

Supplementary material

Tumor	ICD-9	ICD-10
Oral cavity and pharynx	140-149	C00,C14
Esophagus	150	C15
Stomach	151	C16
Small intestine	152	C17
Colorectal	153,154,159	C18-C21
Liver	155.0	C22.0
Gallbladder	156	C23-C24
Pancreas	157	C25
Peritoneus	158	C45.1,C48
Nasal	160	C30-C31
Larynx	161	C32
Lung	162	C33-C34
Pleura	163	C38.4,C45.0
Bones	170	C40-C41
Connective and soft tissue	171	C49
Melanoma	172	C43
Skin	173	C44
Breast	174	C50
Vulva and vagina	184	C51,C52
Uterus	179-182	C53-C55
Ovary	183	C56,C57
Prostate	185	C61
Testis	186	C62
Bladder	188	C67
Kidney	189	C64-C66,C68
Brain	191	C71
Other Central Nervous System	192	C70,C72
Thyroid gland	193	C73
Non-Hodgkin lymphoma	200,202	C82-C85
Hodgkin lymphoma	201	C81
Myeloma	203	C90
Leukaemia	204-208	C91-C95

Table 1. List of tumors analysed and their codes by the International Classification of Diseases-9th Revision/ICD-9 and ICD-10

NCEA		E-PRTR	
Code	Name	Categories	
		3.a (underground)	3.b (open-pit)
5.1	Extraction of anthracite and bituminous coal	33	12
5.2	Extraction of lignite	1	1
7.1	Extraction of iron	1	0
7.29	Extraction of non-metallic minerals	1	5
8.11	Extraction of ornamental rocks	1	30
8.12	Extraction of sand and arcille	0	25
8.91	Extraction of chemistry products and fertilizers	2	0
8.93	Extraction of salt	1	0
8.99	Other mining industries	2	4
9.9	Support activities for other mining installations	1	0

Table 2. Number of installations by National Classification of Economic Activities (NCEA) vs. E-PRTR category of mining.

Mining Group		PRTR Category	NCEA codes	Number of facilities
Code	Name			
1	Underground extraction of anthracite, bituminous coal and lignite	3a	5.1,5.2,9.9	35
2	Underground extraction of metallic or non metallic minerals	3a	7.1,7.29	2
3	Underground extraction of ornamental rocks, sand, arcille, chemistry products, fertilizers or other	3a	8.11,8.12,8.91,8.93,8.99	6
4	Open-pit extraction of anthracite, bituminous coal and lignite	3b	5.1,5.2,9.9	13
5	Open-pit extraction of metallic or non metallic minerals	3b	7.1,7.29	5
6	Open-pit extraction of ornamental rocks, sand, arcille, chemistry products, fertilizers or other	3b	8.11,8.12,8.91,8.93,8.99	59

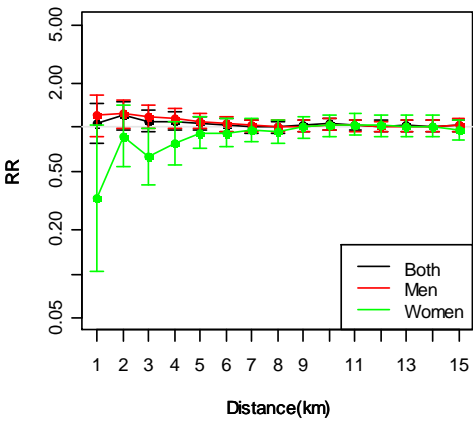
Table 3. Number of installations by Mining group, National Classification of Economic Activities (NCEA) and PRTR category of mining.

Tumor	Group	PRTR Group	NCEA	PRTR Code	Sex	RR	95%CI	N° towns	Obs	Exp
Oral cavity and pharynx	5	3.b	7.29	6870	Both	1.85	0.83 4.10	3	9	6.4
					Men	2.38	1.06 5.38	3	9	5.4
					Women	0.01	0.00 1.E+08	3	0	1.0
Esophagus	1	3.a	5.1	6590	Both	1.81	0.81 4.04	2	8	3.0
					Men	2.36	1.04 5.38	2	8	2.6
	Women	0.01	0.00 1.E+08	2	0	0.4				
	3	3.a	8.91	7446	Both	2.27	0.99 5.20	2	7	3.6
					Men	2.49	1.08 5.77	2	7	3.1
					Women	0.02	0.00 5.E+09	2	0	0.5
4	3.b	5.1	6635	Both	2.88	1.06 7.79	1	6	2.5	
				Men	3.22	1.17 8.86	1	6	2.2	
				Women	0.15	0.00 3.E+10	1	0	0.3	
Stomach	1	3.a	5.1	6865	Both	1.89	0.94 3.82	1	28	21.8
					Men	2.59	1.23 5.43	1	20	12.6
					Women	1.09	0.36 3.32	1	8	9.2
	4	3.b	5.1	6866	Both	1.92	0.95 3.89	1	28	21.8
					Men	2.68	1.27 5.65	1	20	12.6
					Women	1.07	0.35 3.27	1	8	9.2
	6	3.b	8.11	7467	Both	1.76	1.07 2.92	3	26	12.6
					Men	1.57	0.84 2.93	3	15	8.0
					Women	2.27	1.13 4.59	3	11	4.6
	6	3.b	8.12	6860	Both	1.37	0.88 2.13	1	33	29.8
					Men	1.70	1.06 2.72	1	26	19.2
					Women	0.80	0.35 1.81	1	7	10.6
6	3.b	8.99	6871	Both	2.58	1.02 6.53	3	5	3.6	
				Men	2.43	0.74 7.93	3	3	2.3	
				Women	2.94	0.67 12.90	3	2	1.2	
Colorectal	1	3.a	5.1	6751	Both	2.43	1.54 3.85	1	34	14.6
					Men	2.46	1.35 4.47	1	20	8.1
					Women	2.43	1.32 4.48	1	14	6.5
	3	3.a	8.91	7445	Both	1.42	1.04 1.92	2	60	44.1
					Men	1.47	0.99 2.17	2	35	25.0
					Women	1.35	0.86 2.12	2	25	19.2
	4	3.b	5.1	6868	Both	1.94	0.99 3.78	1	13	9.1
					Men	1.54	0.58 4.08	1	5	5.2
					Women	2.29	1.01 5.17	1	8	3.9
	6	3.b	8.11	6896	Both	1.28	0.92 1.78	1	58	46.4
					Men	1.50	1.01 2.23	1	38	27.5
					Women	1.00	0.59 1.71	1	20	18.9
6	3.b	8.12	7579	Both	1.26	0.97 1.62	2	122	110.8	
				Men	1.10	0.80 1.52	2	67	68.0	
				Women	1.47	1.05 2.06	2	55	42.8	
6	3.b	8.12	7470	Both	1.75	1.08 2.85	2	20	11.1	
				Men	1.30	0.64 2.63	2	9	6.8	
				Women	2.49	1.30 4.77	2	11	4.3	
6	3.b	8.12	6760	Both	1.30	1.00 1.69	3	78	60.4	
				Men	1.26	0.90 1.78	3	44	34.9	
				Women	1.34	0.91 1.96	3	34	25.4	
Liver	6	3.b	8.11	6768	Both	1.79	0.99 3.23	1	25	13.0
					Men	1.42	0.73 2.76	1	14	9.7
					Women	2.54	1.06 6.07	1	11	3.3
Gallbladder	1	3.a	5.1	6576	Both	3.59	1.52 8.50	1	19	20.1
					Men	4.92	1.22 19.80	1	11	6.4
					Women	2.86	0.90 9.08	1	8	13.7
	1	3.a	5.1	6588	Both	2.13	0.99 4.57	2	14	14.3
					Men	3.66	1.16 11.58	2	9	4.6
					Women	1.37	0.45 4.18	2	5	9.7
1	3.a	5.1	6589	Both	3.03	1.45 6.34	2	27	28.6	
				Men	5.33	1.66 17.09	2	17	9.1	
				Women	1.93	0.71 5.29	2	10	19.5	
6	3.b	8.12	7465	Both	2.68	1.17 6.16	2	8	3.4	
				Men	3.80	1.13 12.84	2	4	1.3	
				Women	2.08	0.67 6.45	2	4	2.2	
Pancreas	3	3.a	8.91	7446	Both	1.71	0.89 3.27	2	11	8.7
					Men	2.32	1.07 5.04	2	8	4.6
					Women	1.01	0.31 3.31	2	3	4.1
	4	3.b	5.1	7382	Both	1.49	0.89 2.50	2	60	52.1
					Men	1.09	0.53 2.26	2	29	27.7
					Women	2.26	1.07 4.79	2	31	24.4
Lung	1	3.a	5.1	6751	Both	1.83	1.12 2.99	1	28	21.5
					Men	1.79	1.01 3.16	1	23	19.0
					Women	2.16	0.80 5.85	1	5	2.5
	1	3.a	5.1	6823	Both	1.33	0.90 1.96	3	56	49.2
					Men	1.18	0.78 1.78	3	44	43.7
					Women	2.82	1.18 6.73	3	12	5.5
1	3.a	5.2	7496	Both	3.70	1.73 7.89	1	8	4.0	
				Men	3.90	1.74 8.73	1	7	3.6	
				Women	2.50	0.32 19.30	1	1	0.4	
4	3.b	5.1	6822	Both	1.40	0.95 2.07	2	56	47.9	
				Men	1.24	0.82 1.87	2	44	42.5	
				Women	2.94	1.22 7.09	2	12	5.4	
6	3.b	8.99	6871	Both	1.79	1.04 3.07	3	17	10.9	
				Men	1.78	1.03 3.10	3	16	9.8	
				Women	1.83	0.24 14.19	3	1	1.1	
6	3.b	8.12	6760	Both	1.46	1.16 1.83	3	139	112.2	
				Men	1.46	1.14 1.86	3	117	97.5	
				Women	1.38	0.82 2.33	3	22	14.7	
Bones	6	3.b	8.12	7579	Both	3.24	1.24 8.48	2	7	3.3
					Men	3.24	1.05 10.06	2	5	2.1
					Women	2.90	0.39 21.43	2	2	1.3
Melanoma	3	3.a	8.91	7446	Both	2.73	1.08 6.89	2	6	1.5
					Men	3.39	0.92 12.46	2	3	0.8
					Women	2.21	0.59 8.32	2	3	0.7
	6	3.b	8.11	7472	Both	2.29	1.05 5.00	3	12	4.2
					Men	3.01	1.07 8.43	3	7	2.2
					Women	1.59	0.50 5.04	3	5	1.9

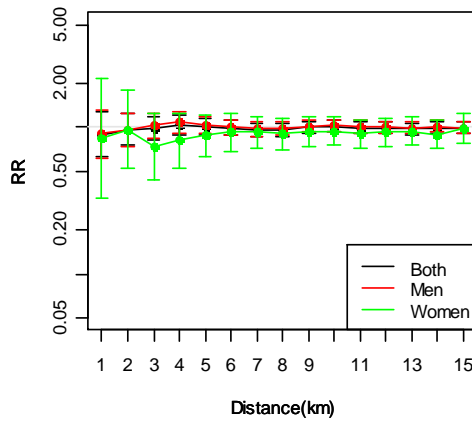
Tumor	Group	PRTR Group	NCEA	PRTR Code	Sex	RR	95%CI	N° towns	Obs	Exp	
Breast	4	3.b	5.2	6910	Both	2.81	1.04	7.56	2	6	3.2
					Men	NA	NA	NA	2	NA	NA
					Women	2.81	1.04	7.56	2	6	3.2
	4	3.b	5.1	6630	Both	3.87	1.46	10.31	1	5	2.4
					Men	NA	NA	NA	1	NA	NA
					Women	3.87	1.46	10.31	1	5	2.4
	6	3.b	8.12	7465	Both	1.66	1.04	2.66	2	23	16.1
					Men	NA	NA	NA	2	NA	NA
					Women	1.66	1.04	2.66	2	23	16.1
6	3.b	8.11	7468	Both	1.45	1.02	2.06	3	63	47.6	
				Men	NA	NA	NA	3	NA	NA	
				Women	1.45	1.02	2.06	3	63	47.6	
Uterus	6	3.b	8.12	7579	Both	2.11	1.26	3.53	2	28	17.0
					Men	NA	NA	NA	2	NA	NA
					Women	2.11	1.26	3.53	2	28	17.0
	1	3.a	5.1	6549	Both	2.48	1.15	5.33	1	13	7.8
					Men	NA	NA	NA	1	NA	NA
					Women	2.48	1.15	5.33	1	13	7.8
	1	3.a	5.1	6590	Both	3.40	1.31	8.80	2	6	2.9
					Men	NA	NA	NA	2	NA	NA
					Women	3.40	1.31	8.80	2	6	2.9
1	3.a	5.1	6591	Both	1.99	1.08	3.70	1	32	27.4	
				Men	NA	NA	NA	1	NA	NA	
				Women	1.99	1.08	3.70	1	32	27.4	
Ovary	1	3.a	5.1	6590	Both	2.73	1.15	6.51	2	7	2.9
					Men	NA	NA	NA	2	NA	NA
					Women	2.73	1.15	6.51	2	7	2.9
	6	3.b	8.11	7472	Both	2.13	1.08	4.19	3	14	10.0
					Men	NA	NA	NA	3	NA	NA
					Women	2.13	1.08	4.19	3	14	10.0
6	3.b	8.12	6760	Both	1.87	1.06	3.28	3	16	11.3	
				Men	NA	NA	NA	3	NA	NA	
				Women	1.87	1.06	3.28	3	16	11.3	
Prostate	6	3.b	8.12	6575	Both	2.46	1.02	5.91	2	6	2.3
					Men	2.46	1.02	5.91	2	6	2.3
					Women	NA	NA	NA	2	NA	NA
	6	3.b	8.11	6681	Both	1.92	1.05	3.52	2	14	8.5
					Men	1.92	1.05	3.52	2	14	8.5
					Women	NA	NA	NA	2	NA	NA
	6	3.b	8.11	6768	Both	0.54	0.30	0.98	1	15	26.3
					Men	0.54	0.30	0.98	1	15	26.3
					Women	NA	NA	NA	1	NA	NA
6	3.b	8.11	7179	Both	0.33	0.12	0.90	1	4	11.8	
				Men	0.33	0.12	0.90	1	4	11.8	
				Women	NA	NA	NA	1	NA	NA	
Bladder	4	3.b	5.1	6868	Both	2.55	1.10	5.91	1	9	3.2
					Men	3.08	1.27	7.50	1	9	2.6
					Women	0.01	0.00	5.E+08	1	0	0.6
	6	3.b	8.12	7579	Both	1.57	1.10	2.24	2	55	37.8
					Men	1.36	0.91	2.03	2	40	32.6
					Women	2.68	1.39	5.18	2	15	5.2
	1	3.a	5.1	6627	Both	2.26	1.05	4.84	1	17	13.0
					Men	3.17	1.47	6.86	1	17	10.9
					Women	0.00	0.00	2.E+07	1	0	2.1
	4	3.b	5.1	6632	Both	2.26	1.05	4.84	1	17	13.0
					Men	3.17	1.47	6.86	1	17	10.9
					Women	0.00	0.00	2.E+07	1	0	2.1
	1	3.a	5.1	6634	Both	2.17	1.06	4.45	1	17	13.0
					Men	3.11	1.51	6.39	1	17	10.9
					Women	0.00	0.00	2.E+07	1	0	2.1
1	3.a	5.1	6650	Both	2.26	1.07	4.81	1	17	13.0	
				Men	3.17	1.48	6.80	1	17	10.9	
				Women	0.00	0.00	2.E+07	1	0	2.1	
3	3.a	8.91	7446	Both	1.77	1.07	2.93	2	20	8.9	
				Men	1.78	1.03	3.06	2	17	7.4	
				Women	1.75	0.51	5.98	2	3	1.5	
6	3.b	8.11	7179	Both	1.91	1.01	3.59	1	16	9.0	
				Men	1.96	0.98	3.90	1	14	7.5	
				Women	1.59	0.38	6.71	1	2	1.5	
6	3.b	8.11	7396	Both	1.47	1.04	2.06	2	59	42.2	
				Men	1.43	0.99	2.08	2	48	36.1	
				Women	1.67	0.80	3.53	2	11	6.2	
6	3.b	8.12	6948	Both	5.52	1.30	23.41	1	5	3.3	
				Men	5.68	0.96	33.67	1	3	2.4	
				Women	6.03	0.54	67.91	1	2	0.9	
6	3.b	8.11	7494	Both	1.14	0.55	2.33	3	10	7.6	
				Men	0.55	0.19	1.60	3	4	5.2	
				Women	3.45	1.19	10.00	3	6	2.4	
Brain	6	3.b	8.11	7035	Both	1.95	1.04	3.65	1	15	10.3
					Men	1.64	0.65	4.16	1	6	5.9
					Women	2.25	0.98	5.16	1	9	4.4
Non-Hodgkin lymphoma	1	3.a	5.1	6593	Both	1.59	0.95	2.66	1	27	14.4
					Men	1.06	0.50	2.22	1	11	7.1
					Women	2.37	1.18	4.76	1	16	7.2
Myeloma	3	3.a	8.99	6956	Both	3.76	1.44	9.78	3	6	1.2
					Men	4.02	1.02	15.86	3	3	0.6
					Women	3.62	0.96	13.61	3	3	0.6
Leukaemia	1	3.a	5.1	6576	Both	1.70	1.05	2.74	1	50	40.5
					Men	2.19	1.17	4.12	1	29	21.5
					Women	1.29	0.65	2.53	1	21	19.0
	1	3.a	5.1	6589	Both	1.53	1.00	2.33	2	66	57.7
					Men	2.02	1.15	3.53	2	39	30.6
					Women	1.12	0.61	2.05	2	27	27.1
	6	3.b	8.11	7468	Both	1.68	1.06	2.68	3	37	23.9
					Men	1.29	0.69	2.40	3	17	13.3
					Women	2.35	1.20	4.62	3	20	10.6
6	3.b	8.12	7470	Both	2.57	1.08	6.13	2	6	2.8	
				Men	2.43	0.85	7.00	2	4	1.7	
				Women	2.82	0.64	12.56	2	2	1.1	

Table4. Relative risk (RR) of dying from those cancers with significant results in towns situated at a distance of less than 5 km (“near vs. far” analysis) from mining installations. Group=Mining Group; E-PRTR Group= type of extraction (3a (underground) or 3b (open-pit)); NCEA= National Classification of Economic Activities in Spain; E-PRTR Code=identification of the installation; 95%CI= 95% Credible interval of the RR; N° towns=number of towns in the “exposure” area; Obs=number of observed deaths in the “exposure” area; Exp=number of expected deaths in the “exposure” area.

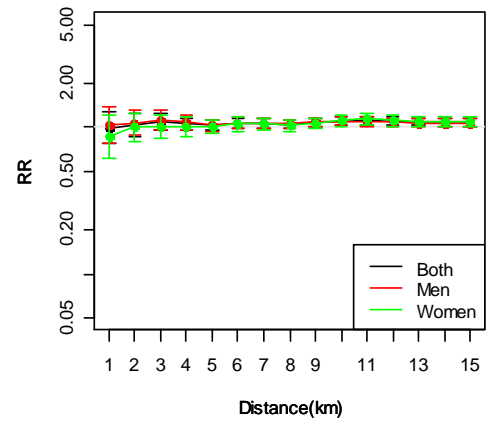
Oral and pharyngeal



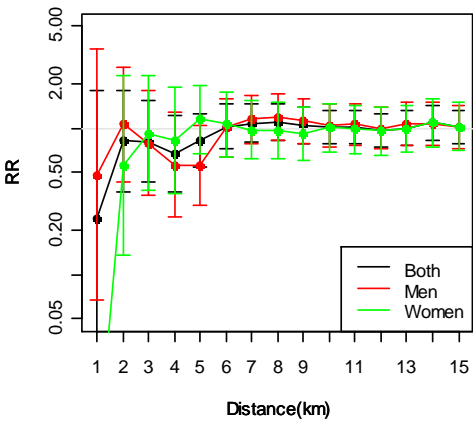
Esophageal



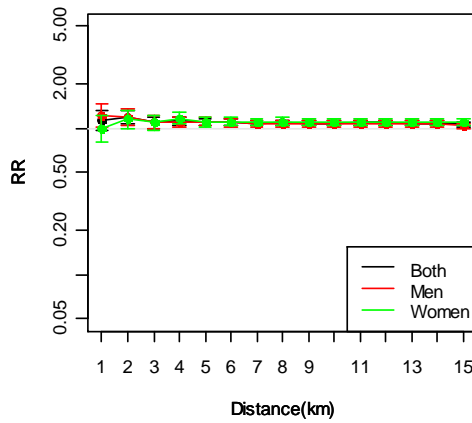
Stomach



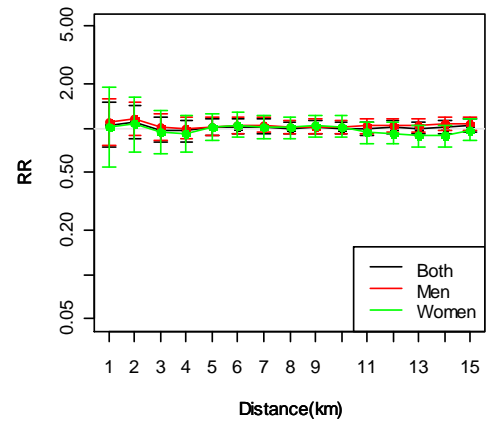
Small intestine



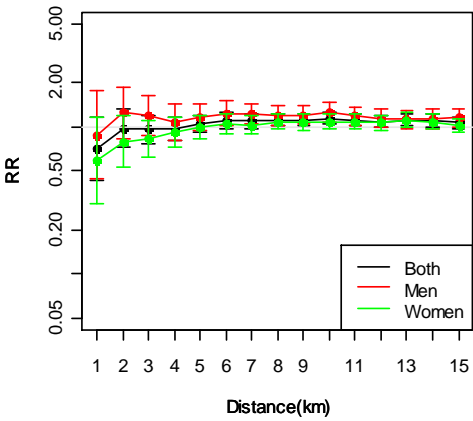
Colorectal



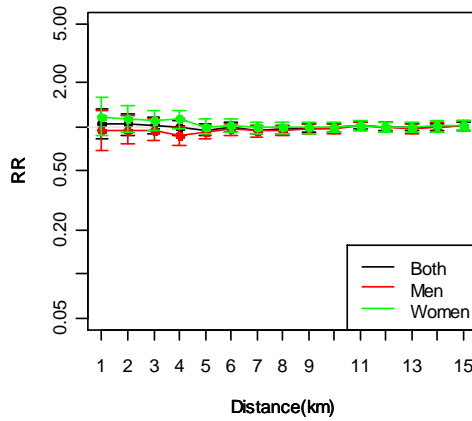
Liver



Gallbladder



Pancreatic



Peritoneal

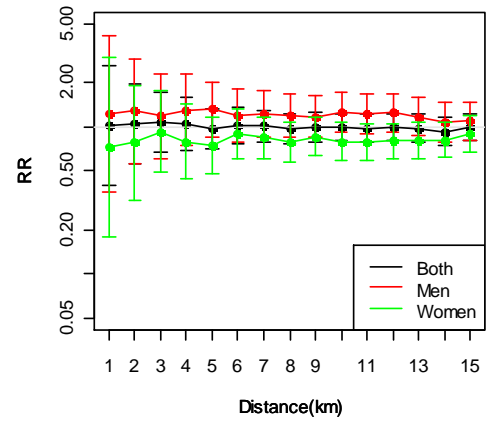


Figure 1. Relative risks and 95% Credible Intervals of dying from Oral and pharyngeal, Esophageal, Stomach, Small intestine, Colorectal, Liver, Gallbladder, Pancreatic and Peritoneal cancers in towns situated at a distance of less than 1, 2, ..., 15 km from mining installations, estimated using spatial regression models in both sexes, men and women.

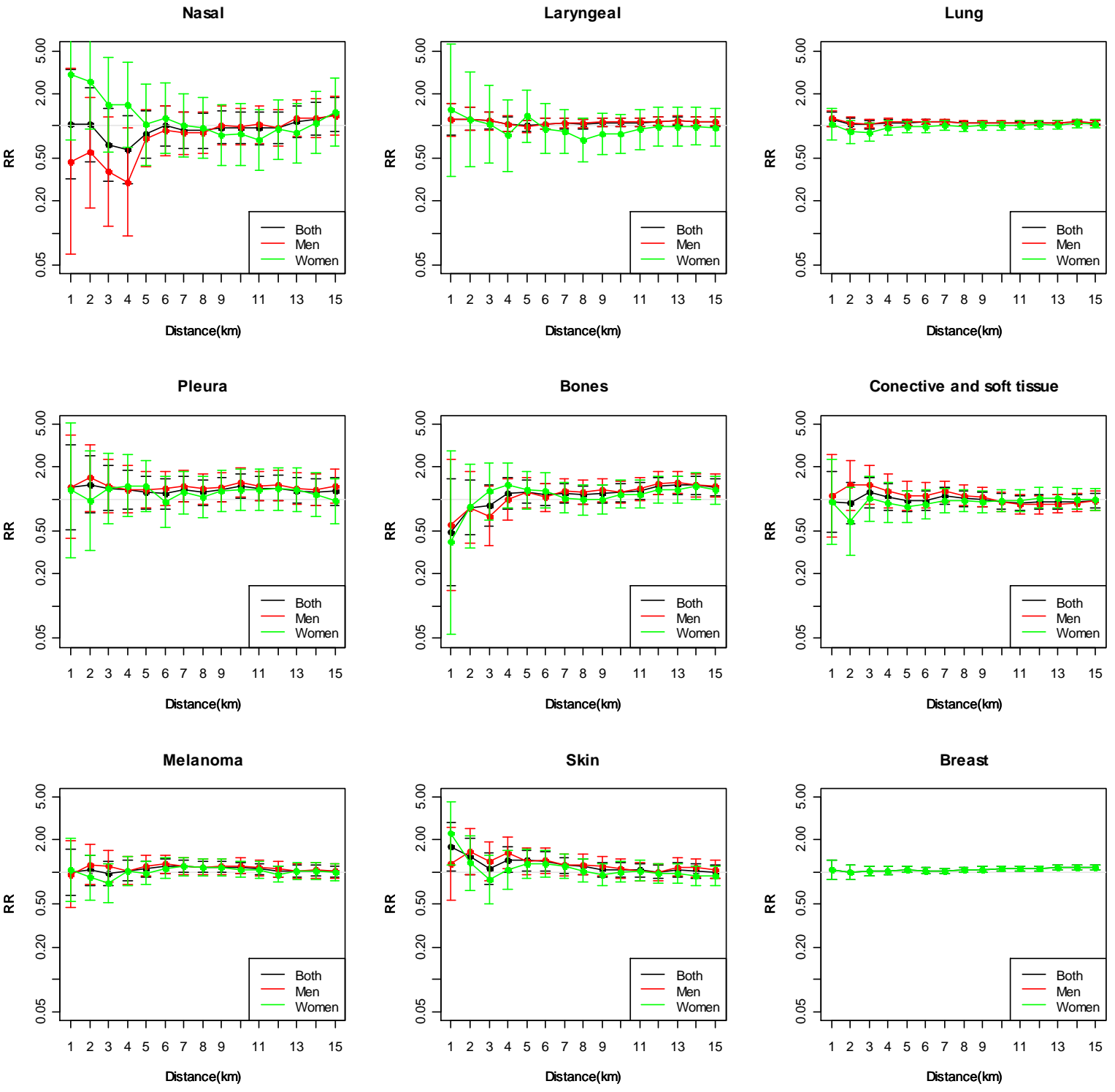


Figure 2. Relative risks and 95% Credible Intervals of dying from Nasal, Laryngeal, Lung, Pleura, Bones, Connective and soft tissue, Melanoma, Skin and Breast cancers in towns situated at a distance of less than 1, 2, ..., 15 km from mining installations, estimated using spatial regression models in both sexes, men and women.

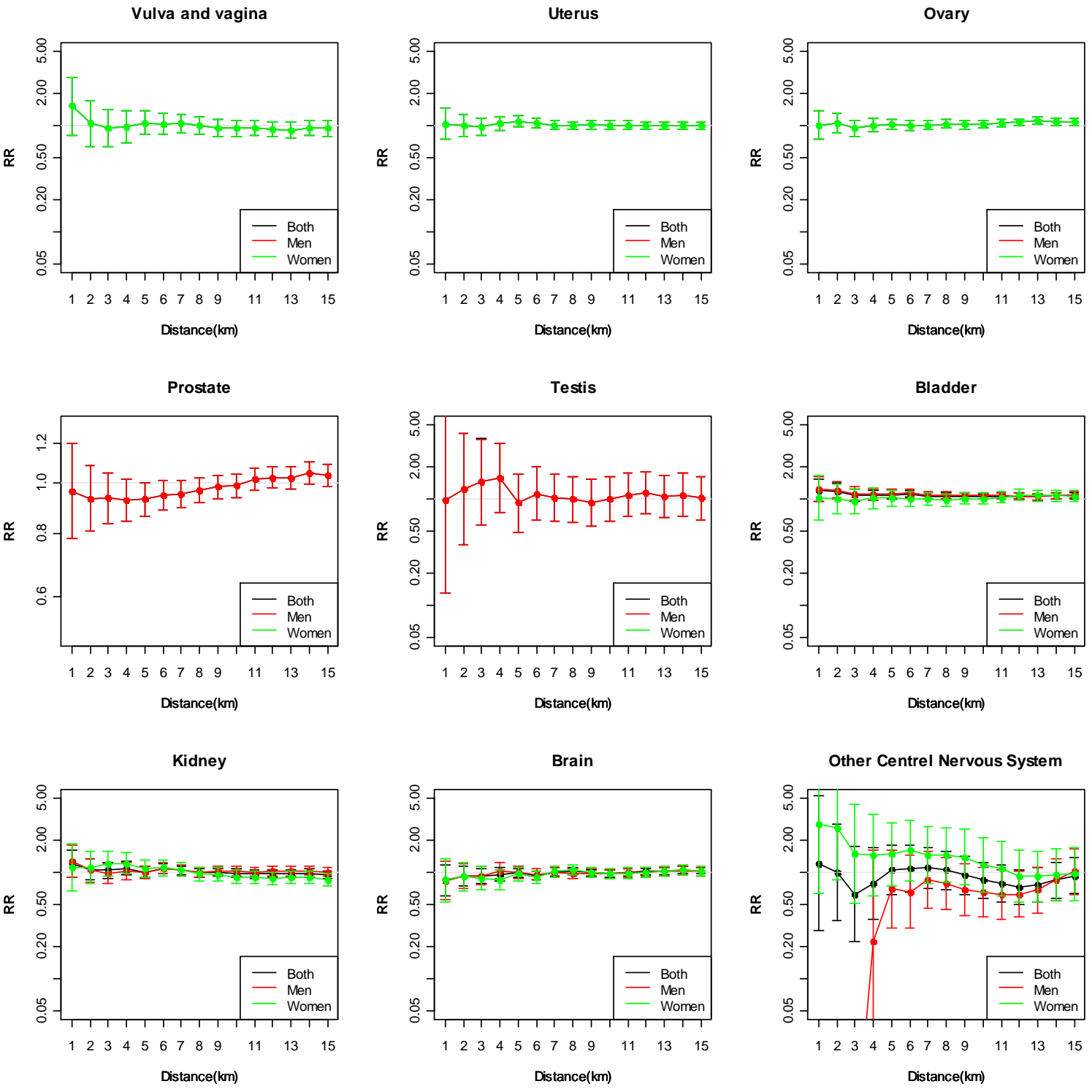
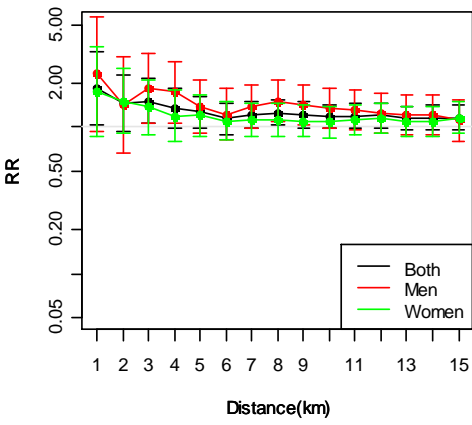
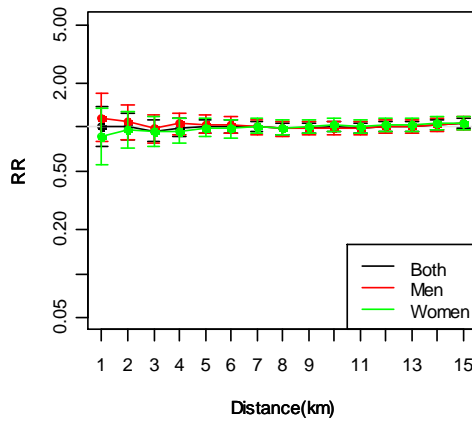


Figure 3. Relative risks and 95% Credible Intervals of dying from Vulva and vagina, Uterus, Ovary, Prostate, Testis, Bladder, Kidney, Brain and Other Central Nervous System cancers in towns situated at a distance of less than 1, 2, ..., 15 km from mining installations, estimated using spatial regression models in both sexes, men and women.

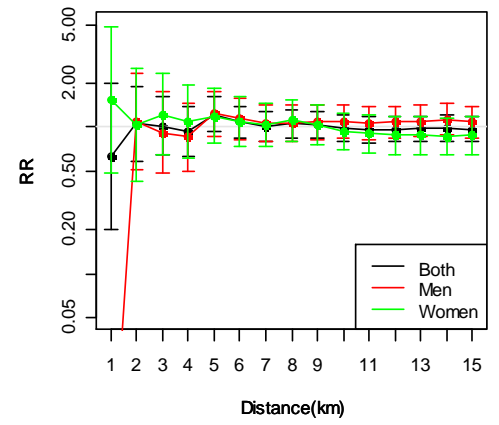
Thyroid gland



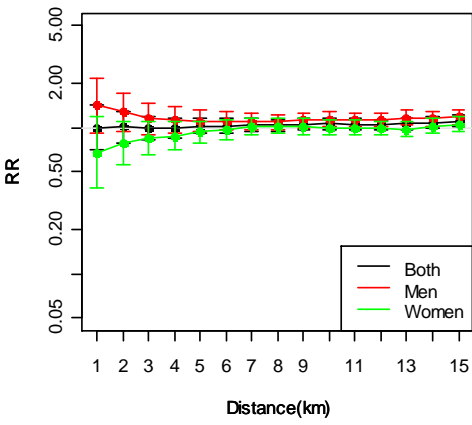
Non-Hodgkin Lymphoma



Hodgkin lymphoma



Myeloma



Leukaemia

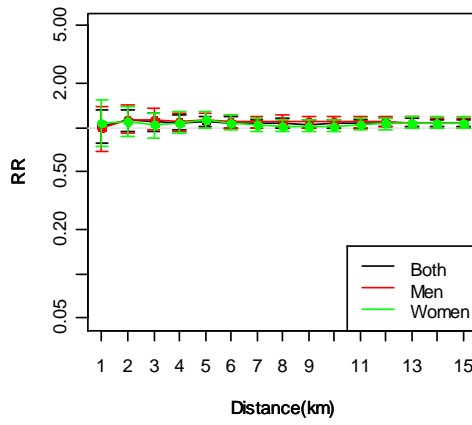


Figure 4. Relative risks and 95% Credible Intervals of dying from Thyroid gland, Non-Hodgkin Lymphoma, Hodgkin lymphoma, Myeloma and Leukaemia cancers in towns situated at a distance of less than 1,2, ..., 15 km from mining installations, estimated using spatial regression models in both sexes, men and women.

Both

Men

Women

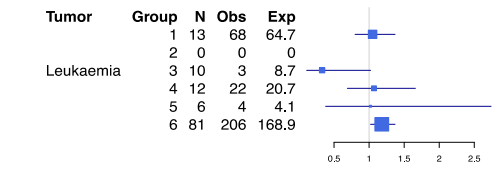
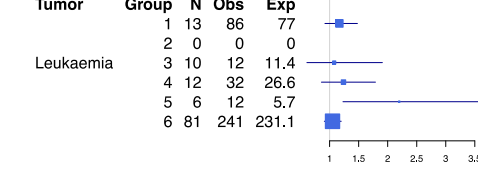
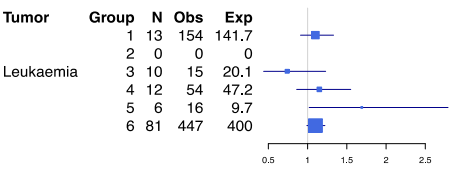
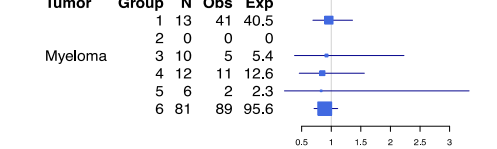
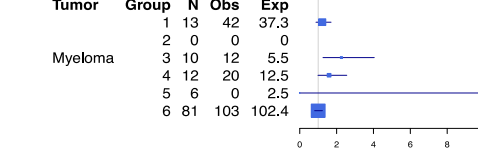
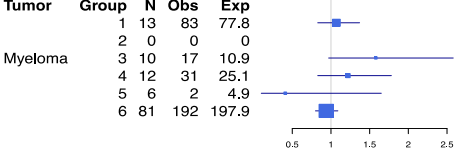
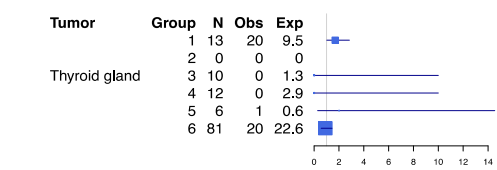
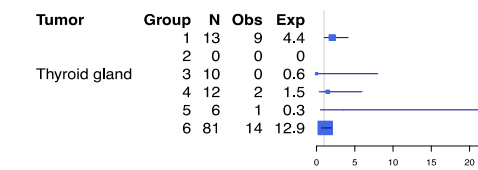
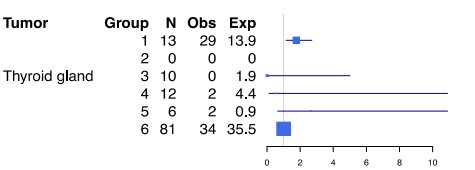
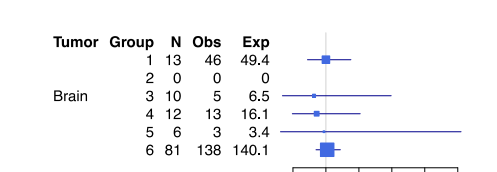
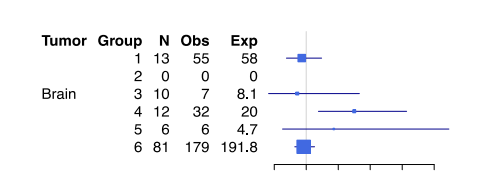
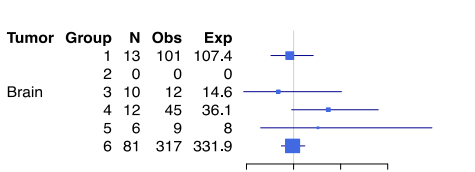
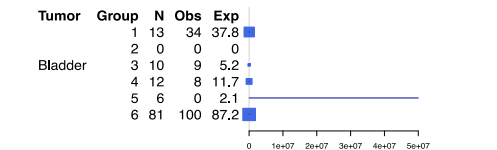
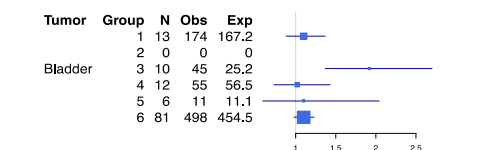
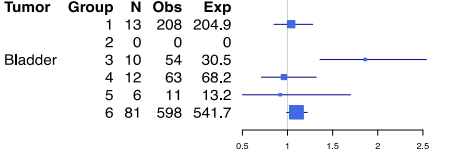
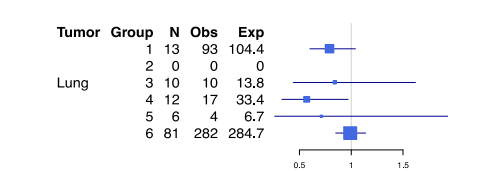
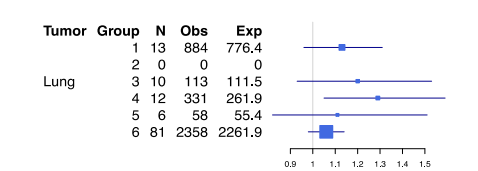
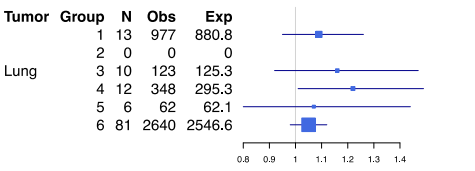
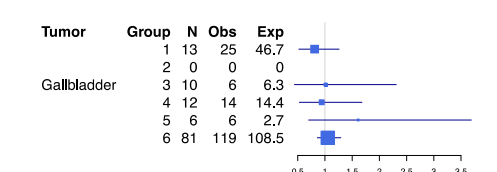
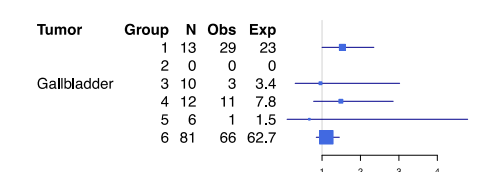
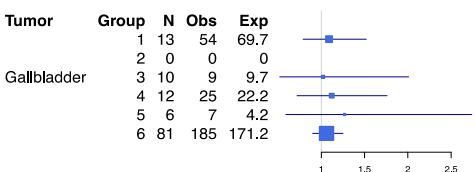
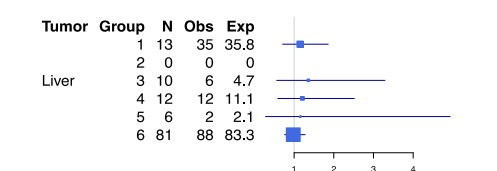
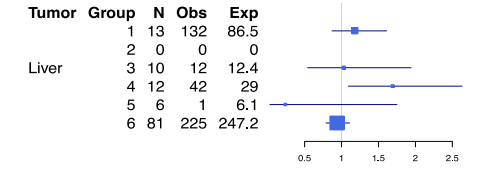
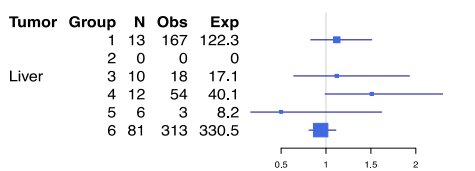
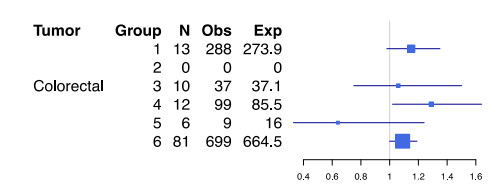
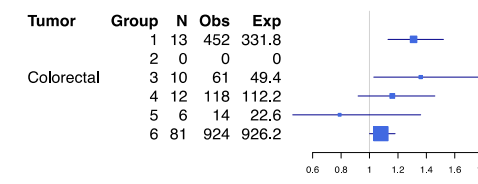
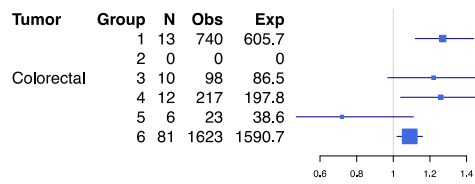
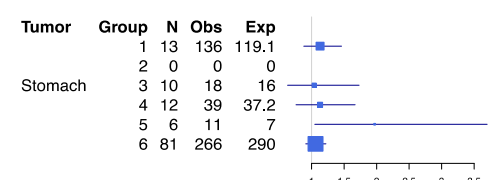
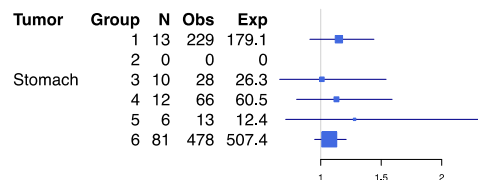
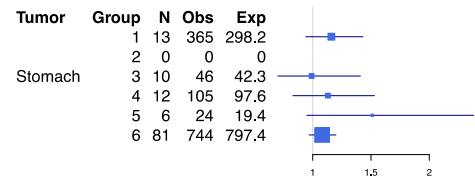


Figure 5. Forest plots of relative risk (RR) and 95% Credible interval of the RR of dying from those cancers with statistically significant increment risk in towns situated at a distance of less than 5 km using spatial regression models by mining group (1=Underground extraction of anthracite, bituminous coal and lignite; 2=Underground extraction of metallic or non metallic minerals;3=Underground extraction of ornamental rocks, sand, clay, chemistry products, fertilizers or other; 4=Open-pit extraction of anthracite, bituminous coal and lignite;5=Open-pit extraction of metallic or non metallic minerals;6=Open-pit extraction of ornamental rocks, sand, clay, chemistry products, fertilizers or other); N= Number of towns in the “exposure” area. Obs=number of observed deaths in the “exposure” area; Exp=number of expected deaths in the “exposure” area.