

Analysing the evidence of the effects of climate change, air pollutants and social factors in the appearance of cataracts

Supplementary Material

Table S1. Evolutionary data on the general population of the study area

Municipality	Altitude (m)	Population 2010			Population 2021		
		M	W	Total	M	W	Total
1. Alcaucín	518	1344	1324	2668	1210	1156	2366
2. Algarrobo	86	3182	3168	6350	3298	3253	6551
3. Almachar	246	970	929	1899	940	903	1843
4. Árchez	530	231	215	446	204	194	398
5. Arenas	500	742	669	1411	615	566	1181
6. Benamargosa	96	815	795	1610	787	748	1535
7. Benamocarra	145	1553	1482	3035	1516	1514	3030
8. Borge (El)	257	526	489	1015	461	445	906
9. Canillas de Aceituno	649	1181	1104	2285	886	818	1704
10. Canillas de Albaida	630	468	456	924	396	415	811
11. Comares	703	854	761	1615	735	614	1349
12. Cómpeta	636	1982	1880	3862	1939	1927	3866
13. Cútar	331	341	330	671	313	289	602
14. Frigiliana	320	1568	1603	3171	1584	1614	3198
15. Iznate	300	481	442	923	474	438	912
16. Nerja	26	10876	11081	21957	10357	10661	21018
17. Periana	550	1868	1734	3602	1644	1515	3159
18. Salares	571	109	96	205	88	85	173
19. Sayalonga	359	782	773	1555	832	782	1614
20. Sedella	646	370	317	687	336	256	592
21. Torrox	120	8691	8612	17303	9547	9390	18937
22. Vélez-Málaga	60	37630	37993	75623	40919	42048	82967
23. Viñuela	150	1014	979	2668	1062	983	2045
TOTAL	-----	77578	77232	154810	80143	80614	160757

Table S2. Evolutionary data on the population over 15 years old in the study area

Municipality	Population 2010 >15 years old			Population 2021 >15 years old		
	M	W	Total	M	W	Total
1. Alcaucín	1177	1176	2353	1092	1036	2128
2. Algarrobo	2704	2706	5410	2827	2801	5628
3. Almachar	836	796	1632	823	777	1600
4. Árchez	205	191	396	189	175	364
5. Arenas	652	584	1236	550	500	1050
6. Benamargosa	717	718	1435	702	669	1371
7. Benamocarra	1326	1259	2585	1255	1263	2518
8. Borge (El)	469	431	900	418	387	805
9. Canillas de Aceituno	1032	995	2027	808	741	1549
10. Canillas de Albaida	433	407	840	356	375	731
11. Comares	765	688	1453	677	567	1244
12. Cómpeta	1734	1645	3379	1746	1723	3469
13. Cútar	306	304	610	287	268	555

14. Frigiliana	1336	1376	2712	1345	1374	2719
15. Iznate	410	366	776	403	357	760
16. Nerja	9288	9641	18929	8979	9359	18338
17. Periana	1588	1498	3086	1440	1332	2772
18. Salares	101	91	192	76	71	147
19. Sayalonga	688	685	1373	752	714	1466
20. Sedella	347	295	642	317	241	558
21. Torrox	7547	7528	15075	8384	8251	16635
22. Vélez-Málaga	31090	31714	62804	34128	35546	69674
23. Viñuela	893	873	1766	946	898	1844
TOTAL	65644	65967	131611	68500	69425	137925

Table S3. Spatial and population data for the study area. Standardized Cumulative cataract incidence in population 15-59 years old (2011-2021); employment data (average 2010-2020) and income (2019 data)

Municipality	Cat <60 years *	Standardized cumulative cataract incidence Men <60 *	Standardized cumulative cataract incidence Women <60 *	Total Standardized cumulative cataract incidence <60 *	Employment %				Income (€)		
					Agric	Indus	Cons	Serv	Net (INE)	Gross (IECA)	Household (INE)
1	< 10	< 50	< 50	< 50	16.48	4.25	19.63	59.65	9172	9560	21031
2	39	91,46	33,46	63,15	21.49	3.25	19.55	55.71	9963	12356	24593
3	14	97,93	56,44	77,92	15.72	2.25	38.82	43.20	8498	6832	20569
4	< 10	< 50	< 50	< 50	18.18	0.88	50.92	30.02	9897	7402	20894
5	< 10	68,19	< 50	< 50	27.59	2.64	20.60	49.17	9466	8177	19183
6	< 10	< 50	57,85	< 50	22.08	3.65	13.65	60.62	8789	8013	19178
7	19	83,94	39,98	61,92	28.99	4.54	19.59	46.88	9509	10144	23931
8	< 10	< 50	< 50	< 50	12.51	1.15	21.75	64.59	9058	7248	18756
9	< 10	< 50	< 50	< 50	13.35	7.11	37.28	42.26	9604	8801	20249
10	< 10	< 50	< 50	< 50	12.97	0.88	25.04	61.12	10354	9729	21164
11	< 10	< 50	< 50	< 50	20.22	2.36	45.24	32.18	8552	7348	19745
12	< 10	< 50	< 50	< 50	7.17	3.46	29.45	59.92	8376	10021	20142
13	< 10	< 50	< 50	< 50	16.76	1.55	24.82	56.86	9090	8510	18421
14	14	54,16	< 50	< 50	4.07	3.08	18.71	74.13	10684	12927	26267
15	< 10	64,98	< 50	58,31	20.24	2.97	35.51	41.28	8006	8193	19098
16	115	68,40	< 50	57,37	1.59	2.62	13.27	82.52	10913	13823	28617
17	11	< 50	< 50	< 50	32.37	2.18	21.73	43.72	8766	8131	20259
18	< 10	< 50	< 50	< 50	2.12	2.50	48.74	46.65	9974	7091	19949
19	< 10	< 50	< 50	< 50	13.72	16.19	37.84	32.26	8518	9331	18115
20	< 10	< 50	< 50	< 50	11.34	0.38	30.66	57.62	10609	8327	19005
21	84	64,13	44,15	54,24	7.84	4.32	14.69	73.15	9553	12624	22780
22	493	68,48	54,18	61,12	11.09	6.14	20.74	62.03	11367	15070	29961
23	< 10	< 50	51,08	< 50	14.11	4.50	21.47	59.93	8973	10064	21096

*In compliance with the Spanish Data Protection Law and in order to safeguard as much information about individuals as possible, municipalities whose number of cataracts is less than 10 in the 11 years of the study, or whose incidence is less than 0.005 ($< 50 \cdot 10^{-4}$) have been recorded as follows: <10 (number of cataracts); <50 (standardized cumulative cataracts incidence $\cdot 10^{-4}$ inhabitants). In villages with small

populations such as those analysed in this study, it may be easy to identify such individuals, which is what we are trying to avoid in this way.

Municipalities: 1. Alcaucín; 2. Algarrobo; 3. Almachar; 4. Árchez; 5. Arenas; 6. Benamargosa; 7. Benamocarra; 8. El Borge; 9. Canillas de Aceituno; 10. Canillas de Albaida; 11. Comares; 12. Cómpeta; 13. Cútar; 14. Frigiliana; 15. Iznate; 16. Nerja; 17. Periana; 18. Salares; 19. Sayalonga; 20. Sedella; 21. Torrox; 22. Vélez-Málaga; 23. Viñuela

INE: Instituto Nacional de Estadística. IECA: Instituto de Estadística y Cartografía de Andalucía. Income INE and Income IECA refer to per capita annual income in euros

Table S4. Climate and pollution data for the study area 30-year average values (1990-2020) for climate data (except insolation and humidity), and 11-year average values (2010-2020) for pollution data

Municipality	Average annual Temperature	Annually-Average Maximum Temperature	Annual Absolute Maximum temperature	Insolation (*)	Precipitation (mm)	Average Annual Humidity %	Average CO ₂ (Kt)	Average CO (t)	Average CH ₄ (t)	Average N ₂ O (t)	Average PM ¹⁰ (t)	Average PM _{2.5} (t)	Average Σ Pollutants (Kt)
1	16,03	21,11	26,97	3731	623,5	64,9	7,0	159,9	30,4	3,8	19,3	15,7	79,9
2	18,30	22,53	27,73	4143	430,2	66,1	12,5	46,0	13,7	1,9	6,2	4,7	140,9
3	17,46	22,01	27,45	3892	501,8	65,7	2,8	46,2	14,0	1,8	5,9	4,3	33,3
4	15,97	21,07	26,95	3783	628,8	64,9	1,3	22,1	3,0	0,7	2,5	2,0	16,2
5	16,13	21,17	27,00	3839	615,4	65,0	3,4	81,5	10,6	3,1	10,2	7,4	39,8
6	18,25	22,50	27,71	3940	434,7	66,1	3,1	30,8	6,4	1,9	4,7	3,2	36,2
7	17,99	22,34	27,62	4050	456,6	66,0	3,8	30,9	9,2	1,1	4,5	3,5	41,3
8	17,40	21,97	27,43	3790	506,7	65,7	2,3	71,0	23,4	2,2	7,9	5,9	28,0
9	15,34	20,68	26,74	3845	682,1	64,5	5,1	103,7	28,2	2,6	12,8	10,1	58,3
10	15,44	20,74	26,77	3754	673,6	64,6	2,4	56,9	10,5	1,4	7,6	5,6	29,1
11	15,06	20,50	26,65	3760	706,2	64,4	4,4	64,9	26,6	3,3	13,2	10,4	52,1
12	15,41	20,72	26,76	3742	676,2	64,6	6,1	143,2	28,0	2,0	15,3	12,4	70,1
13	17,01	21,73	27,30	3843	539,8	65,4	2,3	52,6	12,7	2,2	6,5	4,7	27,8
14	17,07	21,76	27,32	3754	534,9	65,5	8,2	69,7	14,5	2,0	8,6	6,9	93,0
15	17,18	21,83	27,35	3984	525,9	65,5	2,2	25,7	5,5	3,0	7,7	4,4	26,7
16	18,62	22,73	27,83	4138	403,3	66,3	53,8	215,1	27,4	4,3	20,7	17,0	597,7
17	15,86	21,00	26,91	4030	637,8	64,8	8,6	240,4	98,0	8,2	27,2	19,8	98,3
18	15,75	20,93	26,88	3861	647,2	64,7	0,9	18,2	3,3	0,7	2,2	1,6	11,6
19	16,87	21,63	27,25	3774	552,3	65,4	3,2	64,7	5,9	2,0	8,0	6,3	37,2
20	15,36	20,69	26,75	3820	680,7	64,5	1,8	48,9	24,3	1,7	5,9	4,3	22,5
21	18,13	22,42	27,67	4064	445,4	66,1	41,8	234,0	31,6	6,0	27,5	22,2	465,2
22	18,44	22,62	27,77	4176	418,6	66,2	158,9	786,1	288,3	28,8	97,8	77,4	1769,3
23	17,97	22,32	27,61	3877	458,8	66,0	5,8	67,2	158,9	2,2	8,4	6,4	67,0

* Insolation: Direct + Diffuse + Global Radiation in KWh*m²/year¹ Values for CO₂ and Total Pollutants in Kt*year*10⁻⁴ inhabitants. Rest of pollutants values in t*year *10⁻⁴ inhabitants. Climate data from 1990 to 2020 have been taken to achieve a fit with the World Meteorological Organisation's criteria for using valid samples of climate data.

Municipalities: 1. Alcaucín; 2. Algarrobo; 3. Almachar; 4. Árchez; 5. Arenas; 6. Benamargosa; 7. Benamocarra; 8. El Borge; 9. Canillas de Aceituno; 10. Canillas de Albaida; 11. Comares; 12. Cómpeta; 13. Cútar; 14. Frigiliana; 15. Iznate; 16. Nerja; 17. Periana; 18. Salares; 19. Sayalonga; 20. Sedella; 21. Torrox; 22. Vélez-Málaga; 23. Viñuela

Figure S1. Average Annual Temperature

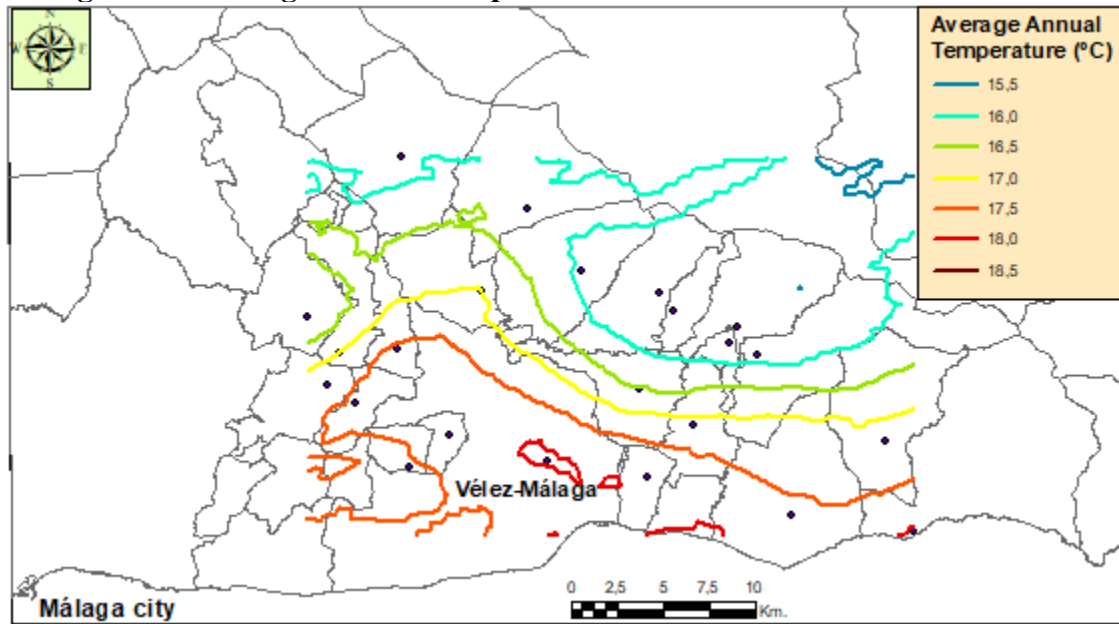


Figure S2. Annually-Averaged Maximum Temperature

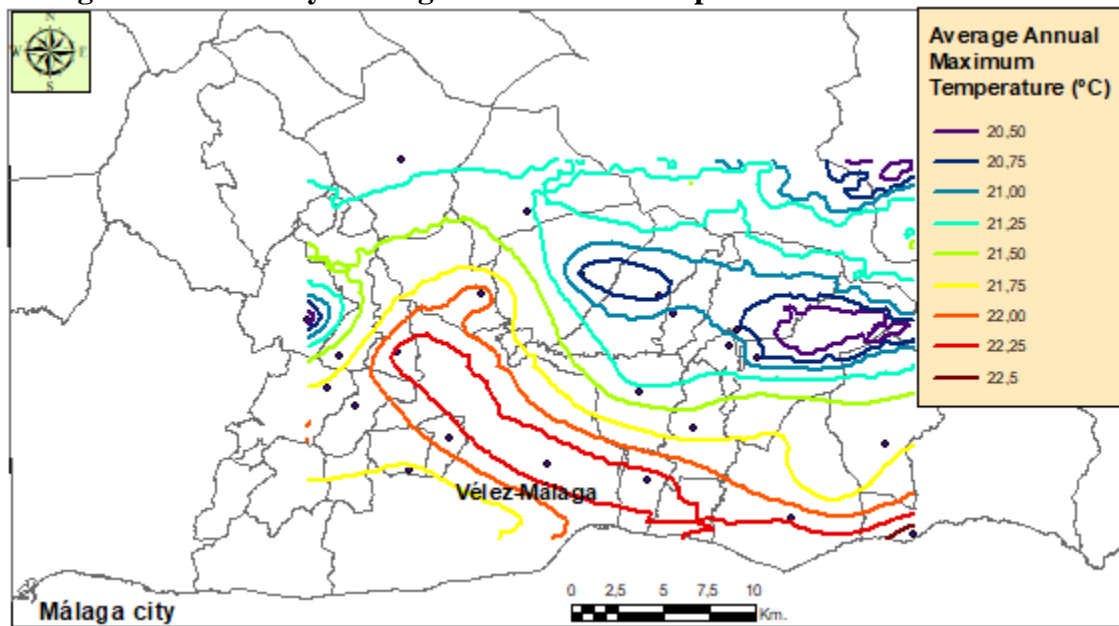


Figure S3. Annual Absolute Maximum Temperature

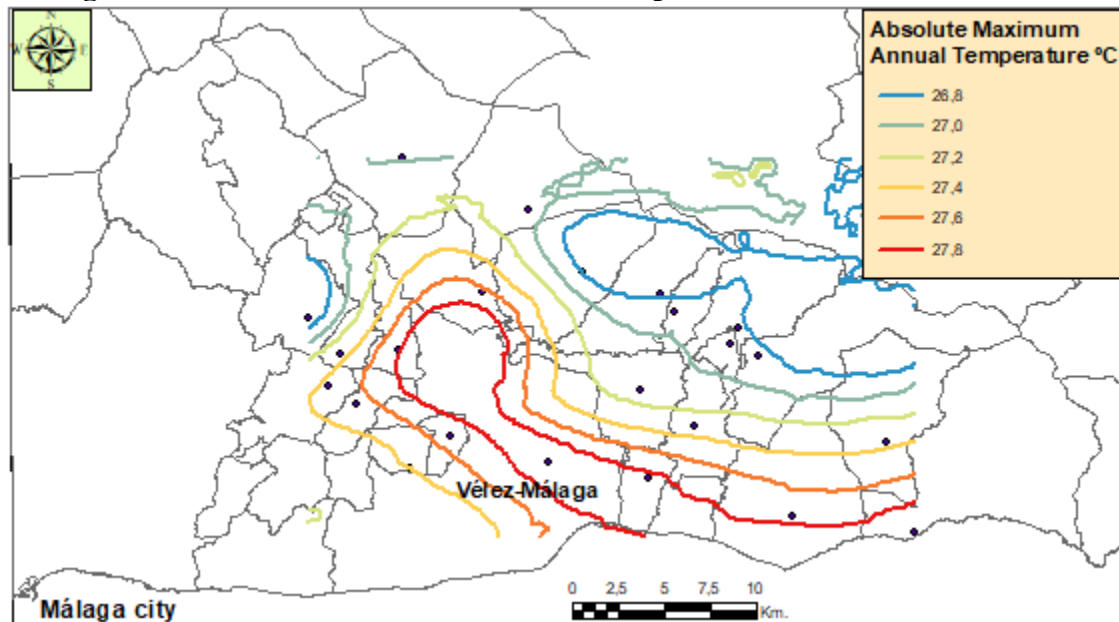


Figure S4. Average Annual Insolation

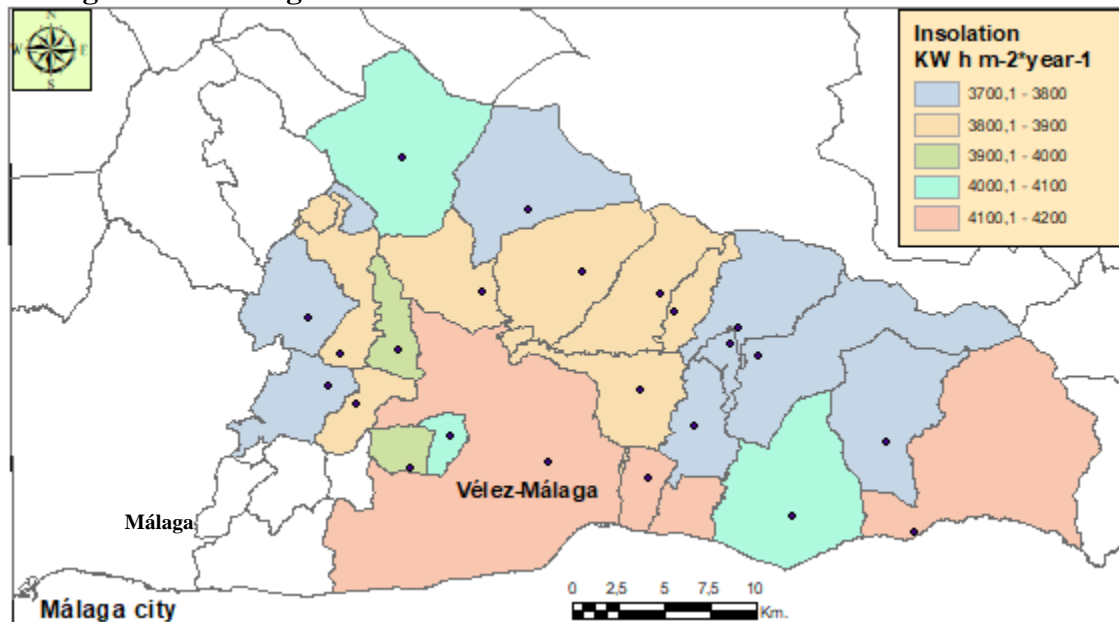


Figure S5. Sum of Annual Precipitation

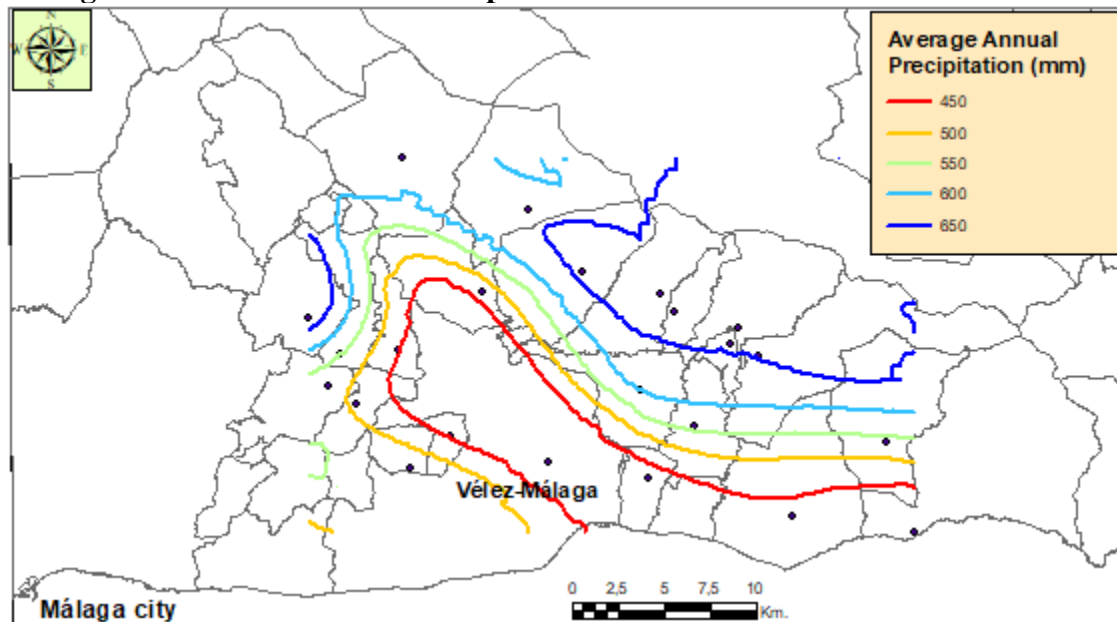


Figure S6. Standardized Cumulative Cataract Incidence in men under 60 years old

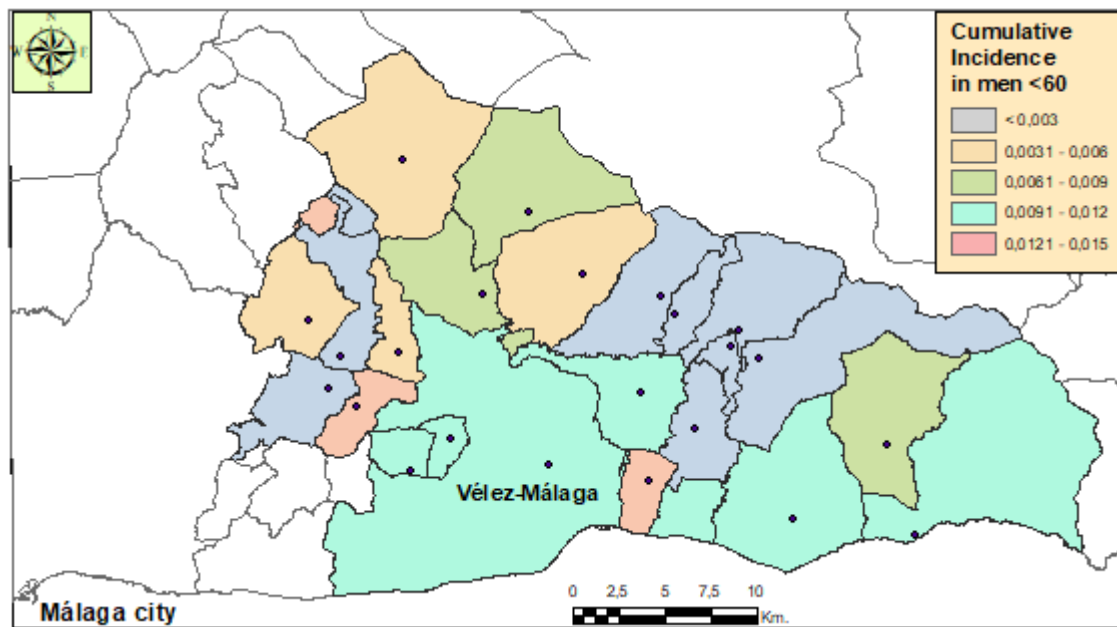


Figure S7. Standardized Cumulative Cataract Incidence in women under 60 years old

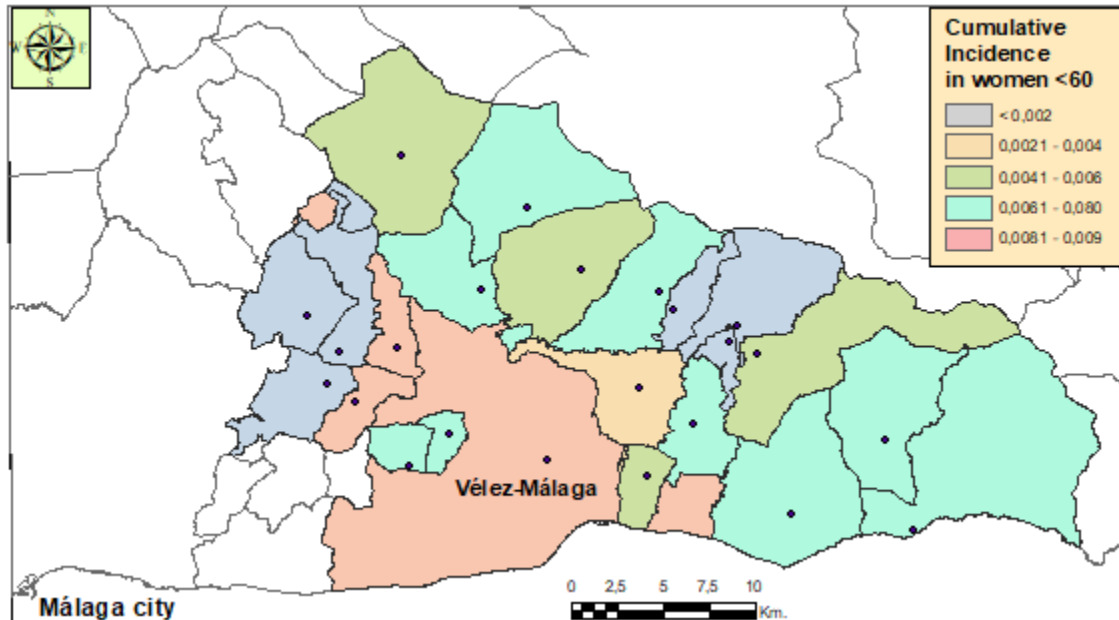
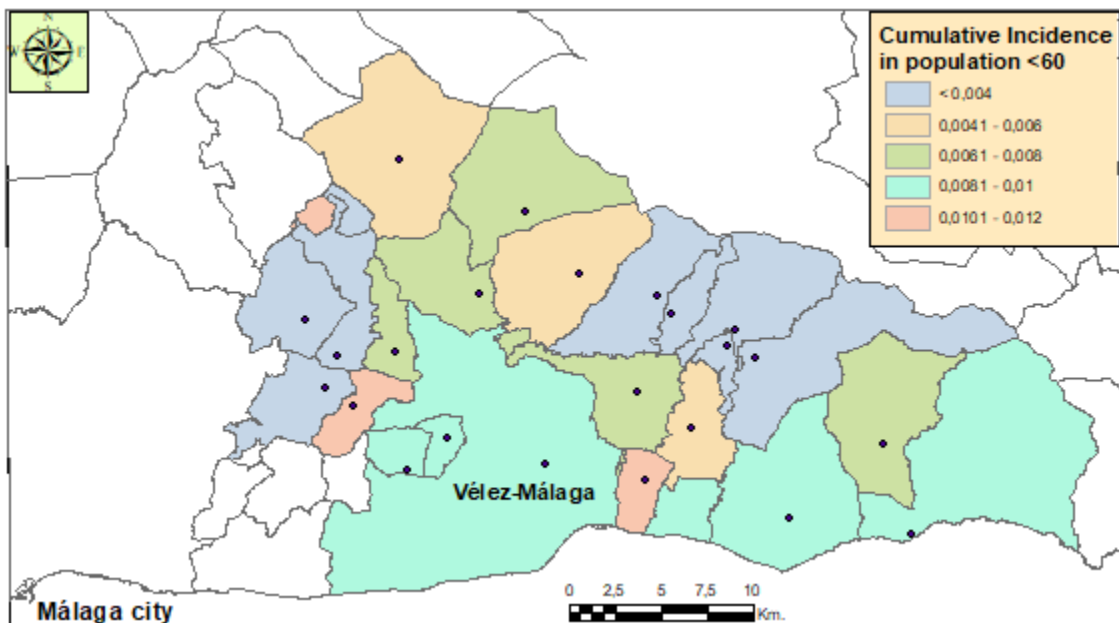


Figure S8. Standardized Cumulative Cataract Incidence in people under 60 years old



Explanatory note for figures 6 to 8: We have not had segregated municipal data for the population over 60 years of age, only accumulated values for the county, or only disaggregated annual values for the population under 60 years of age.