

Appendix Table 1 – Outcome of fieldwork: ascertainment and interviewing by country

a) Meningioma cases

Data collection outcome	Overall		Country												UK	
	Number of cases	%	Australia	Canada	Denmark	Finland	France	Germany	Israel	Italy	Japan	New Zealand	Norway	Sweden	North	South
Number of cases ascertained	3115		413	134	155	252	190	275	390	124	102	72	191	205	222	390
Outcome of attempt to interview																
% refused	339	11	17	13	14	7	9	3	8	8	5	15	1	6	10	24
% MD refused	69	2	4	7	0	0	5	0	0	1	15	3	0	2	0	3
% died or too ill	66	2	1	2	6	0	2	4	1	2	0	3	0	2	4	4
% untraced or other reasons ¹	216	7	16	7	0	2	8	3	1	0	0	7	22	0	5	13
% interviewed	2425	78	62	70	81	92	76	91	90	89	80	72	77	90	81	56
Interview																
% self respondent	2383	98	100	96	98	99	99	98	97	92	100	98	99	98	99	100
% face-to-face	2294	95	100	100	100	99	95	100	100	65	100	100	53	93	100	100
Delay between diagnosis and interview ² (months)																
median	3.4		3.9	7.7	3.2	1.3	3.4	0.0	4.1	8.2	1.8	4.1	15.4	5.7	2.3	5.6
5-95 percentiles	0.0/21.9		1.4/17.7	2.5/22.9	0.8/13.7	0.0/8.4	0.2/27.9	-0.4/9.5	0.2/24.2	0.9/19.7	0.4/12.8	1.8/9.0	-0.1/29.9	0.3/15.7	1.0/11.4	1.8/23.9
Delay between case and control interviews ³ (months)																
median	-2.1		-0.3	-0.3	-0.5	-0.5	-4.1	-3.1	-9.3	-3.2	-5.1	-4.1	-0.4	-0.5	-2.9	0.0
5-95 percentiles	-16.1/6.3		-9.2/10.6	-3.6/7.8	-5.2/2.0	-6.2/2.0	-14.1/-0.8	-11.1/6.5	-33.0/6.5	-15.0/5.5	-14.4/-1.3	-29.2/11.7	-14.9/11.4	-8.1/6.6	-9.4/-0.9	-8.4/8.7

¹ This includes 7 cases who were interviewed but for whom data were lost (these are included as non-interviewed subjects in the current paper, unlike in Cardis et al 2007 (26)).

² Date of interview – date of diagnosis

³ Date of case interview – date of control interview

b) Glioma cases

Data collection outcome	Overall		Country													
	Number of cases	%	Australia	Canada	Denmark	Finland	France	Germany	Israel	Italy	Japan	New Zealand	Norway	Sweden	UK	
															North	South
Number of cases ascertained	4301	100	536	273	248	211	155	312	206	128	90	132	236	298	628	848
Outcome of attempt to interview																
% refused	470	11	16	7	16	12	19	5	6	1	4	10	1	8	10	15
% MD refused	198	5	4	7	0	0	7	0	0	1	26	4	0	9	2	8
% died or too ill	637	15	14	18	10	1	6	11	6	6	3	14	0	5	16	33
% untraced or other reasons ²	231	5	9	6	1	2	6	1	0	0	0	9	22	1	3	7
% interviewed	2765	64	56	62	73	84	61	82	87	92	67	64	76	76	68	36
Interview																
% self respondent	2416	87	86	82	94	97	89	90	81	56	98	80	69	93	92	95
% face-to-face	2606	94	99	97	100	99	97	100	99	61	100	100	52	94	100	100
Delay between diagnosis and interview (months)																
median	2.9		3.5	6.1	2.2	0.5	1.9	0.1	3.5	6.2	1.4	3.8	15.0	2.7	2.1	4.4
5-95 percentiles	0.0 / 18.8		1.3 / 18.8	2.9 / 12.2	0.5 / 11.2	0.0 / 5.0	0.3 / 24.1	-0.3 / 15.1	0.2 / 20.6	0.4 / 17.5	0.3 / 6.5	1.8 / 8.5	-0.1 / 33.2	0.5 / 12.4	1.0 / 8.5	1.4 / 19.8
Delay between case and control interviews (months)																
median	-2.3		-0.5	-1.2	-0.5	-0.9	-4.5	-3.0	-8.1	-4.6	-6.0	-4.6	0.1	-1.2	-2.9	-0.6
5-95 percentiles	-13.9 / 7.1		-11.2 / 10.8	-8.6 / 5.8	-7.2 / 2.2	-7.8 / 2.1	-11.4 / -0.9	-11.6 / 13.0	-32.8 / 4.0	-17.2 / 13.5	-16.3 / -1.3	-38.3 / 3.0	-10.9 / 17.0	-12.0 / 3.6	-10.4 / -0.9	-13.5 / 7.4

²This includes 12 cases who were interviewed but for whom data were lost (these are included as non-interviewed subjects in the current paper, unlike in Cardis et al 2007 (26))

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c) Controls (all)

Data collection outcome	Overall		Country													
	Number of controls	%	Australia	Canada	Denmark	Finland	France	Germany	Israel	Italy	Japan	New Zealand	Norway	Sweden	UK	
															North	South
Number of controls sampled	14354		1608	1330	1277	1337	639	1869	911	486	568	350	404	617	1747	1211
Outcome of attempt to interview																
% refused	4303	30	37	32	32	42	21	29	25	13	25	16	21	22	20	47
% MD refused	126	1	0	0	0	0	0	0	0	0	0	0	0	0	7	0
% died or too ill	49	0	0	0	1	0	0	1	0	0	0	0	0	1	0	0
% untraced or other reasons ¹	2218	15	21	18	16	16	5	6	9	17	25	35	10	12	27	5
% interviewed	7658	53	42	49	52	42	74	64	66	70	51	49	69	66	45	48
Interview																
% self respondent	7615	99	100	99	100	100	100	100	100	95	100	88	100	100	100	100
% face-to-face	7179	94	98	98	100	99	88	100	99	35	100	100	54	94	100	100

¹This includes 38 controls who were interviewed but for whom data were lost

Appendix Table 2 – ORs between mobile phone use and brain tumours (meningioma and glioma separately) using the “Inskip method” for comparing side of use with side of tumour, by different windows of time before the reference date – excludes use with hands-free devices

a) Meningioma

Time window/ Side of use	Overall				Highest decile of cumulative call time only				
	Left sided tumours	Right sided tumours	OR ¹	95% CI	Left sided tumours	Right sided tumours	OR ¹	95% CI	
Overall									
Left	185	153	1.00		21	13	1.00		
Right	255	278	1.07	1.00 1.16	25	32	1.22	0.96 1.62	
Regular users 1-4 years before reference date									
Left	111	86	1.00		5	2	1.00		
Right	147	163	1.10	1.00 1.22	3	5	1.52	0.81 3.88	
Regular users 5-9 years before reference date									
Left	58	54	1.00		8	9	1.00		
Right	91	86	1.00	0.90 1.14	15	15	0.97	0.76 1.36	
Regular users 10 years or more before reference date									
Left	16	13	1.00		8	2	1.00		
Right	17	29	1.22	0.95 1.68	7	12	1.81	0.98 4.09	

b) Glioma

Time window/ Side of use	Overall				Highest decile of cumulative call time only				
	Left sided tumours	Right sided tumours	OR ¹	95% CI	Left sided tumours	Right sided tumours	OR ¹	95% CI	
Overall									
Left	281	170	1.00		48	20	1.00		
Right	345	499	1.27	1.19 1.37	37	68	1.55	1.24 1.99	
Regular users 1-4 years before reference date									
Left	125	86	1.00		8	1	1.00		
Right	167	247	1.23	1.12 1.37	4	7	2.37	0.93 8.59	
Regular users 5-9 years before reference date									
Left	116	54	1.00		21	9	1.00		
Right	128	169	1.34	1.19 1.53	18	25	1.40	1.04 2.01	
Regular users 10 years or more before reference date									
Left	40	30	1.00		19	10	1.00		
Right	50	83	1.24	1.05 1.50	15	36	1.57	1.13 2.30	

¹ ORs adjusted for sex, age, study centre, ethnicity in Israel, and education.

Appendix Table 3 – ORs between mobile phone use and brain tumours (meningioma and glioma separately); joint analyses of effects of phone technology (analogue and digital) and phone use – excludes use with hands-free devices

Type of phone signal	Exposure category	Meningioma					Glioma				
		Cases	Controls	OR ¹	95% CI		Cases	Controls	OR ¹	95% CI	
Analogue	Never regular user or non analogue user	2182	2392	1.00			2283	2518	1.00		
	Ever regular analogue user	227	270	0.81	0.65	1.03	425	454	1.00	0.83	1.21
	Cumulative call time (hours) of exclusive analogue use										
	<5 hours	14	21	0.63	0.29	1.37	30	26	1.34	0.66	2.72
	5 h - 114.9	84	111	0.72	0.51	1.01	161	188	0.92	0.70	1.22
	115-359.9	59	55	1.13	0.71	1.80	85	103	0.93	0.65	1.33
	360-1639.9	48	40	0.84	0.51	1.39	91	108	0.86	0.60	1.24
1640 +	22	34	0.50	0.25	0.99	58	29	1.95	1.08	3.54	
Digital	Never regular user or non digital user	1266	1306	1.00			1252	1276	1.00		
	Ever regular digital user	1143	1356	0.79	0.68	0.92	1456	1696	0.76	0.66	0.88
	Cumulative call time (hours) of exclusive digital use										
	<5 hours	160	209	0.86	0.65	1.12	156	202	0.69	0.52	0.92
	5 h - 114.9	511	642	0.72	0.60	0.86	639	764	0.80	0.68	0.96
	115-359.9	194	259	0.81	0.63	1.05	266	332	0.71	0.56	0.89
	360-1639.9	182	180	0.80	0.60	1.06	267	320	0.65	0.51	0.83
1640 +	96	37	1.84	1.17	2.88	128	78	1.46	0.98	2.17	
Unknown or both	Never regular user or only analogue or only digital user	2174	2395	1.00			2292	2574	1.00		
	Ever regular user of unknown signal type or both analogue and digital phones	235	267	1.05	0.84	1.32	416	398	1.13	0.93	1.38
	Cumulative call time (hours) of exclusive unknown or both use										
	<5 hours	27	30	1.19	0.64	2.22	30	36	1.10	0.60	2.02
	5 h - 114.9	106	124	1.08	0.78	1.51	177	179	1.03	0.78	1.35
	115-359.9	40	54	0.81	0.49	1.34	88	82	1.12	0.76	1.66
	360-1639.9	44	49	0.95	0.56	1.61	81	74	1.46	0.95	2.26
1640 +	18	107	4.43	1.42	13.9	40	27	1.37	0.69	2.70	

¹ ORs adjusted for sex, age, study centre, ethnicity in Israel, and education.

Appendix Table 4 – Results of additional sensitivity analyses on ORs between mobile phone use and brain tumours (meningioma and glioma separately) for the highest decile of cumulative call time, covering method of analysis, adjustment for confounders and influence of individual study centres

	Meningioma					Glioma				
	Cases	Controls	OR ¹	95 % CI		Cases	Controls	OR ¹	95 % CI	
Main analysis (baseline for comparison)	130	107	1.15	0.81	1.62	210	154	1.40	1.03	1.89
Method of analysis										
Stratified analysis	130	107	1.10	0.82	1.48	207	154	1.39	1.08	1.77
Adjustment for confounders										
Epilepsy	130	107	1.16	0.82	1.63	210	154	1.44	1.07	1.96
Skull x-rays 5 years prior to reference date	130	107	1.17	0.83	1.66	210	154	1.49	1.09	2.03
Neck x-rays 5 years prior to reference date	na ²					210	154	1.43	1.05	1.94
Full mouth x-rays 2 years prior to reference date	na					210	154	1.40	1.03	1.90
Regular smoking	na					210	154	1.41	1.04	1.90
Industrial work involving heating of food or other materials	na					210	154	1.42	1.04	1.92
Working with electrical motors	na					210	154	1.39	1.03	1.88
Working with ionising radiation	na					210	154	1.41	1.04	1.91
Use of portable or non-portable transmitters	130	107	1.18	0.83	1.66	210	154	1.44	1.06	1.95
Impact of individual countries										
Exclude Australia	114	95	1.16	0.80	1.69	176	132	1.39	0.99	1.95
Exclude Canada	125	101	1.15	0.81	1.64	196	147	1.41	1.03	1.93
Exclude Denmark	125	106	1.07	0.76	1.52	201	147	1.40	1.02	1.92
Exclude Finland	103	88	1.13	0.77	1.66	182	135	1.34	0.97	1.85
Exclude France	126	102	1.13	0.80	1.60	202	151	1.38	1.02	1.88
Excluding Germany	126	98	1.17	0.81	1.67	202	146	1.35	0.98	1.85
Excluding Israel	109	76	1.30	0.90	1.88	196	130	1.47	1.08	2.02
Excluding Italy	122	104	1.08	0.76	1.54	205	151	1.40	1.03	1.90
Excluding Japan	127	104	1.15	0.81	1.62	204	150	1.40	1.03	1.90
Excluding New Zealand	127	107	1.14	0.81	1.62	202	148	1.39	1.02	1.89
Excluding Norway	122	105	1.08	0.76	1.54	197	149	1.38	1.01	1.89
Excluding Sweden	124	99	1.28	0.89	1.84	198	148	1.36	0.99	1.85
Excluding UK-North	123	106	1.15	0.81	1.62	185	135	1.42	1.05	1.93
Excluding UK-South	117	100	1.12	0.78	1.62	184	133	1.46	1.04	2.03

¹ ORs adjusted for sex, age, study centre, ethnicity in Israel, and education.

² na: this factor was not related to mobile phone use in controls or to risk of disease in non mobile phone users and was therefore not considered as a potential confounder for meningioma

Appendix Table 5 – Results of sensitivity analyses on ORs between mobile phone use and brain tumours (meningioma and glioma separately) for regular use, covering possible indicators of sample representativeness and response quality

Factors included in sensitivity analyses	Meningioma					Glioma				
	Cases	Controls	OR ¹	95 % CI		Cases	Controls	OR ¹	95 % CI	
Main analysis (baseline for comparison)	1262	1488	0.79	0.68	0.91	1666	1894	0.81	0.70	0.94
Presentation of the study										
Explicit mention of mobile phones	634	737	0.67	0.55	0.82	827	878	0.87	0.71	1.07
Mobile phones mentioned, but not stressed	502	619	0.86	0.68	1.08	710	888	0.72	0.57	0.91
No mention of mobile phones	126	132	1.54	0.74	3.23	129	128	0.85	0.46	1.58
Participation rates										
Study centres with control participation rates < 60%	634	692	0.78	0.63	0.97	1015	1062	0.91	0.74	1.12
Study centres with control participation rates ≥ 60%	628	796	0.79	0.64	0.96	651	832	0.70	0.56	0.86
Excluding study centres with hospital based case ascertainment ²	1175	1395	0.79	0.68	0.91	1584	1815	0.81	0.69	0.94
Quality and timing of interview										
Excluding proxy interviews	1241	1462	0.79	0.68	0.92	1480	1666	0.84	0.71	0.99
Excluding telephone interviews	1128	1351	0.77	0.65	0.89	1509	1737	0.82	0.70	0.96
With experienced interviewers only ³	1190	1388	0.77	0.66	0.90	1551	1751	0.82	0.70	0.96
Balanced interviewer workload ⁴	984	1138	0.78	0.66	0.93	1321	1490	0.79	0.66	0.93
Control interviews within 1 month of case interview	321	360	0.74	0.56	0.97	375	393	0.84	0.63	1.11
Interviewer judgement of quality of response ⁵										
Excluding non-responsive study subjects or subjects with poor memory	952	1141	0.79	0.67	0.93	1117	1282	0.81	0.67	0.97
Duration of call time										
When answered by day/week/month	84	84	1.29	0.84	1.99	83	95	0.84	0.48	1.47
When answered by call	1054	1273	0.73	0.63	0.86	1304	1527	0.77	0.66	0.91
Exclusion of subjects who reported more than 5 hours per day ⁶	1221	1452	0.78	0.67	0.90	1611	1844	0.80	0.69	0.93
Use of imputation and ranges										
Excluding responses with imputed items	1082	1298	0.77	0.66	0.90	1301	1555	0.73	0.63	0.86
Using minimum rather than median when range given	1260	1483	0.79	0.69	0.92	1659	1889	0.80	0.69	0.93

¹ ORs adjusted for sex, age, study centre, ethnicity in Israel, and education.

² Japan and France-Paris excluded

³ Included only interviewers who conducted at least 20 interviews

⁴ Included only interviewers' whose case/control interview ratio was between 1/4 and 3/4 (between 1/6 and 5/6 in Germany where 2 controls were matched to each case)

⁵ Restricted to study subjects who the interviewers judged to be fairly or very cooperative and responsive and who were judged to remember fairly well, well or very well both their current and past mobile phone use history.

⁶ Exclusion was based on all use of a mobile phone; that is, including use with hands-free devices

Appendix Table 6 – Distribution of Regular User OR for meningioma and glioma by ratio of case to control participation rates

	Meningioma				Glioma			
	Participation rate (%)			OR ² for regular use 1 year or more in the past	Participation rate (%)			OR ² for regular use 1 year or more in the past
	Cases	Controls	Ratio ¹		Cases	Controls	Ratio ¹	
Australia	62	42	1.48	0.71	56	42	1.33	1.05
Canada	70	49	1.43	2.03	62	49	1.27	0.74
Denmark	81	52	1.56	1.10	73	52	1.40	0.8
Finland	92	42	2.19	0.68	84	42	2.00	0.85
France	76	74	1.03	0.77	61	74	0.82	1.00
Germany	91	64	1.42	1.04	82	64	1.28	0.83
Israel	90	66	1.36	0.50	87	66	1.32	0.96
Italy	89	70	1.27	1.02	92	70	1.31	0.62
Japan	80	51	1.57	0.91	67	51	1.31	0.58
New Zealand	72	49	1.47	0.65	64	49	1.31	1.12
Norway	77	69	1.12	0.80	76	69	1.10	0.39
Sweden	90	66	1.36	0.48	76	66	1.15	0.74
UK North	81	45	1.80	0.67	68	45	1.51	0.66
UK South	56	48	1.17	0.71	36	48	0.75	0.80

¹ Ratio of case to control participation rates

² ORs adjusted for sex, age, study centre, ethnicity in Israel, and education.