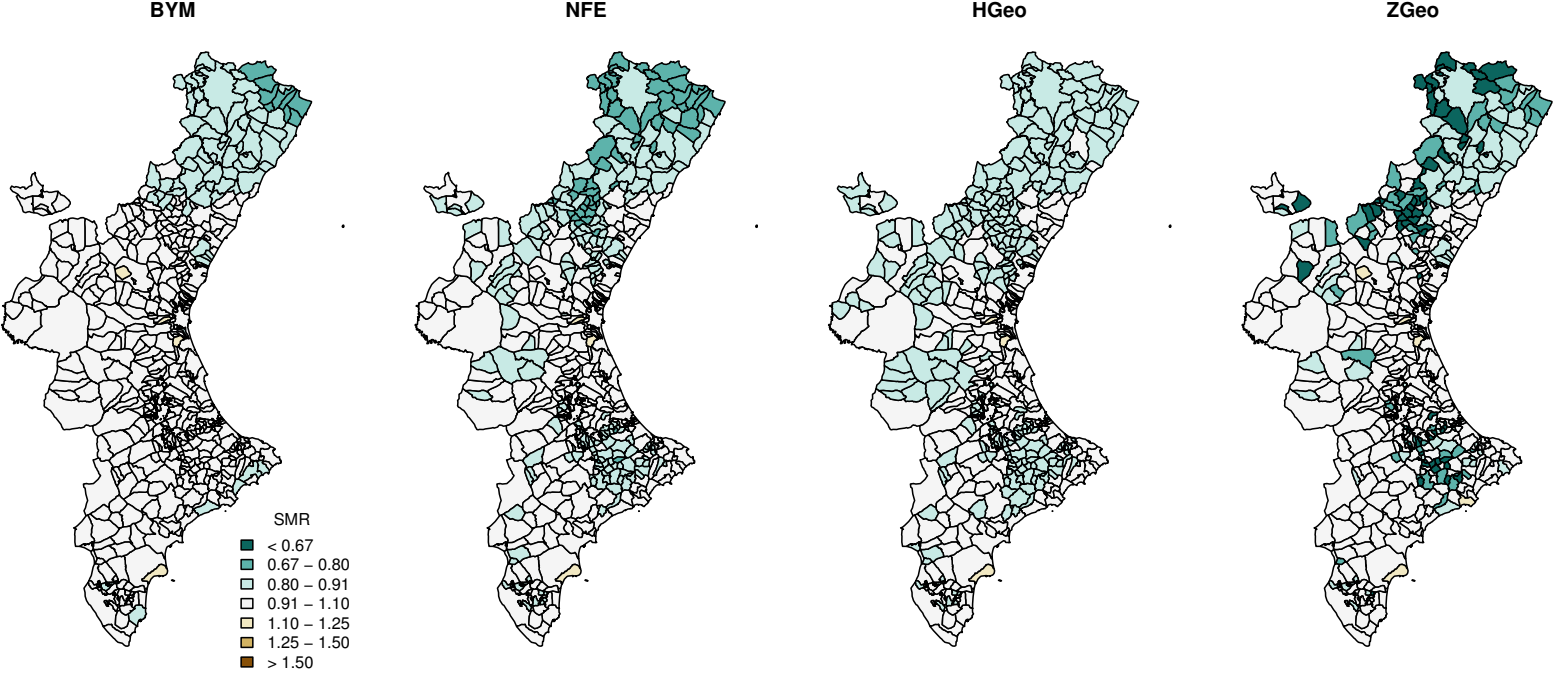
(Women, Vesicle)



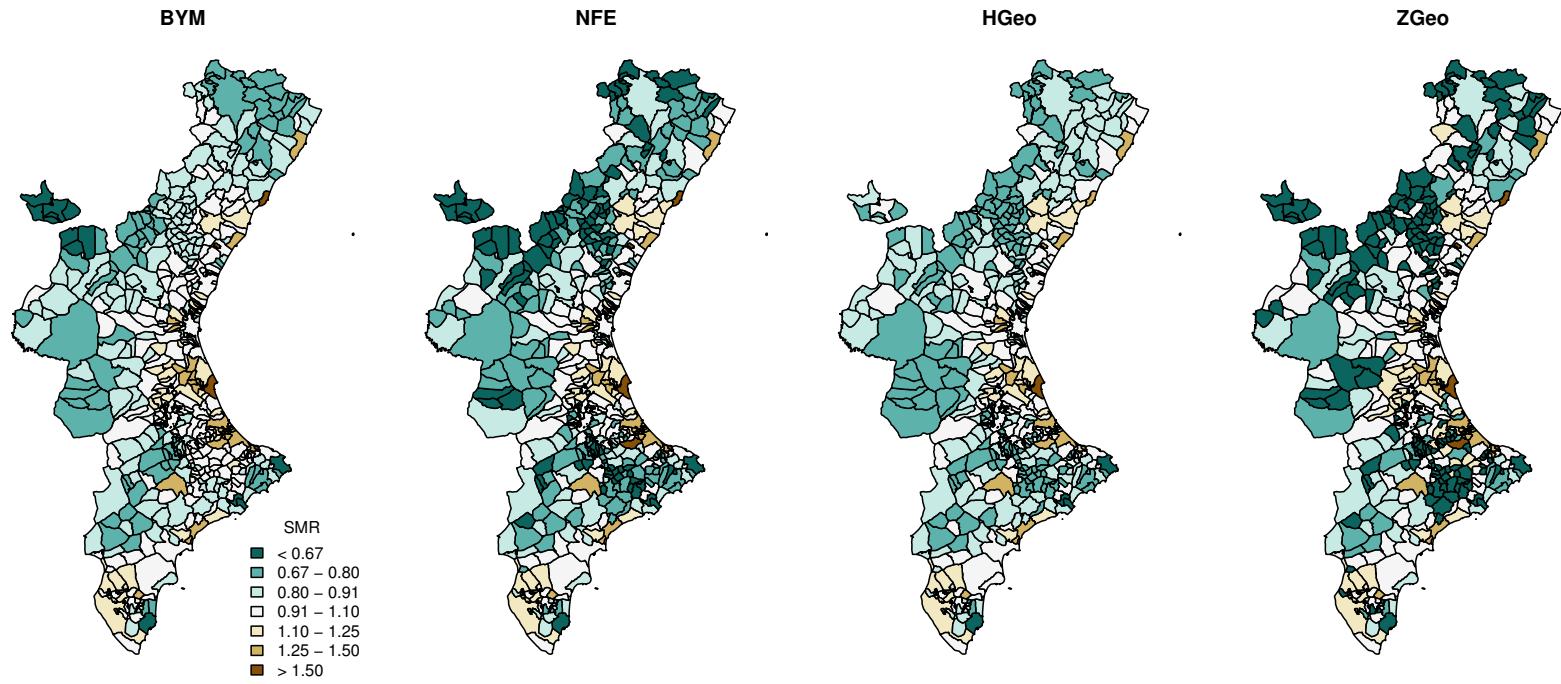
(Men, Pancreas)



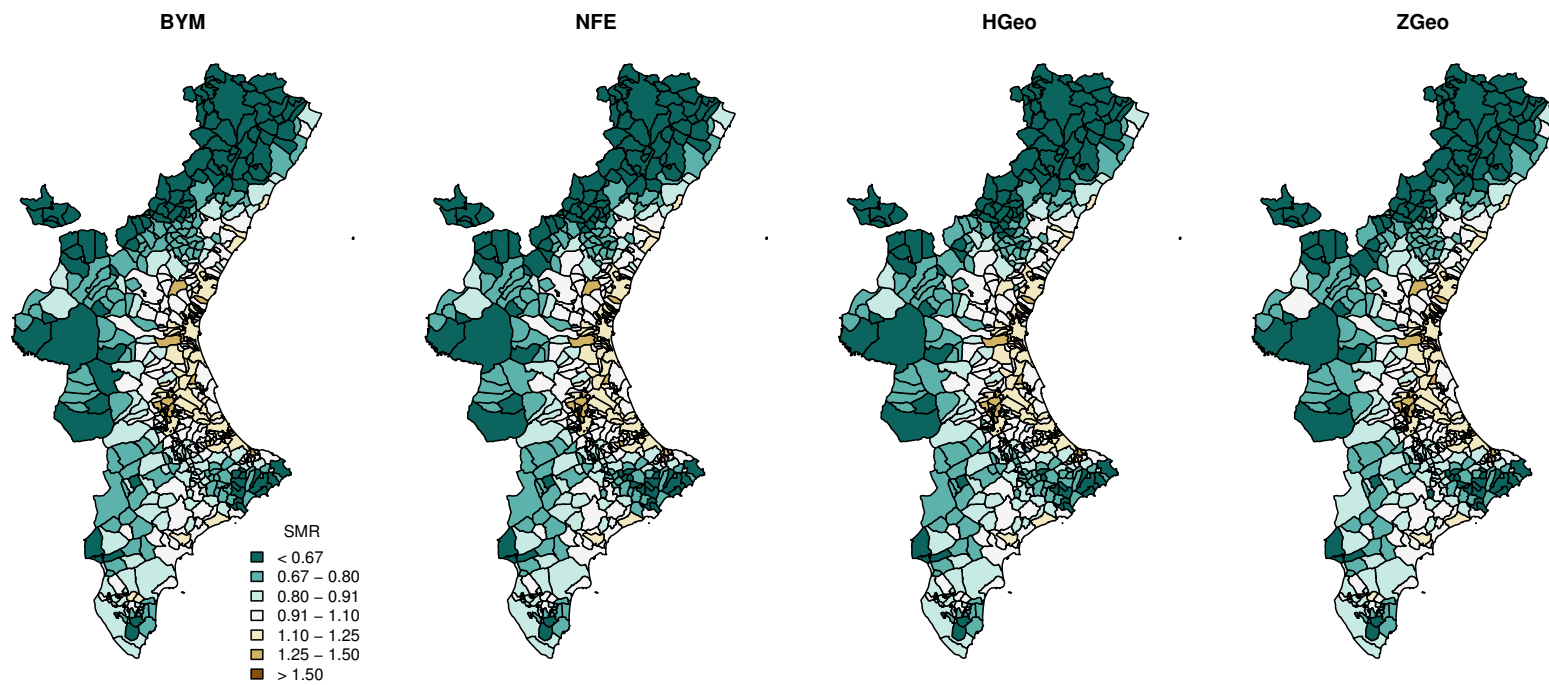
(Women, Pancreas)



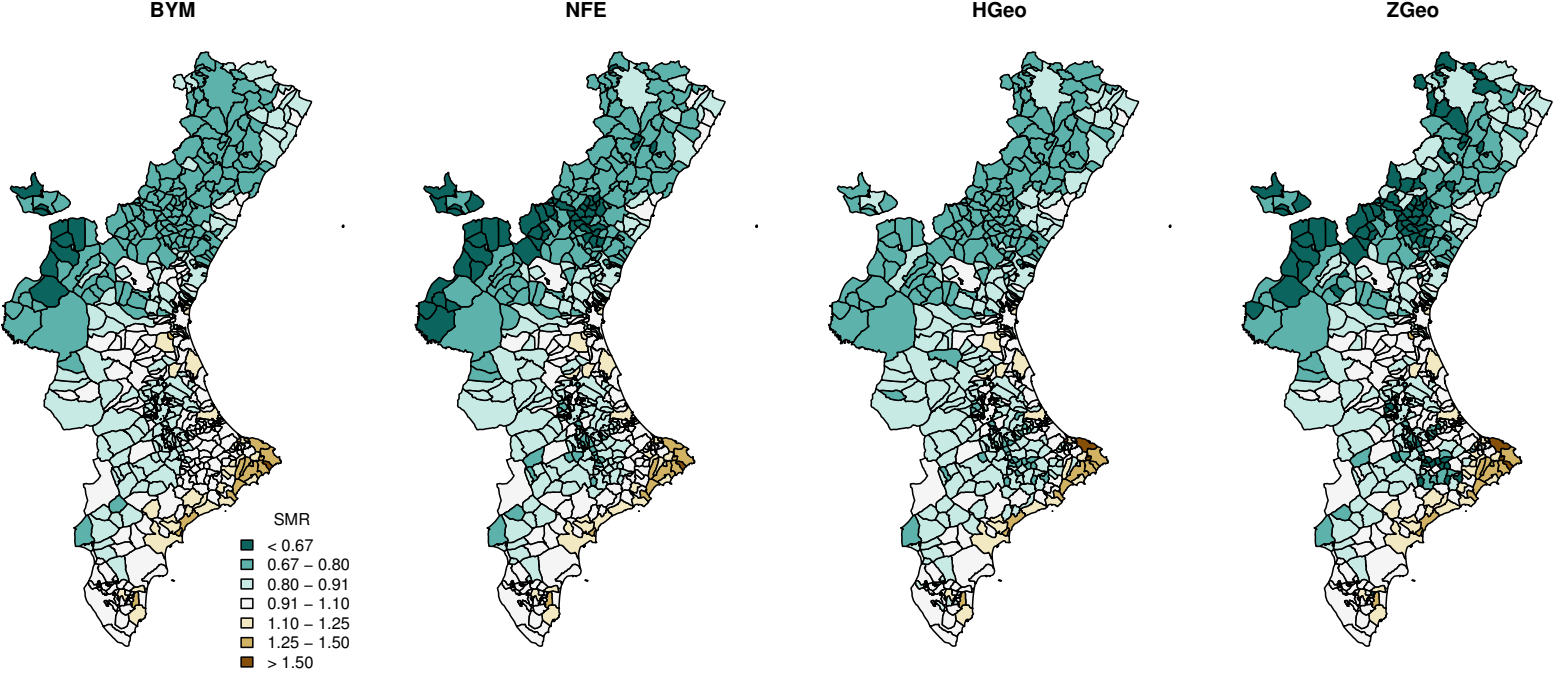
(Men, Larynx)



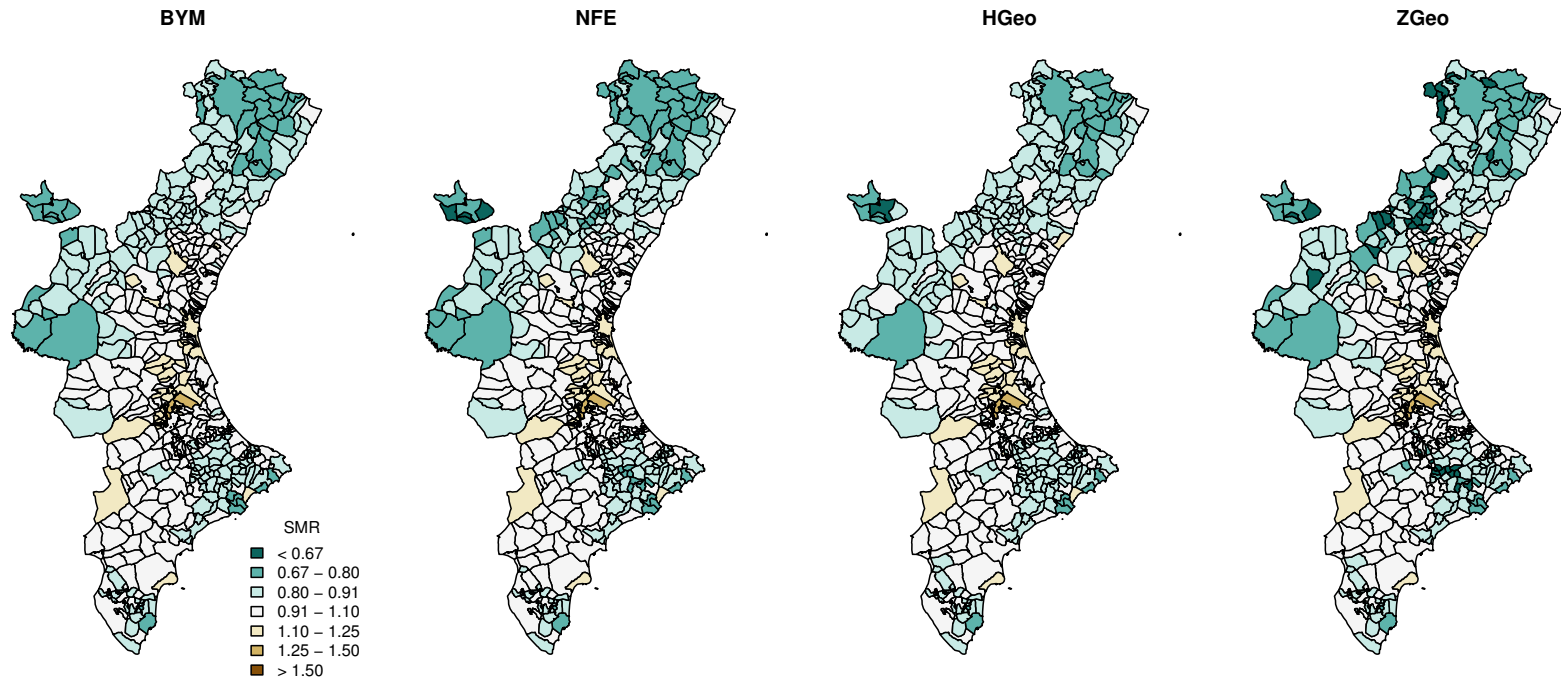
(Men, Lung)



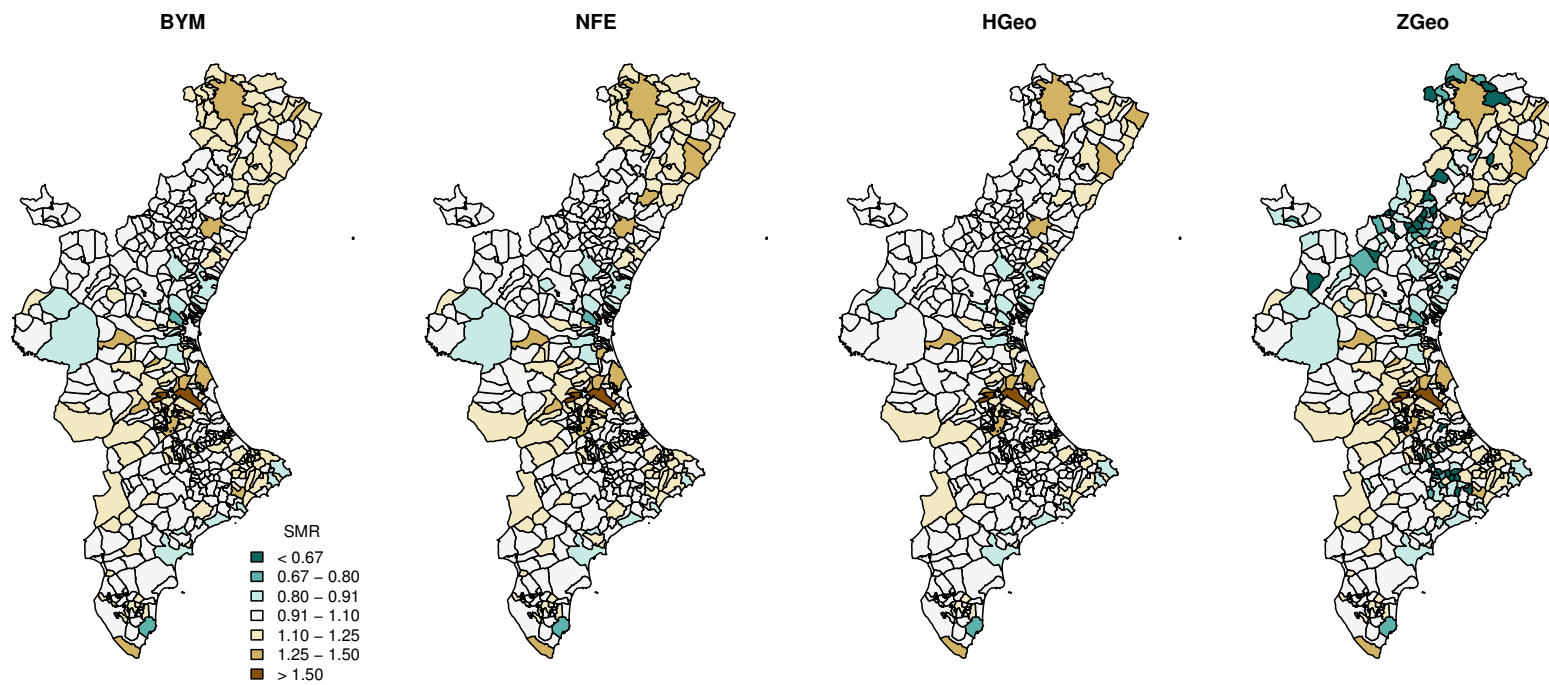
(Women, Lung)



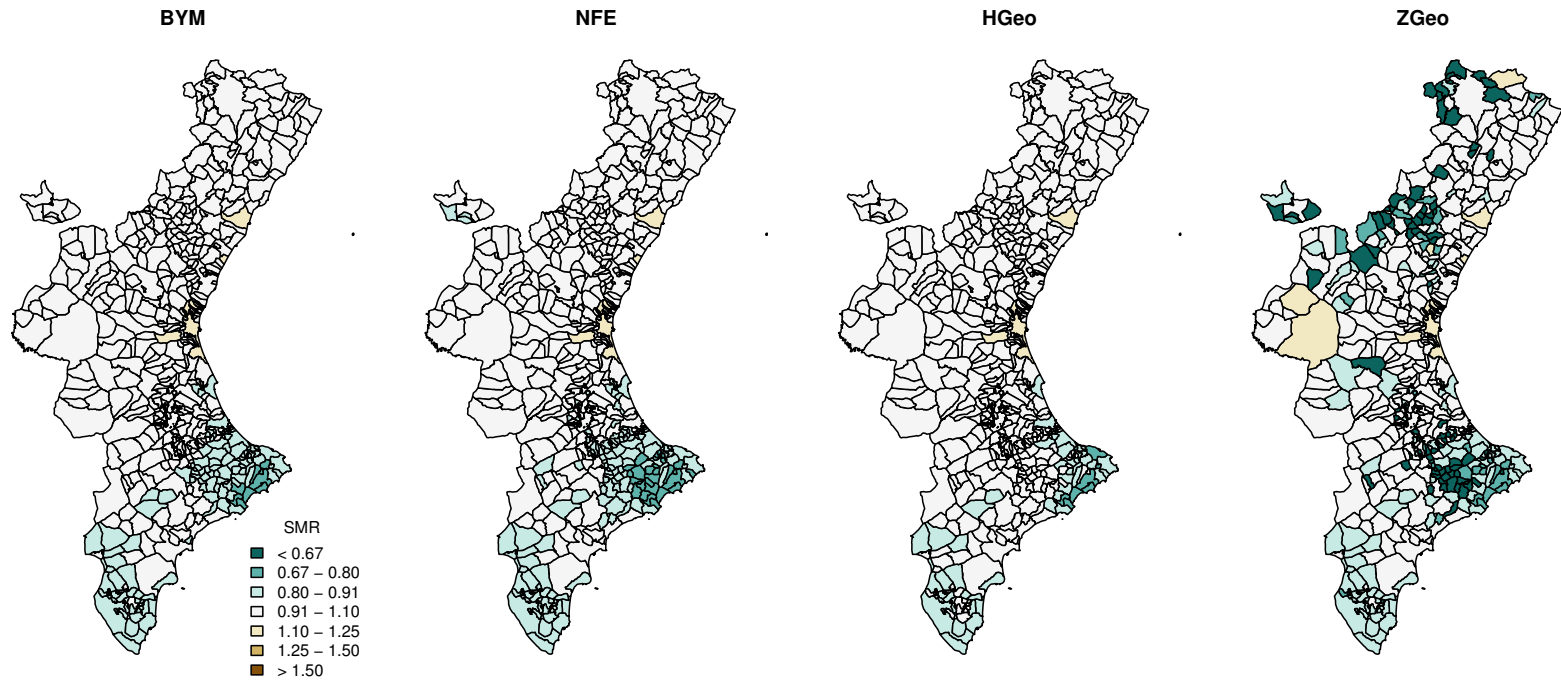
(Women, Breast)



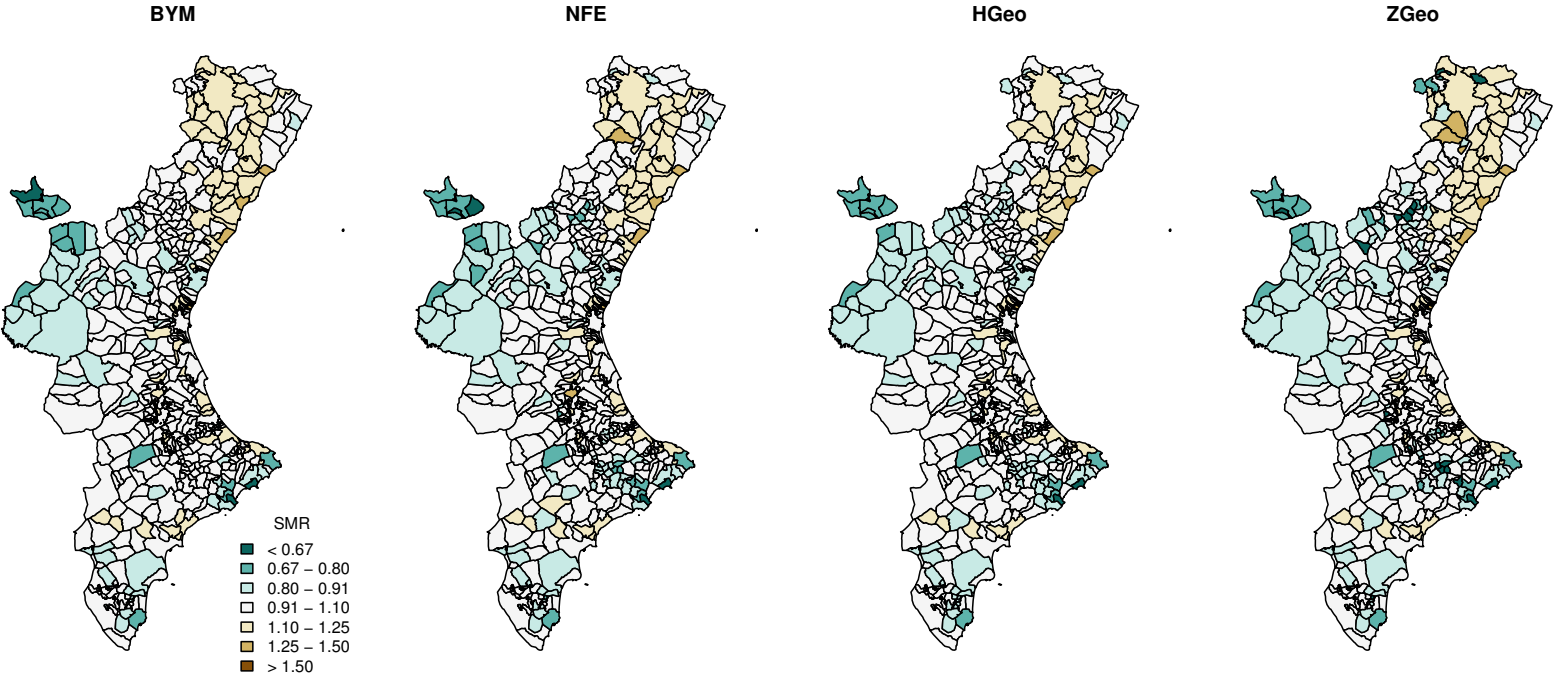
(Women, Uterus)



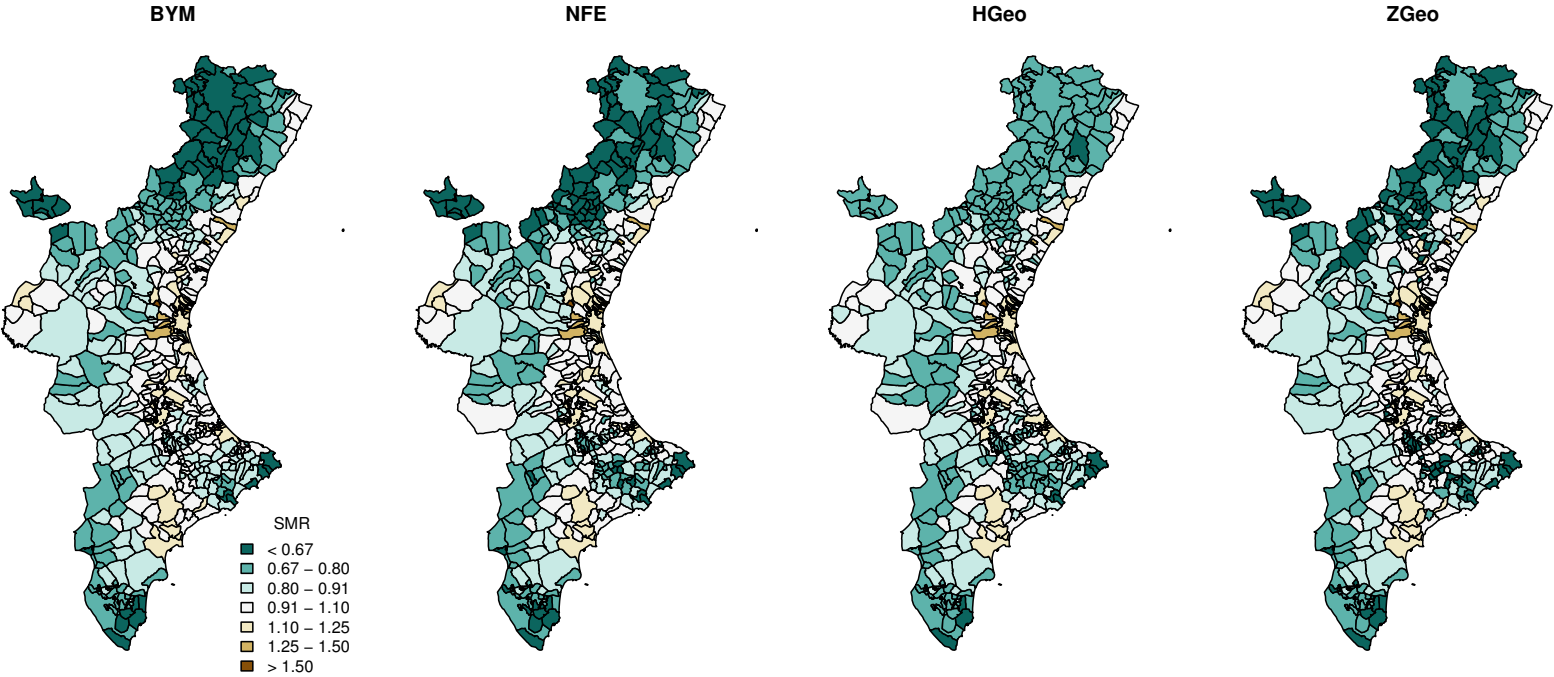
(Women, Ovary)



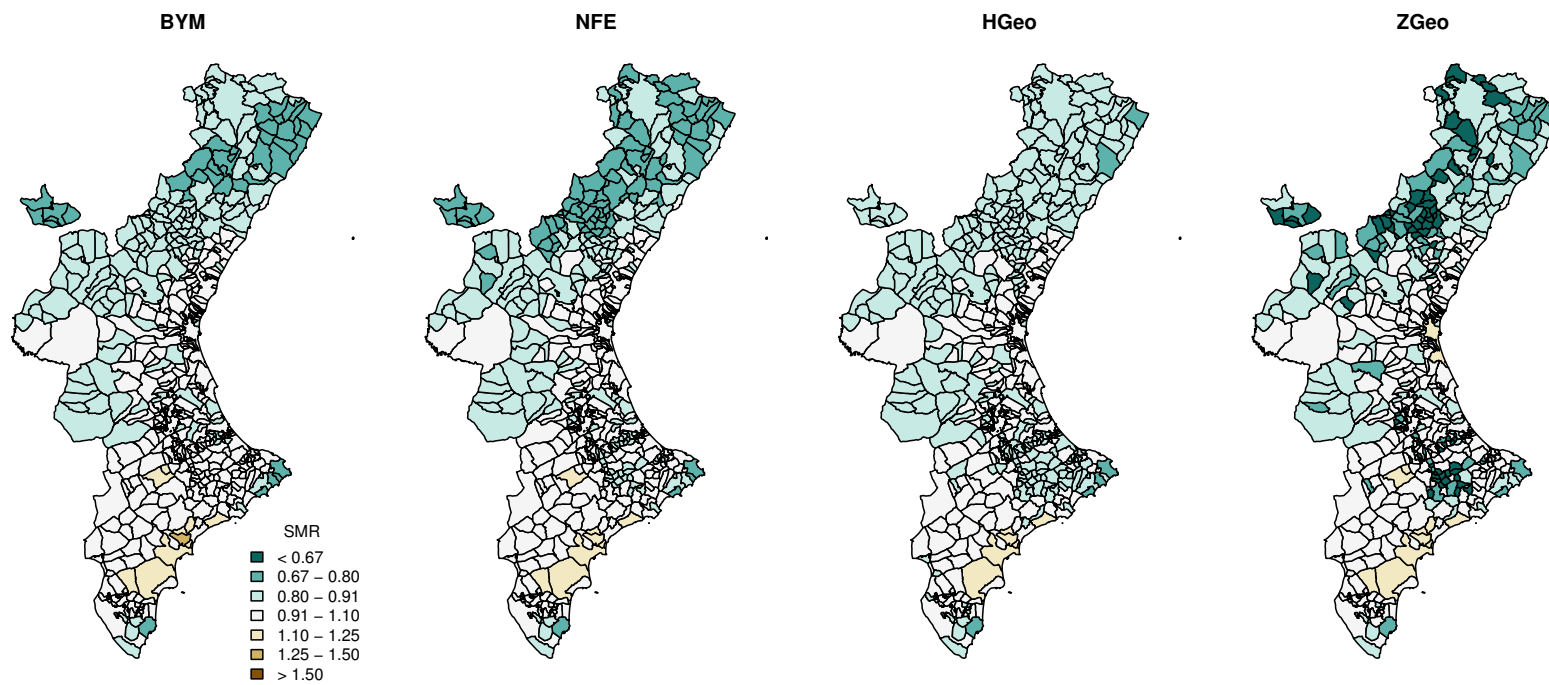
(Men, Prostate)



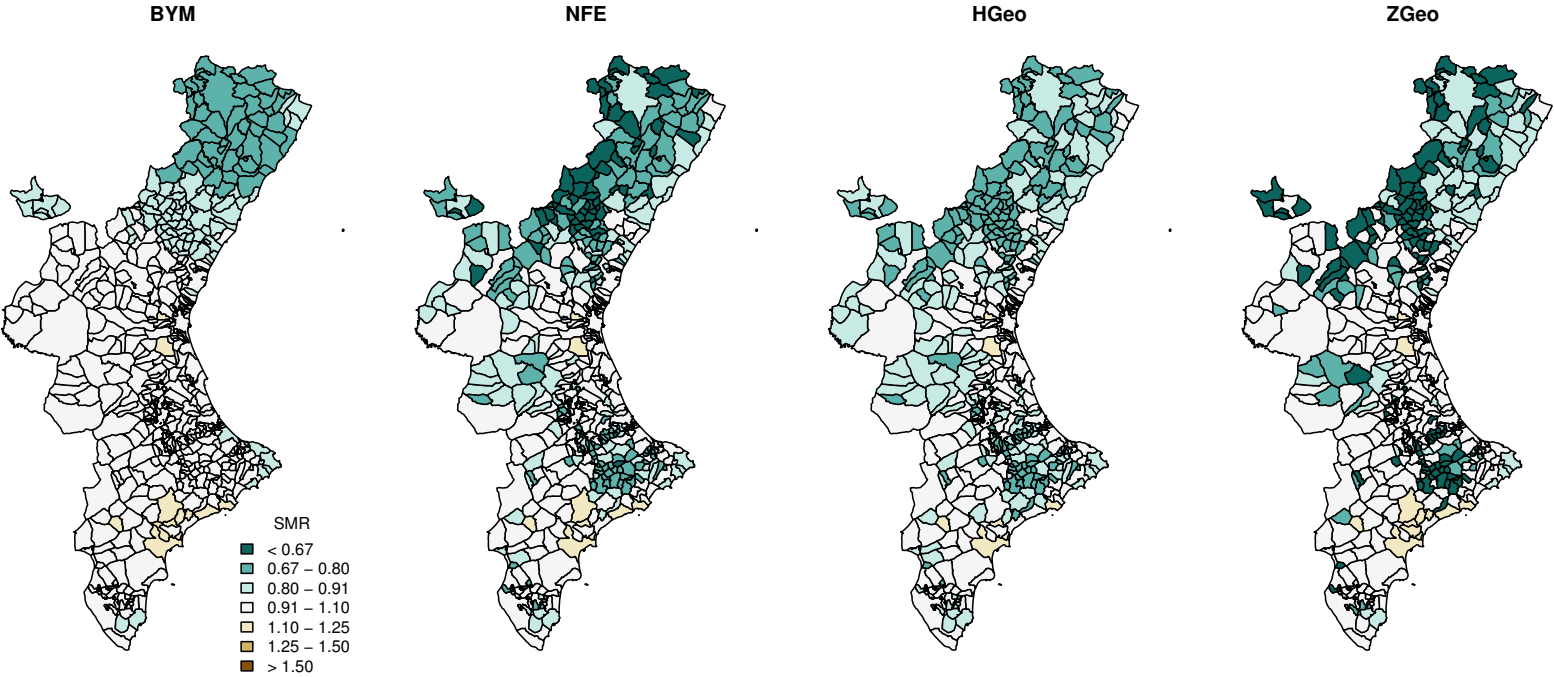
(Men, Bladder)



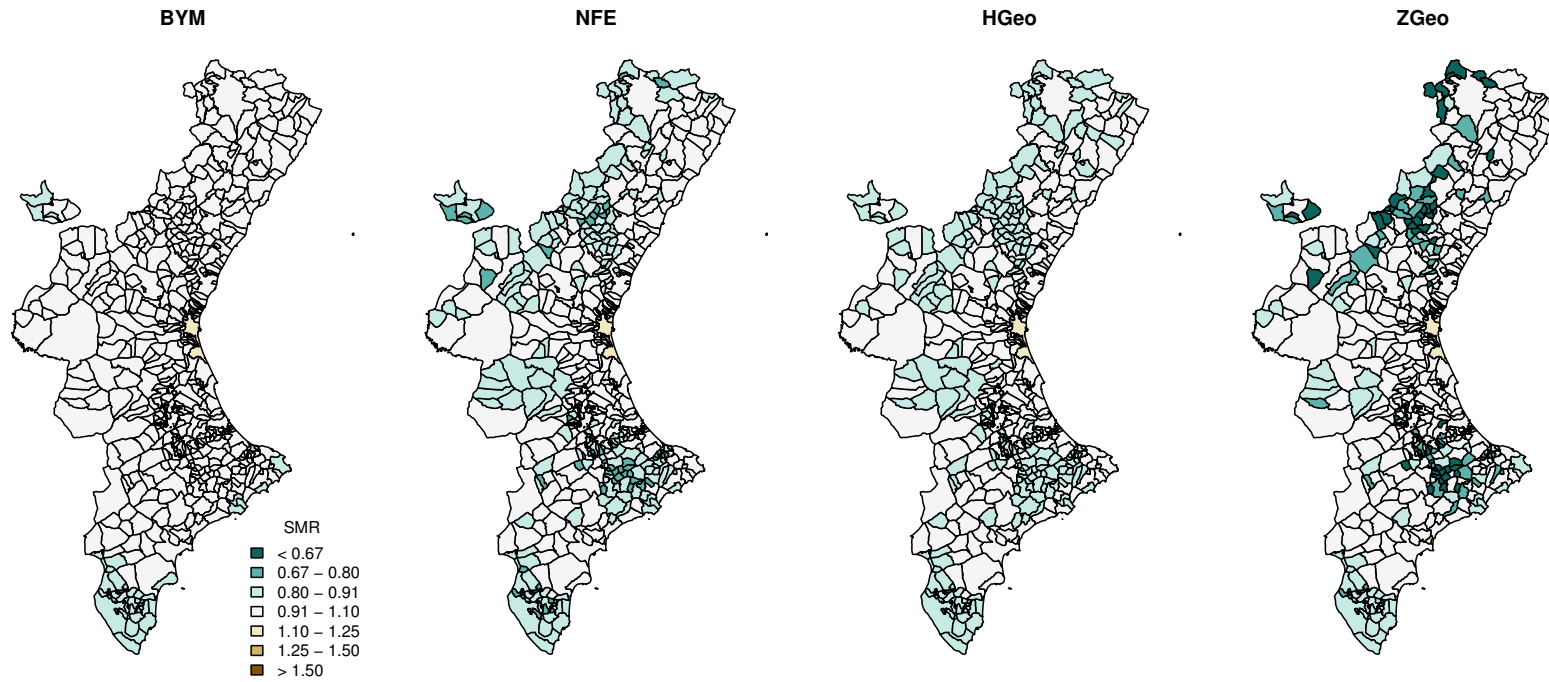
(Men, Lymphatic)



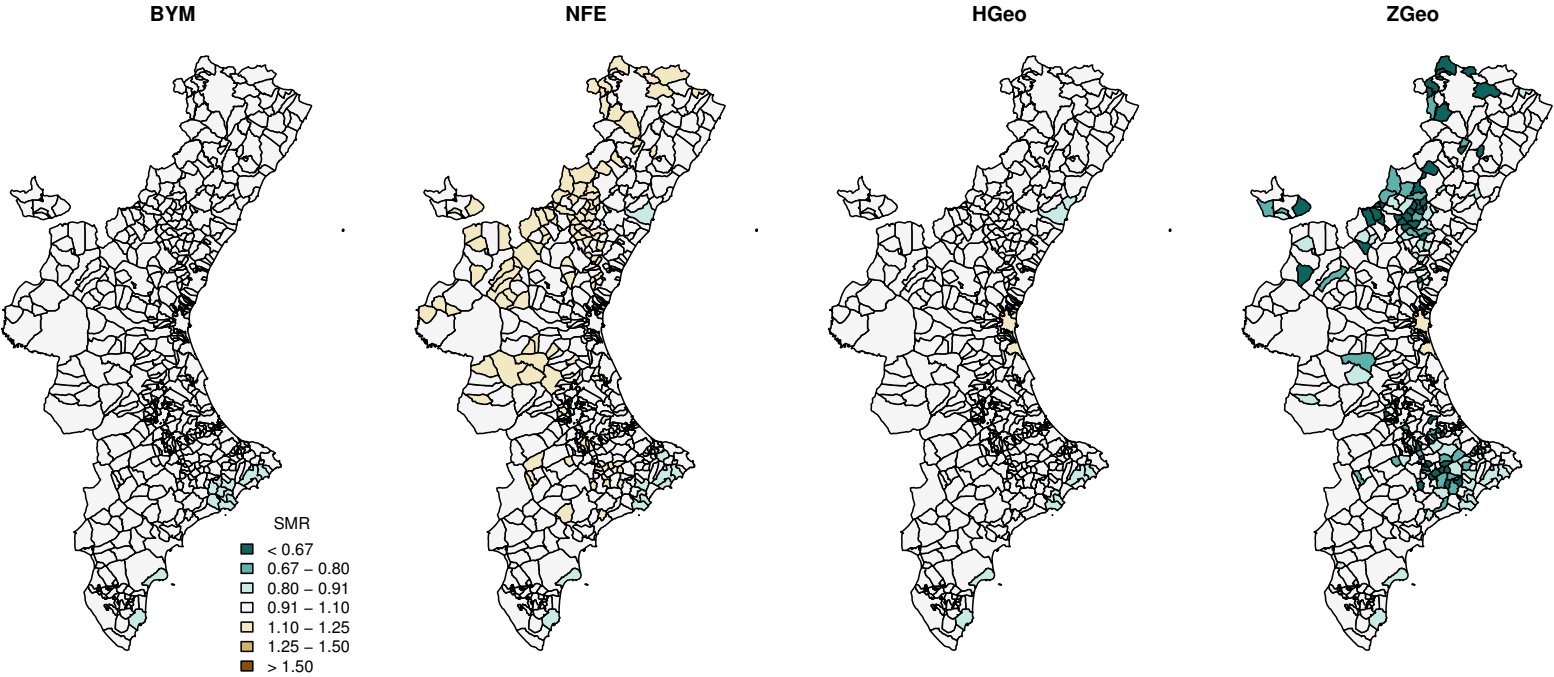
(Women, Lymphatic)



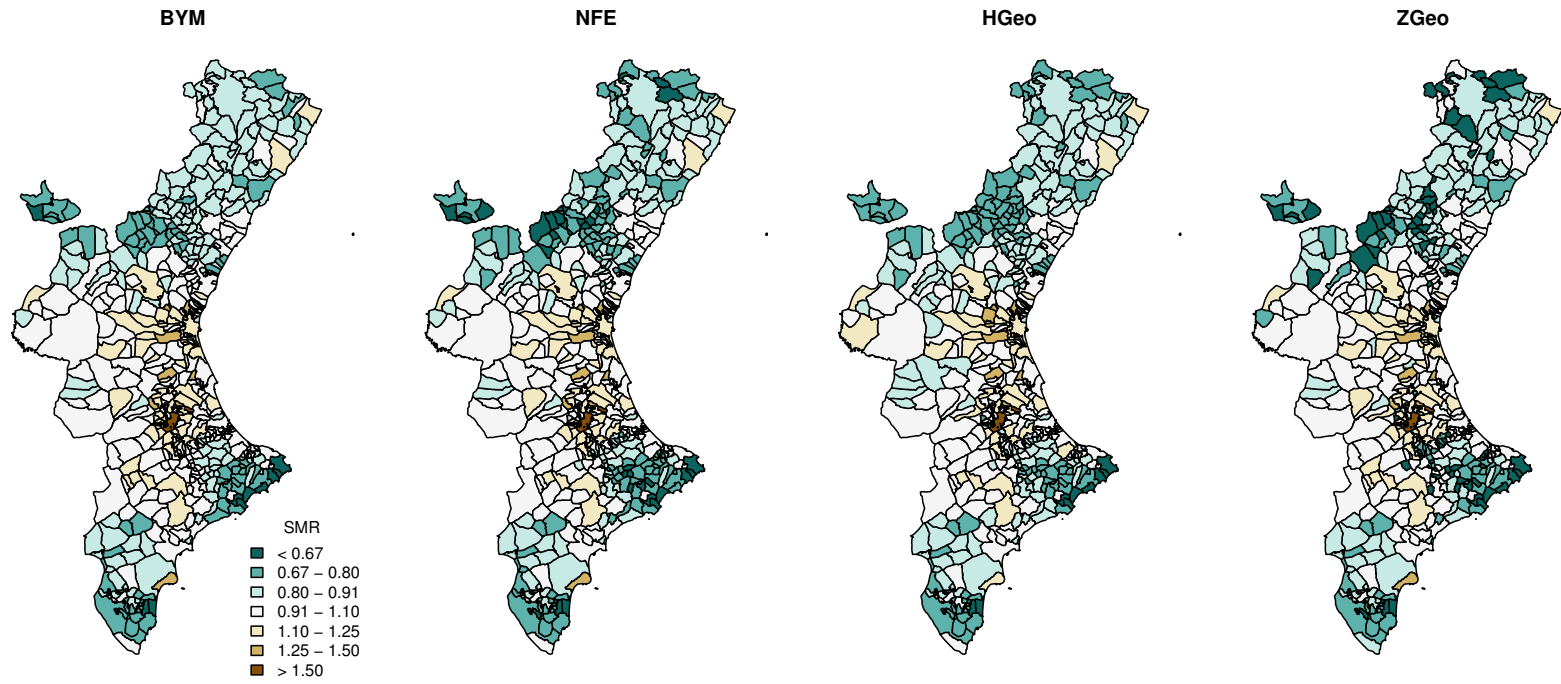
(Men, Leukemia)



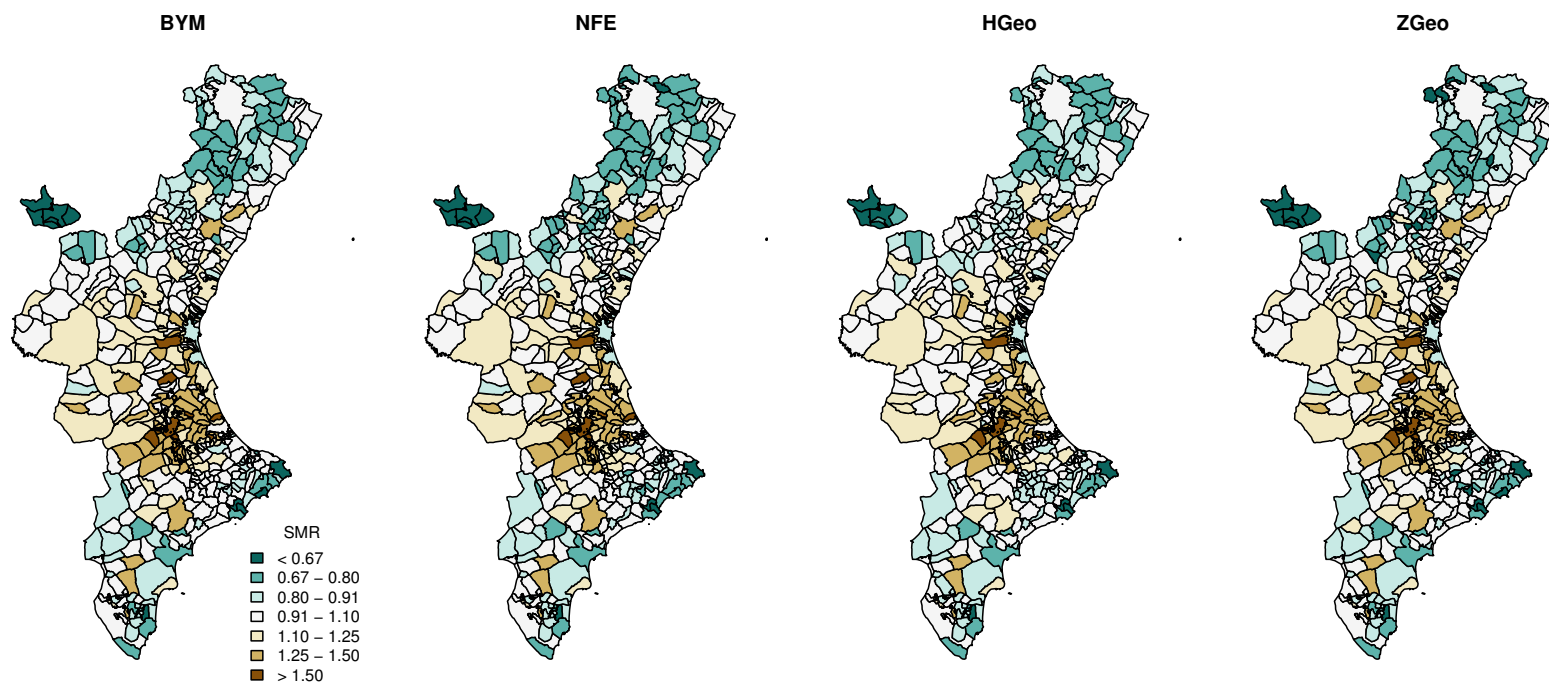
(Women, Leukemia)



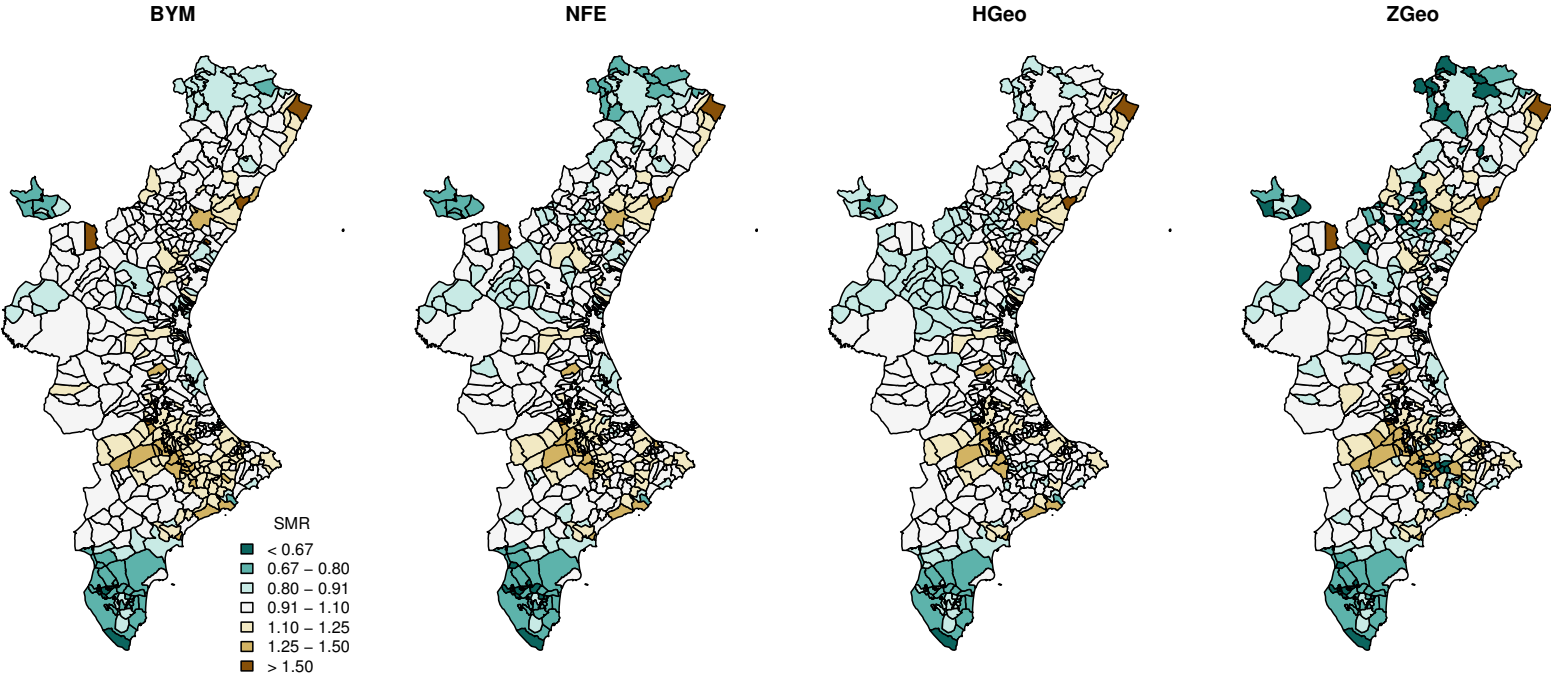
(Men, Diabetes)



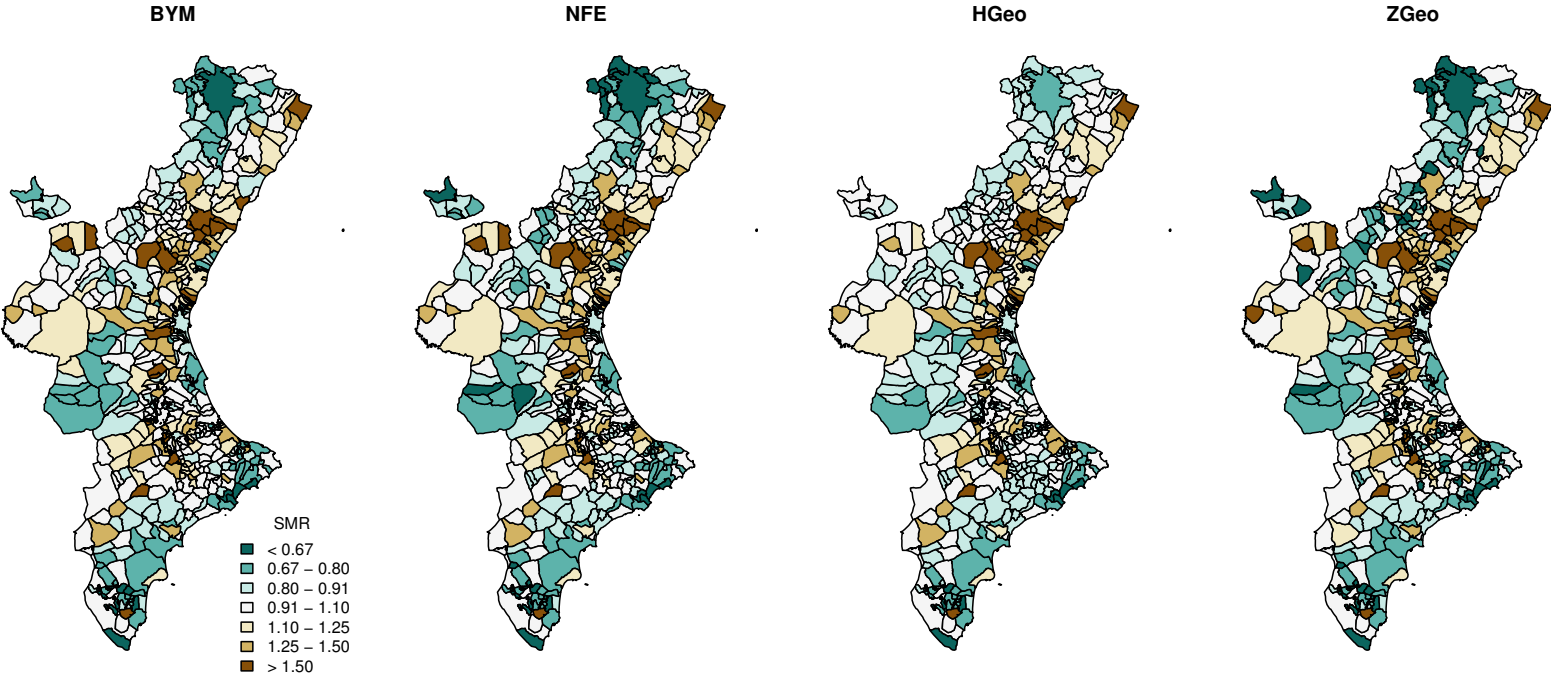
(Women, Diabetes)



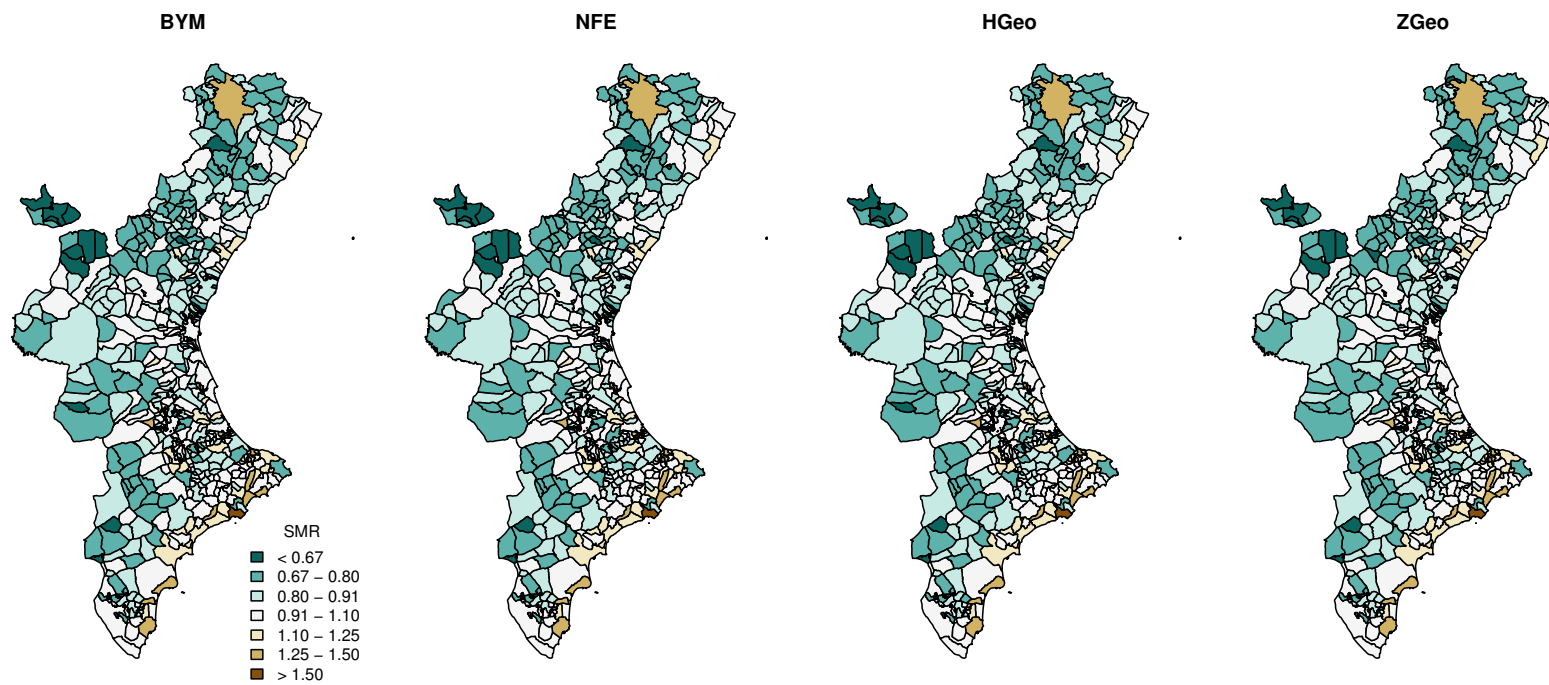
(Men, Hypertensive)



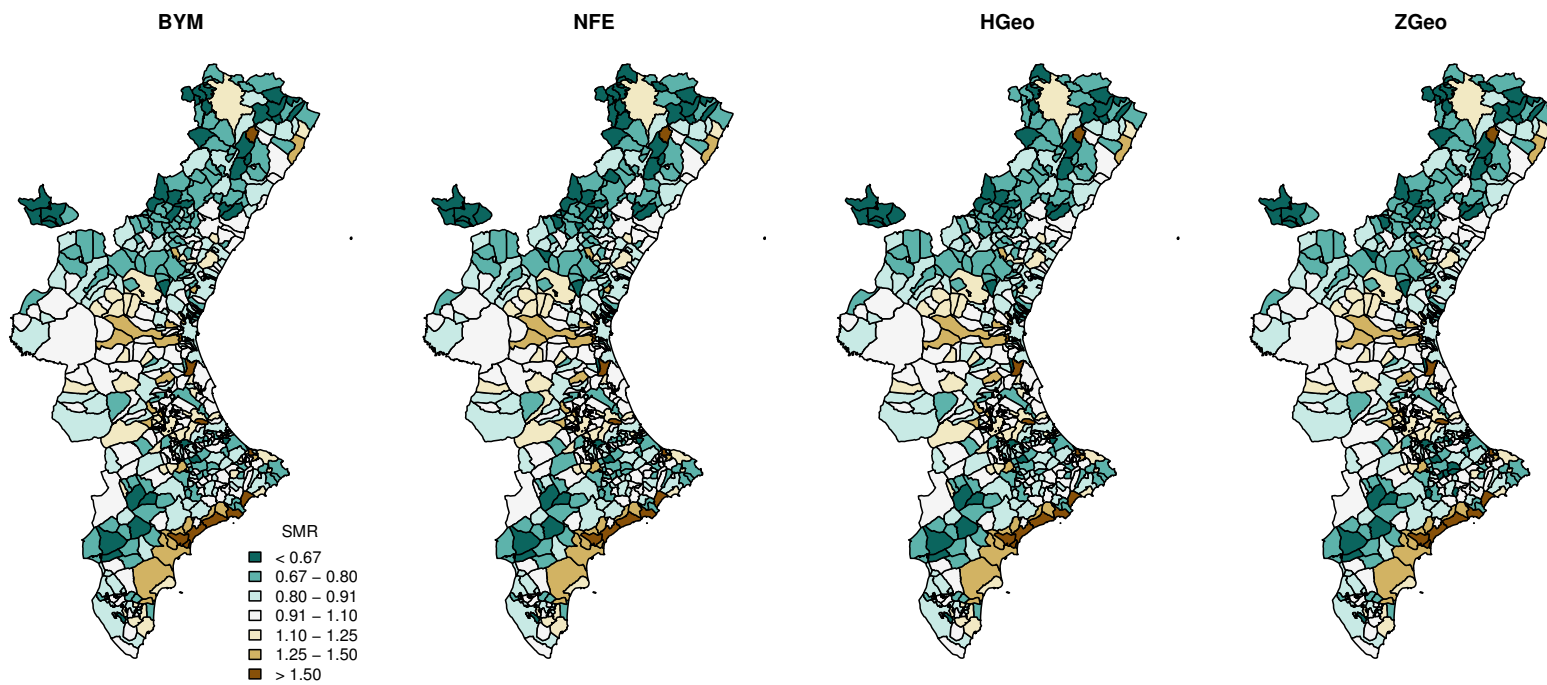
(Women, Hypertensive)



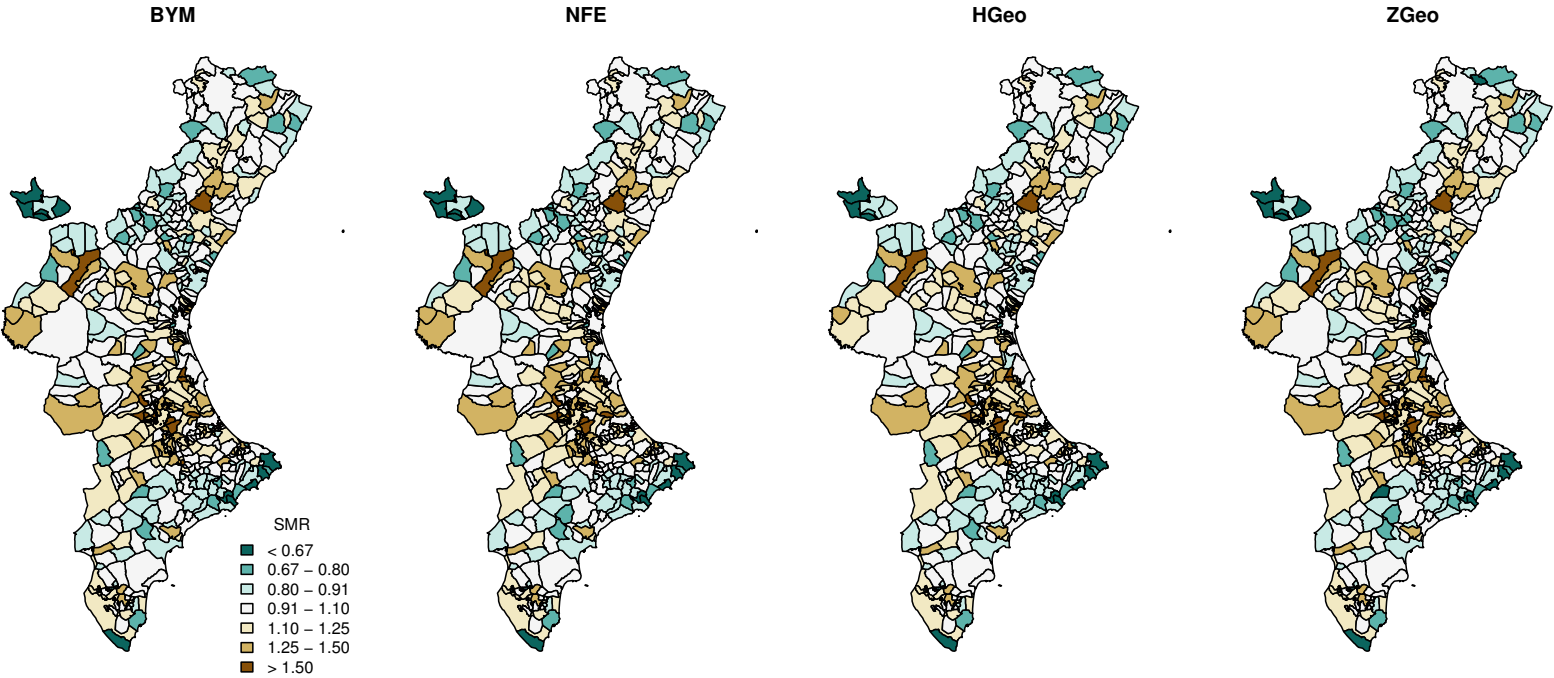
(Men, Ischemic)



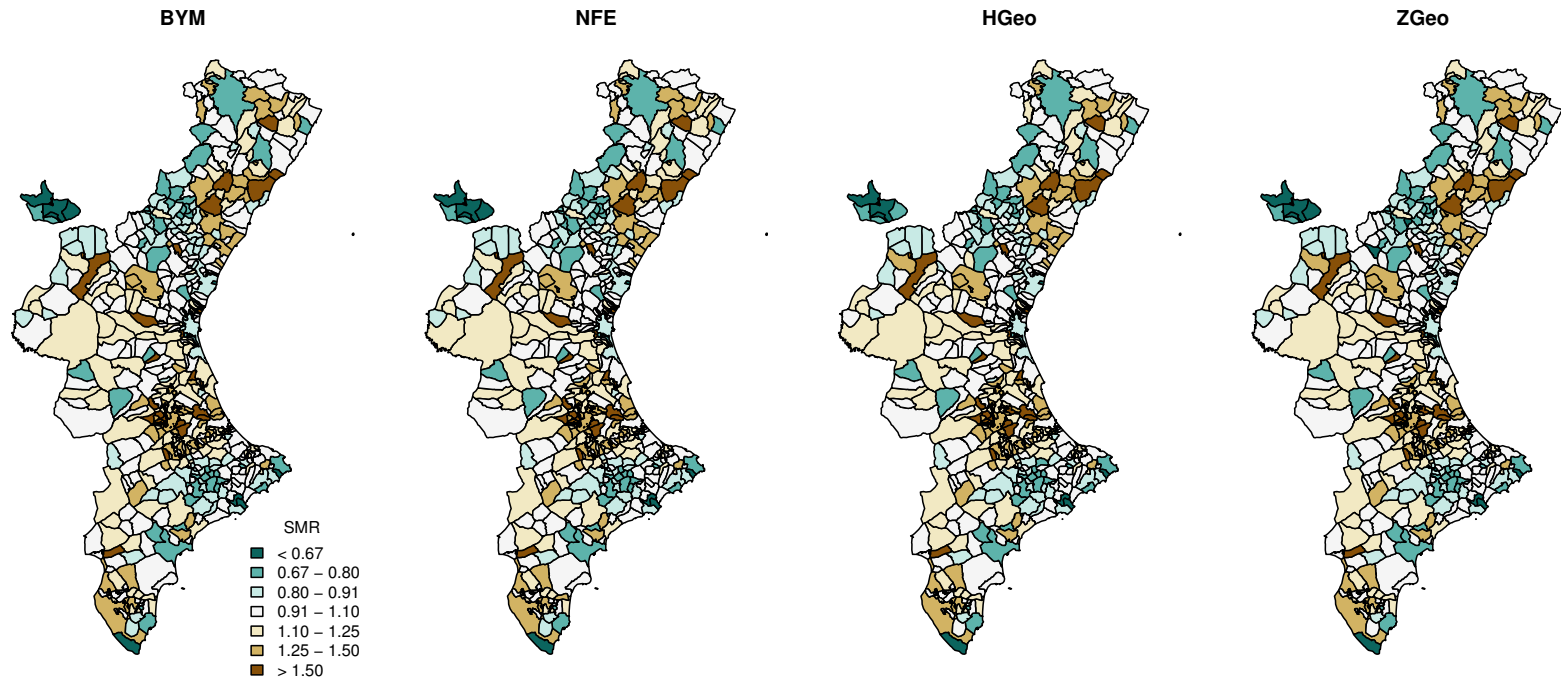
(Women, Ischemic)



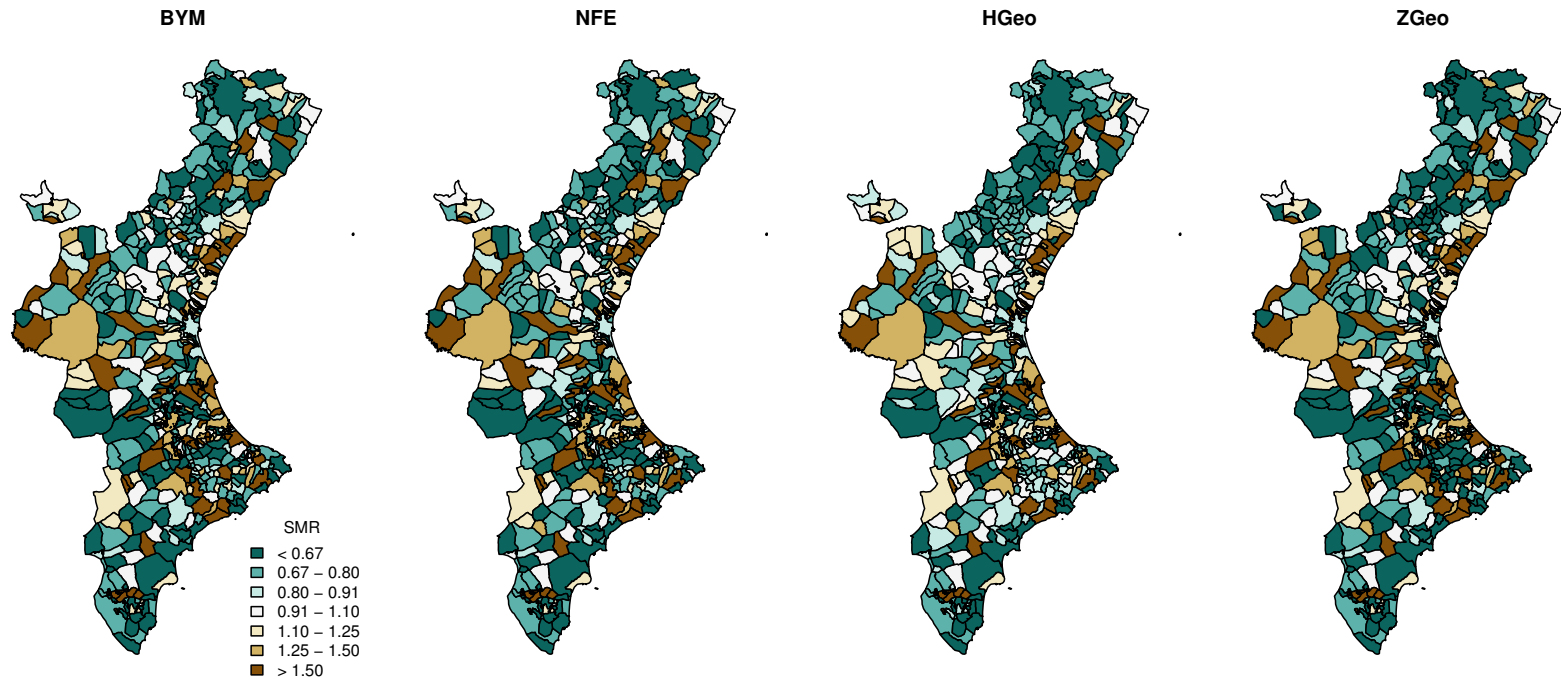
(Men, Cerebrovascular)



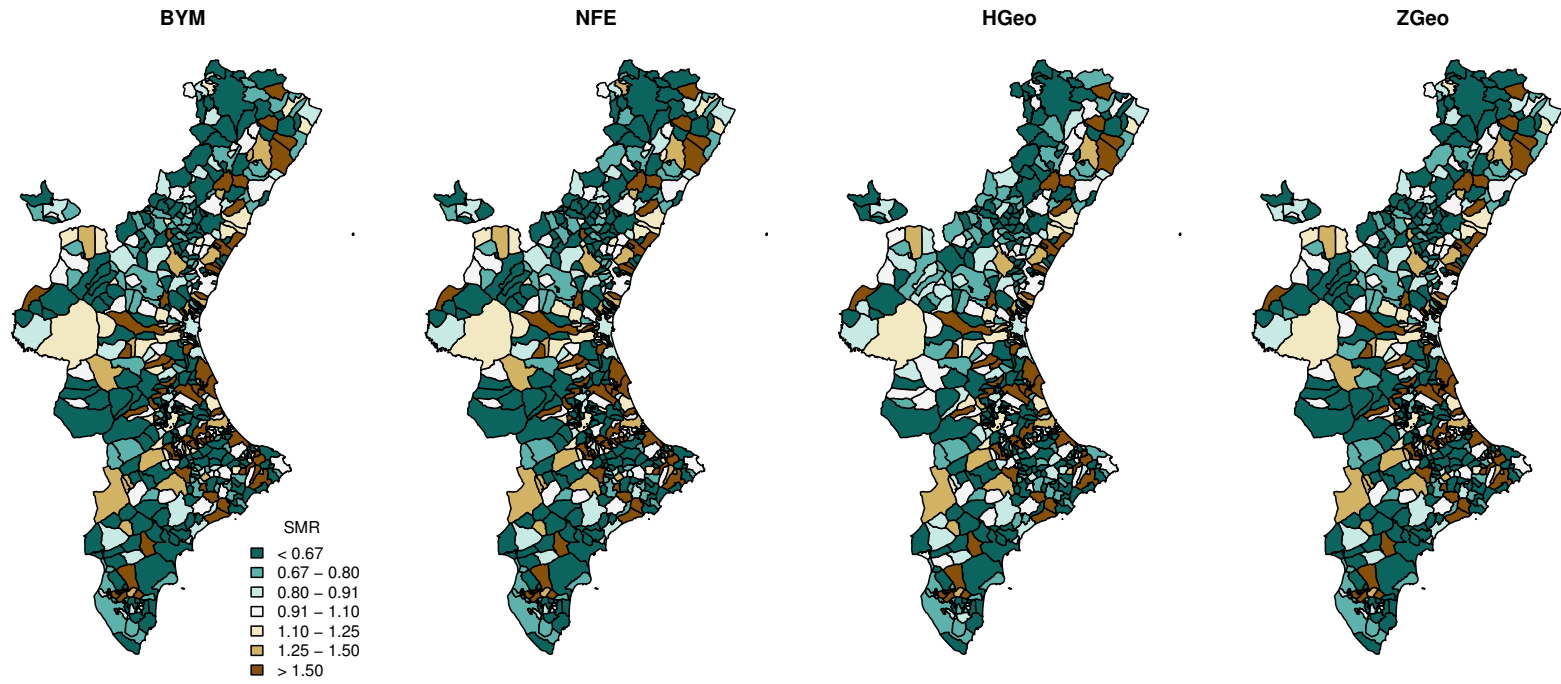
(Women, Cerebrovascular)



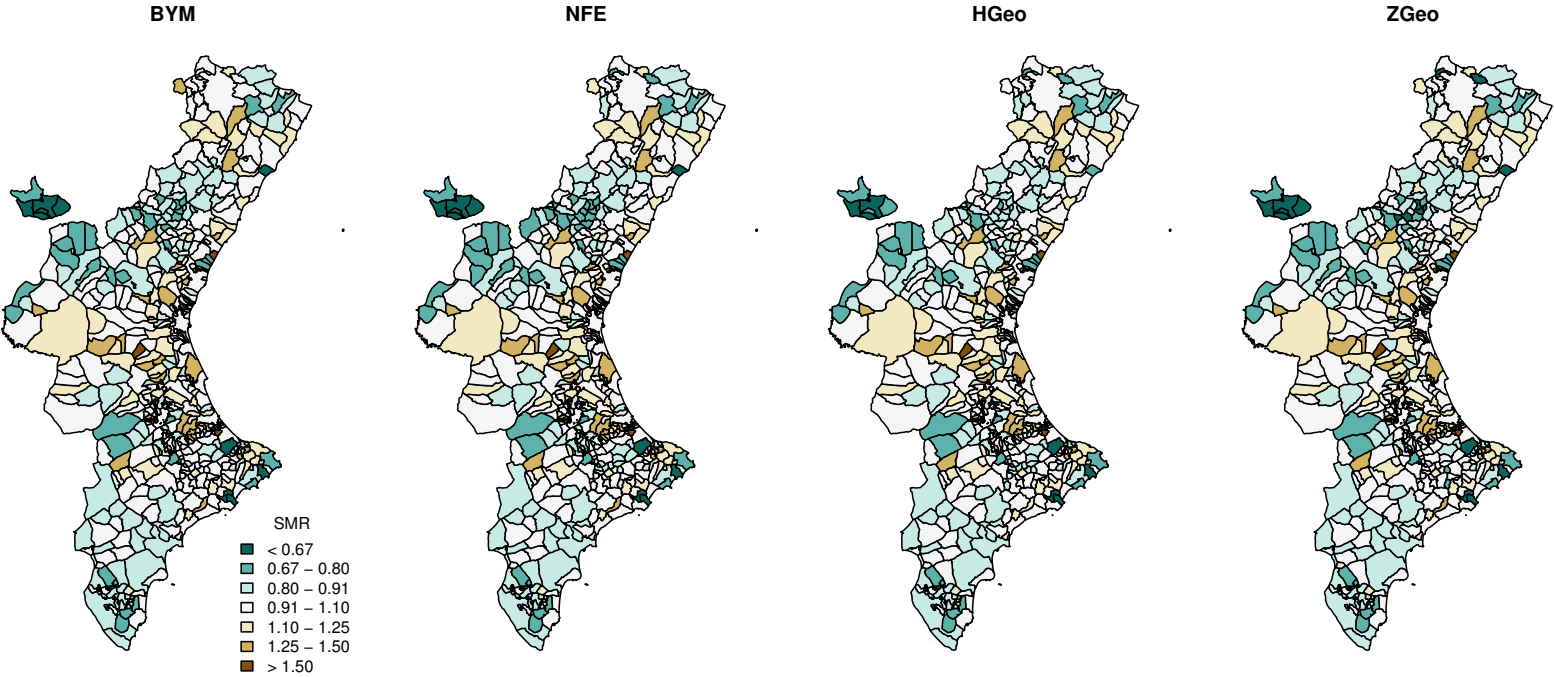
(Men, Atherosclerosis)



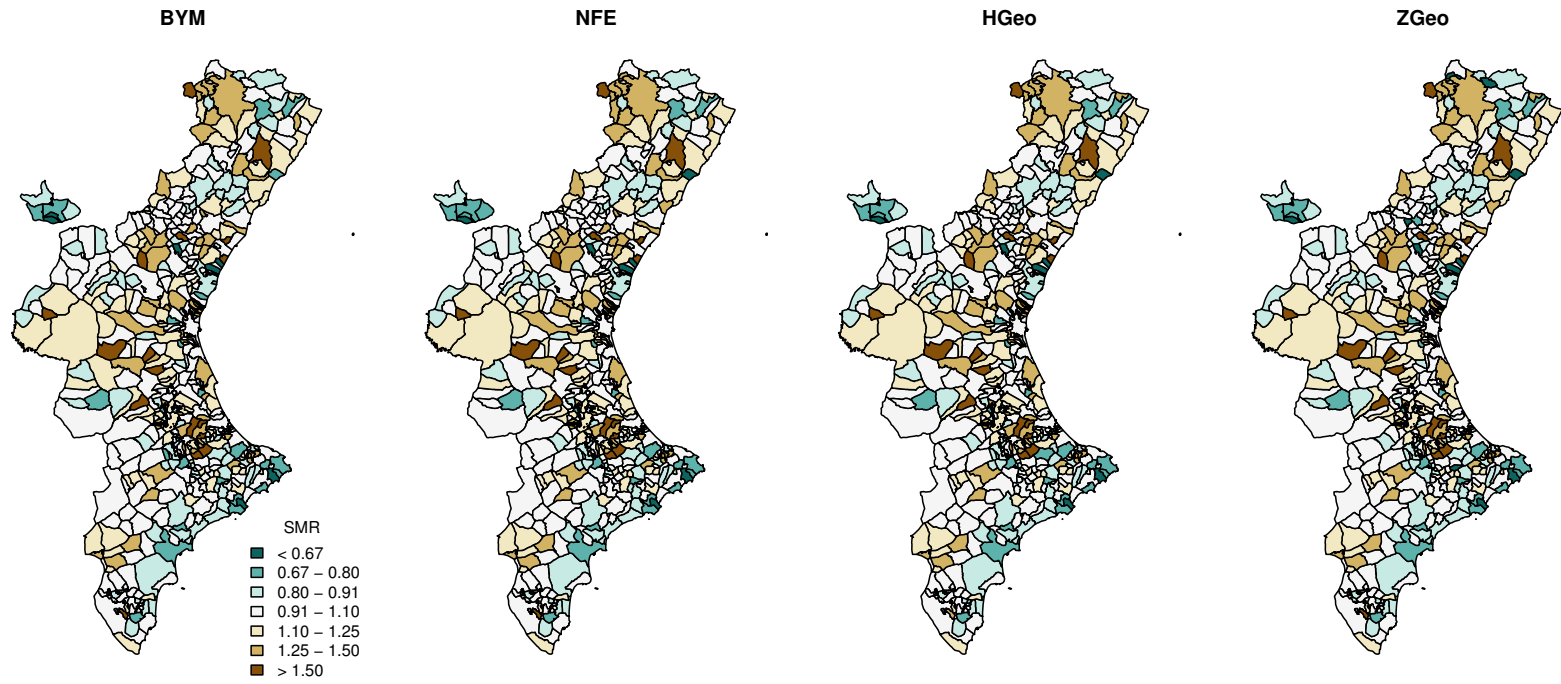
(Women, Atherosclerosis)



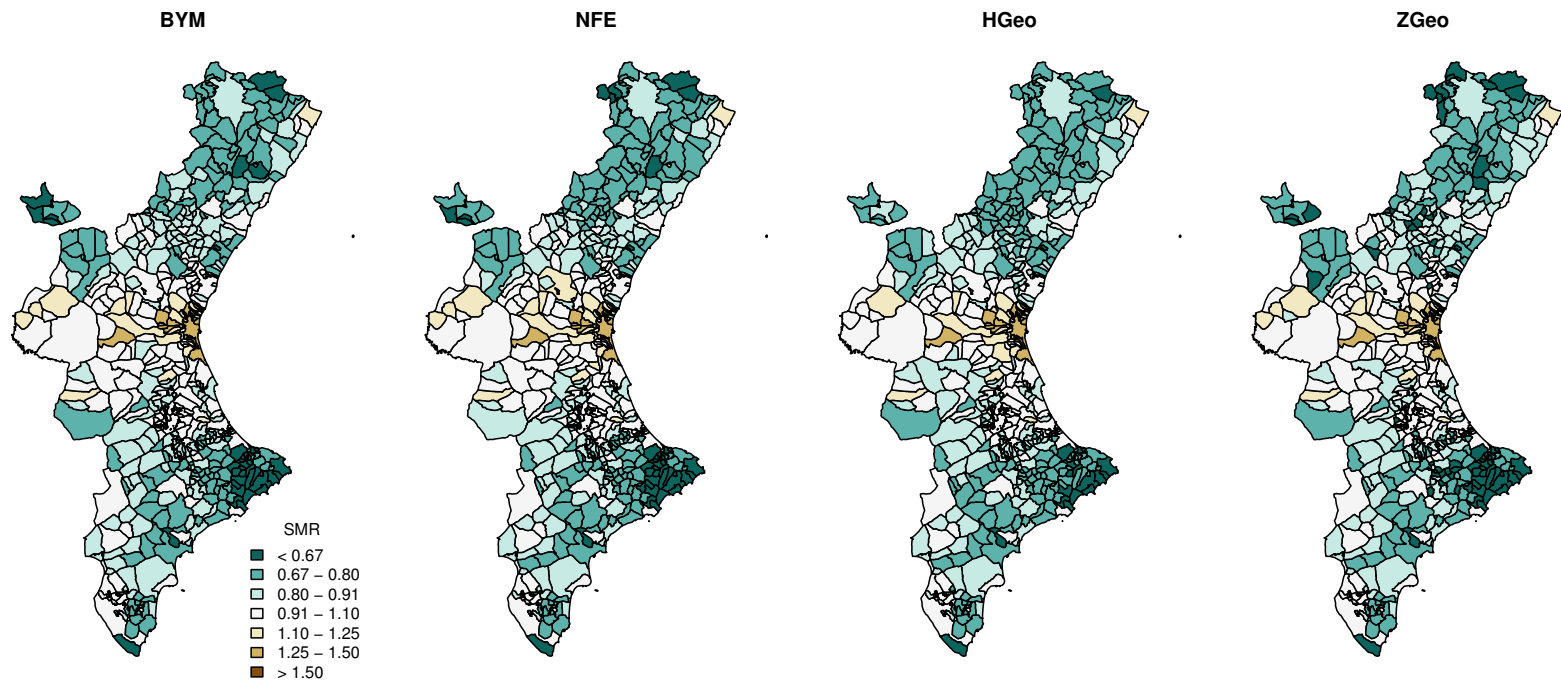
(Men, Other Cardiovascular)



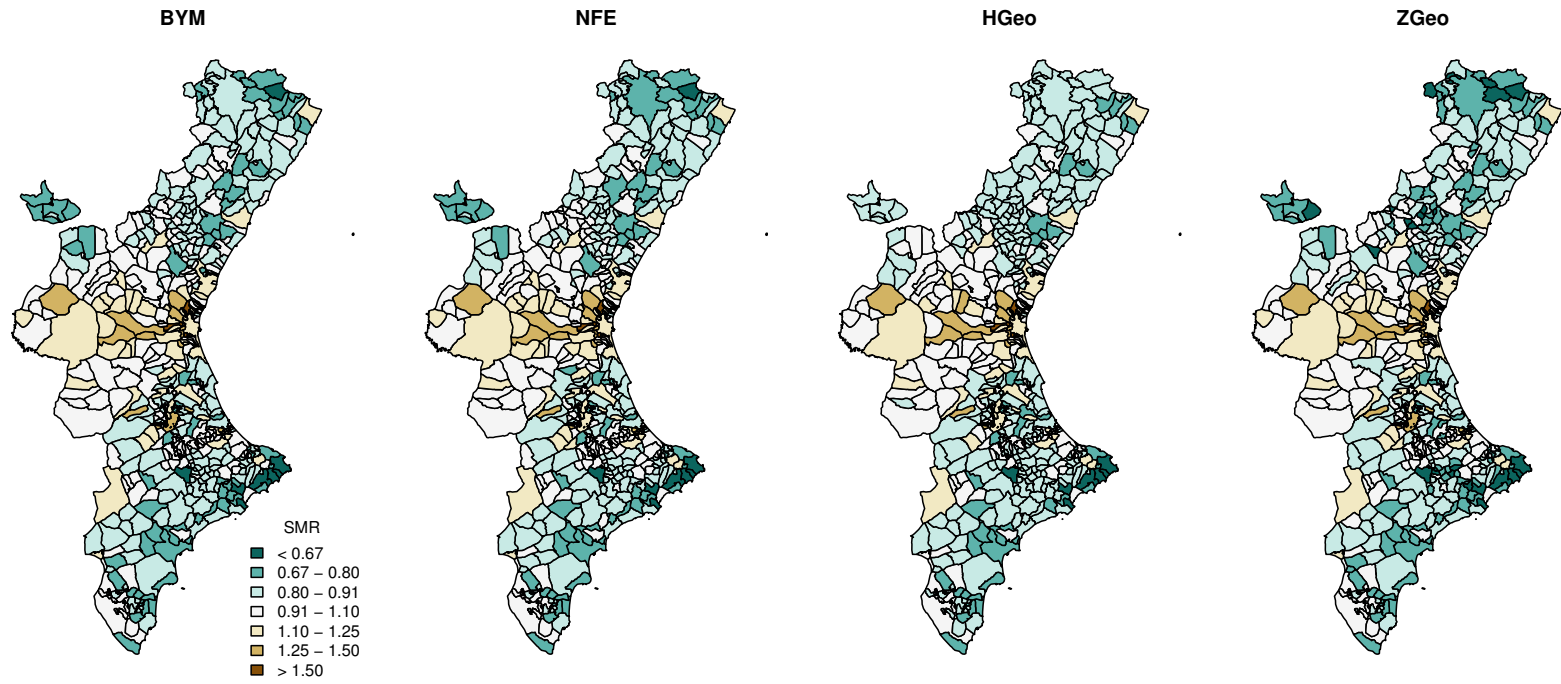
(Women, Other Cardiovascular)



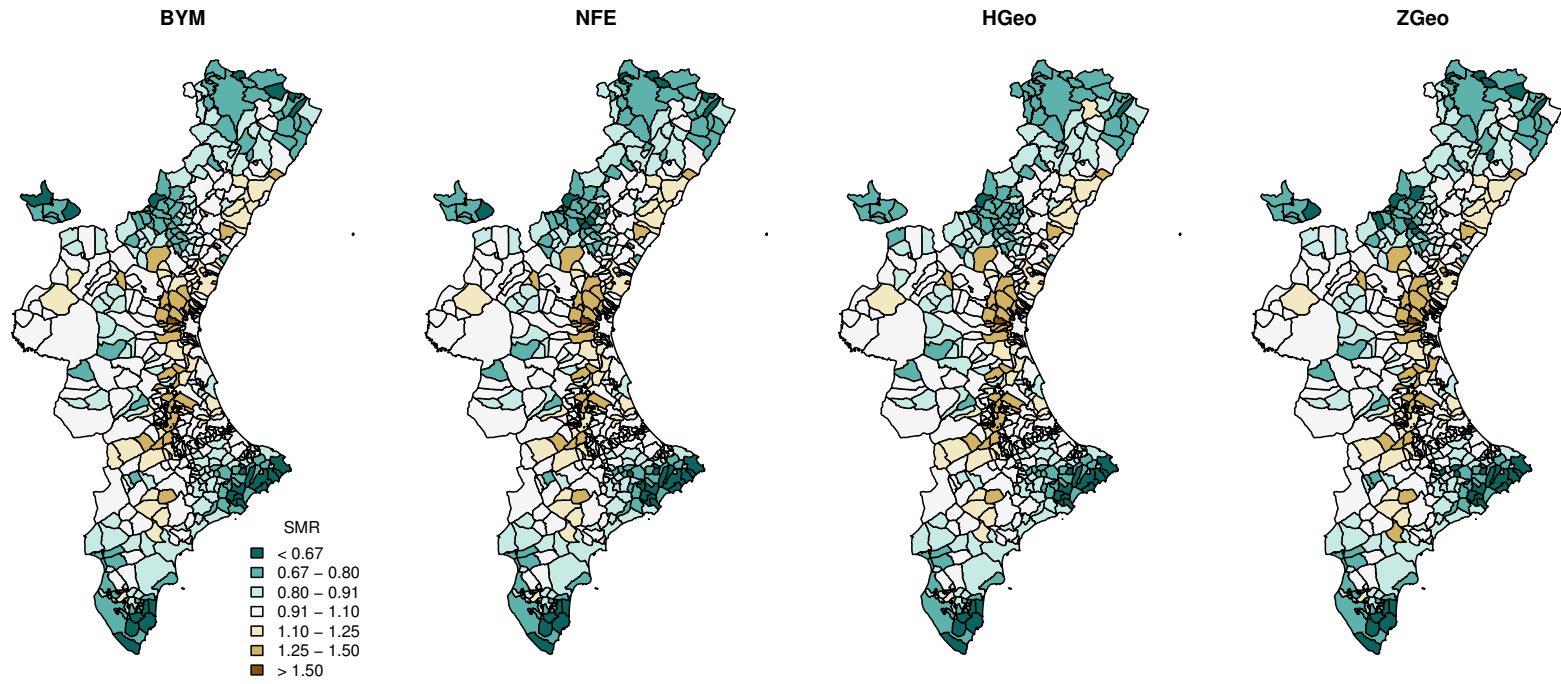
(Men, Pneumonia)



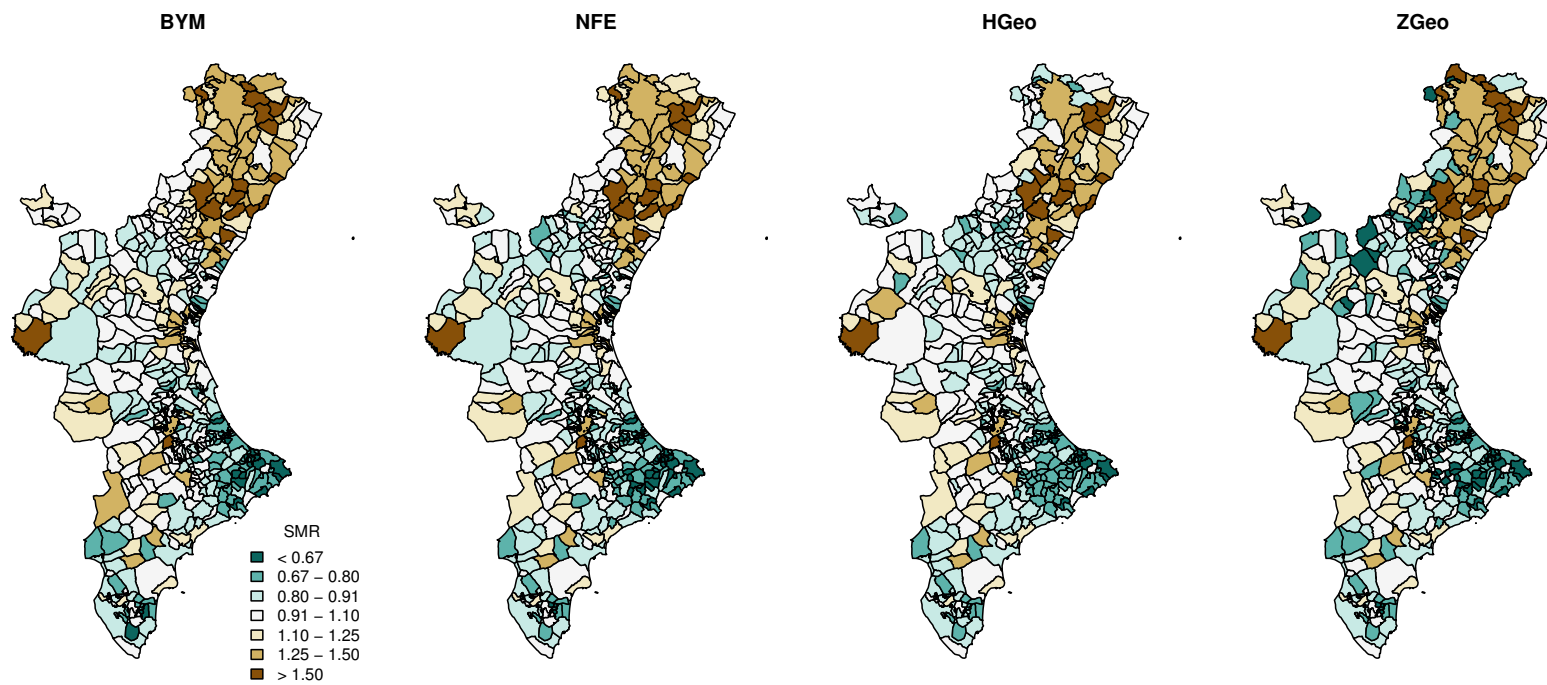
(Women, Pneumonia)



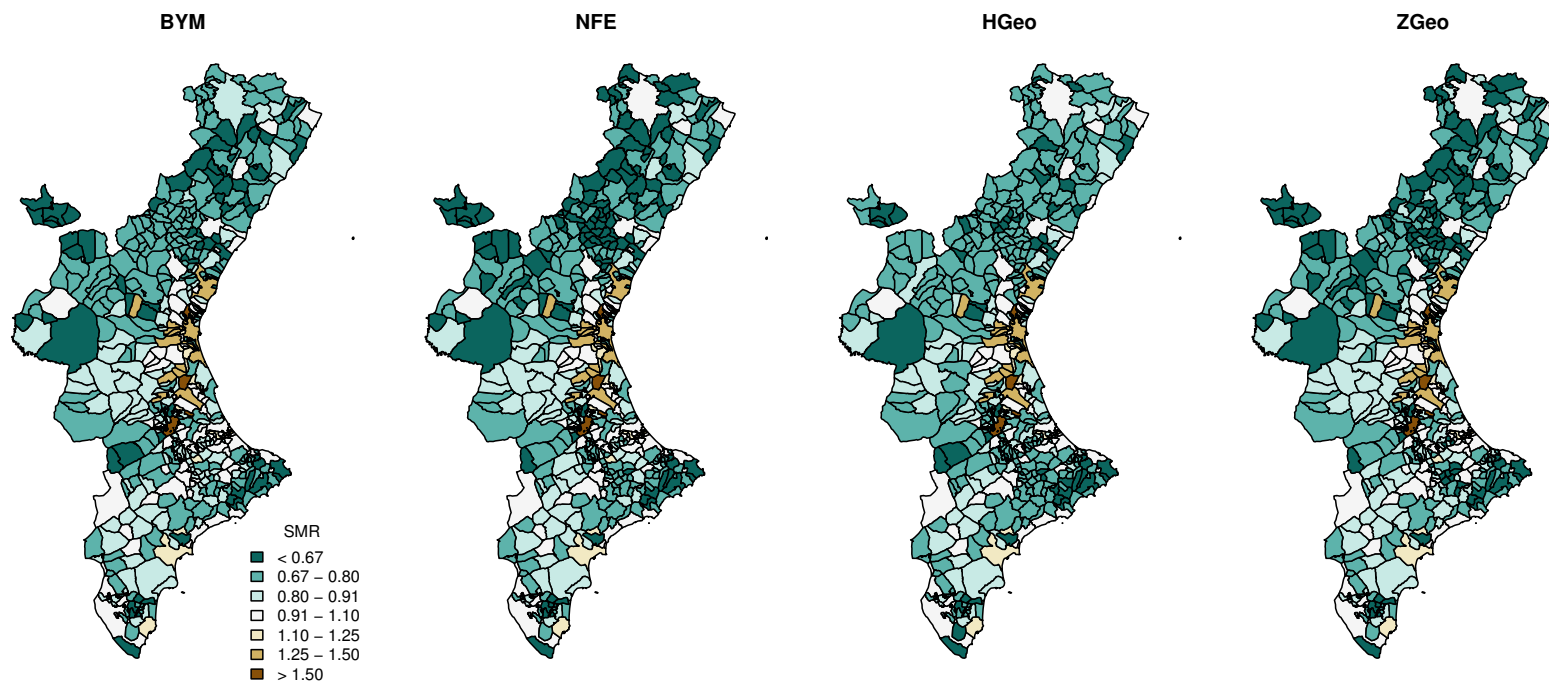
(Men, COPD)



(Women, COPD)



(Men, Cirrhosis)



(Women, Cirrhosis)

