

Epidemiology of Meningiomas in England

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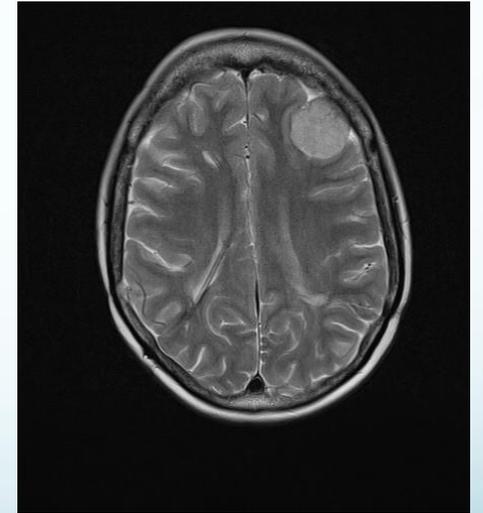
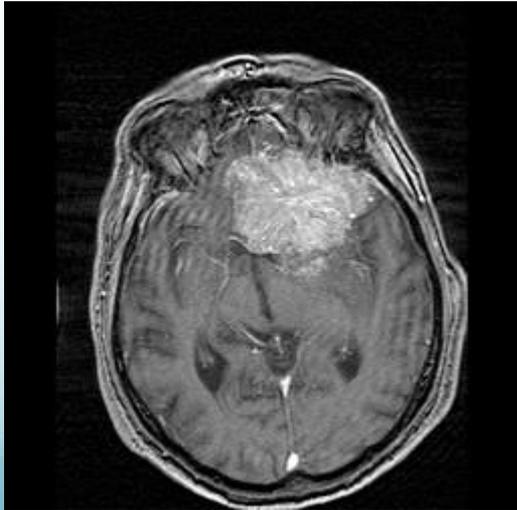
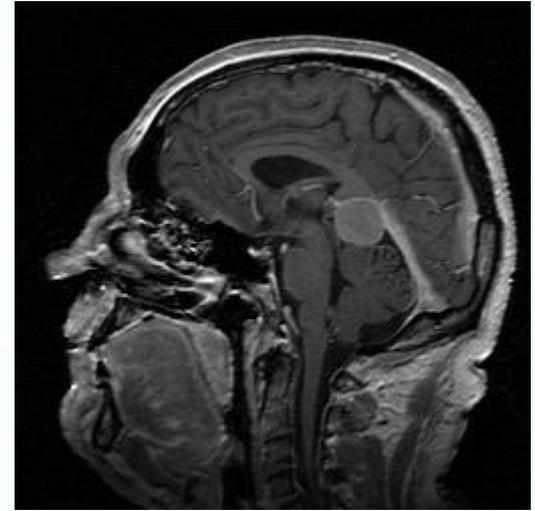
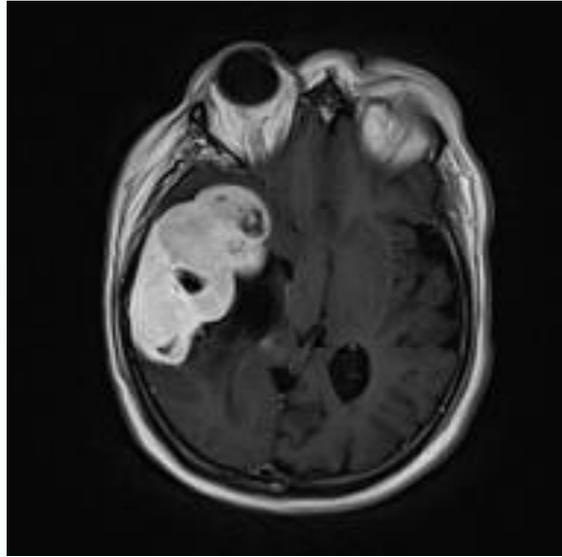
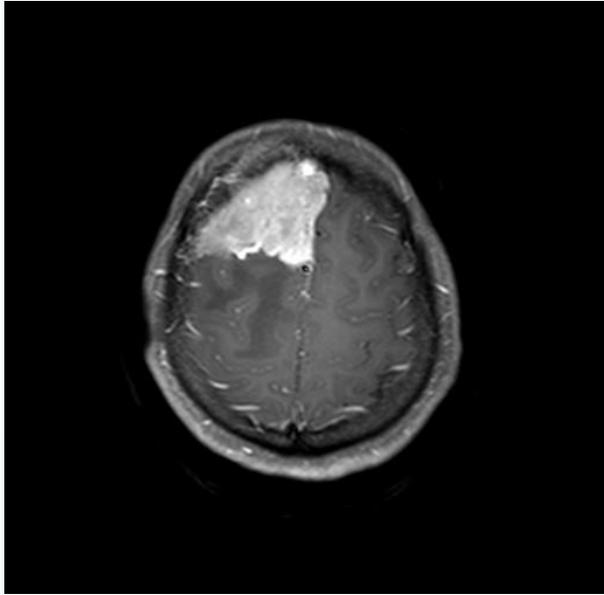
On behalf of NCRAS

Background

- Meningiomas are considered to be mostly benign CNS tumours, however not infrequently they can manifest more aggressive features and the morbidity associated with them can lead to serious consequences for the quality of life and life-expectancy of the individuals affected by them.

What did we know so far?

- Meningiomas represent approximately 20% of all symptomatic intracranial tumors (DeMonte and Al-Mefty 1995).
- Meningiomas occur at a rate of 7.8 in 100,000 per year, and only 25% of these (2 in 100,000 per year) are symptomatic on presentation (Radhakrishnan et al 1995).



Design

- To review the incidence and survival rates of meningiomas in England
- A population-based study linking data from the National Cancer Registration Service with Hospital Episode Statistics for England, to identify patients diagnosed with a meningioma

Subjects:

All patients diagnosed with a meningioma in England between 1999-2013

Methods

- Demographic data, tumour behaviour, initial treatment patterns, and survival rates were evaluated using surveillance epidemiology statistical methods

Results

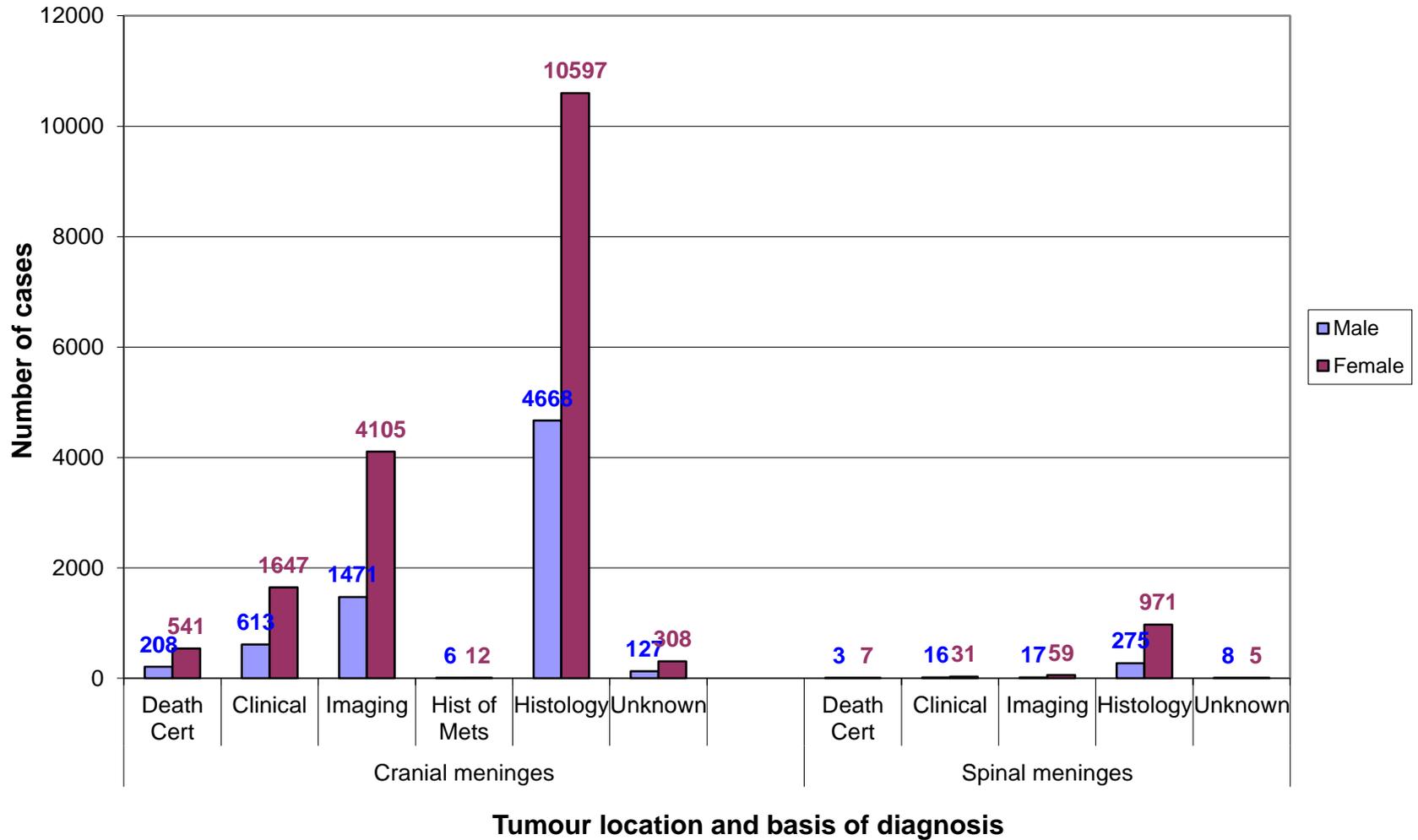
- 24284 cranial (70,8% Females) and 1390 spinal (77.1% Females) meningiomas of all grades were diagnosed.
- Median age at diagnosis 65 years
- 64% were diagnosed histologically, 22% on imaging and 14% other
- 88% are WHO grade I, 7% grade II and 5% grade III

Meningiomas in England 1999-2013

1. Tumours diagnosed in residents of England 1999-2013

SUBSITE	BEHAVIOUR_ICD10_O2	Total	Male	Female
Cranial_meninges	0: ~ WHO Grade 1	21490	5954	15536
Cranial_meninges	1: ~ WHO Grade 2	1656	699	957
Cranial_meninges	3: ~ WHO Grade 3	1138	434	704
Spinal_meninges	0: ~ WHO Grade 1	1244	263	981
Spinal_meninges	1: ~ WHO Grade 2	61	25	36
Spinal_meninges	3: ~ WHO Grade 3	85	30	55
Cranial_meninges all grades		24284	7087	17197
Spinal_meninges all grades		1390	318	1072
All_meninges all grades		25674	7405	18269

Meningiomas (all sites and WHO grades) diagnosed in England residents 1999-2013 by tumour location and basis of diagnosis

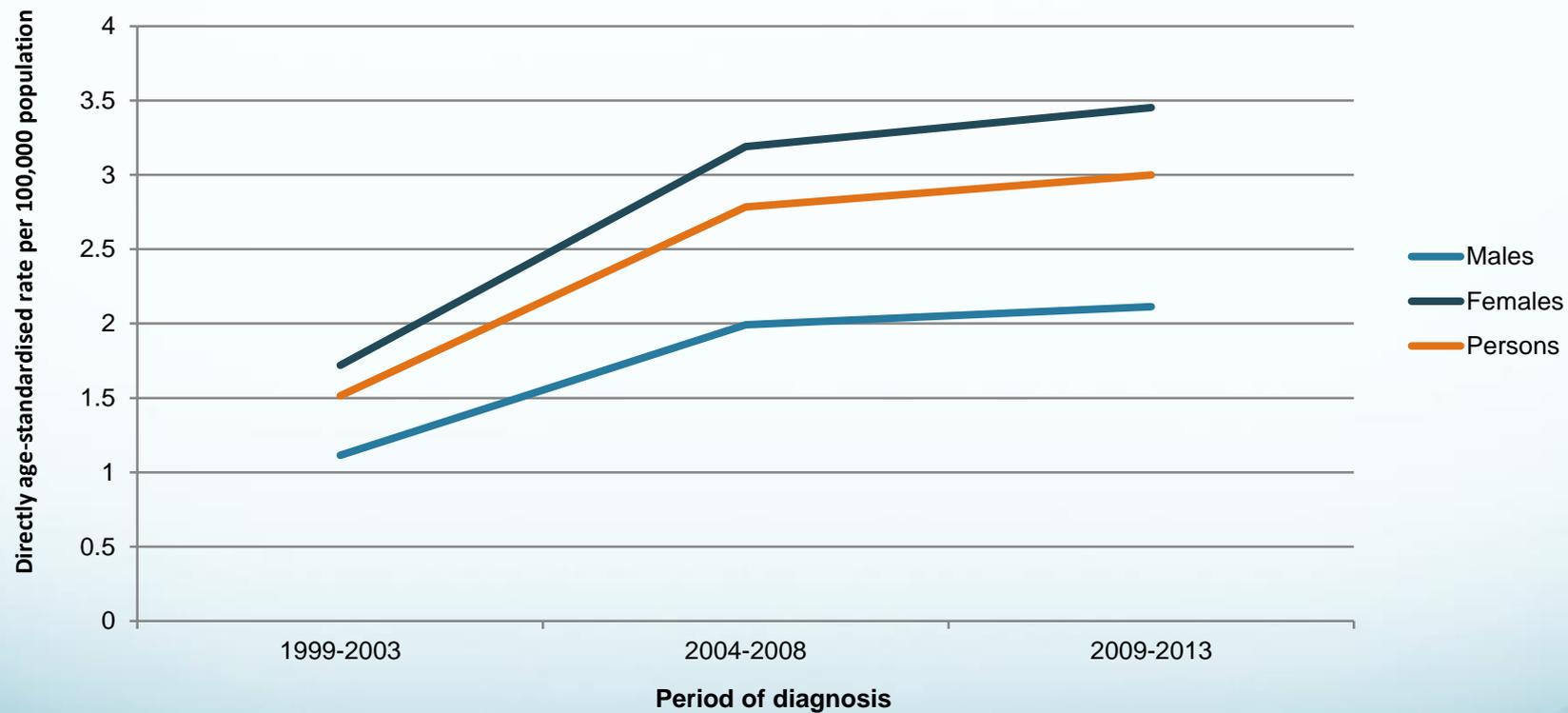


Results

(Cranial meningiomas)

- For all cranial meningiomas 5 and 10-year survival are 73% and 68.1% in grade I, 78.4% and 68.5% in grade II 45, 4% and 39% in grade III.
- Postoperative 5 and 10 year survivals for cranial meningiomas were improved at 90.7% and 86.9% in grade I, 84, % and 75.1% in grade II and 62.2% and 54. 1% in grade III respectively
- The age -standardized annual incidence has increased from 1,5 in 1999 to **3 per 100.000** population in 2013

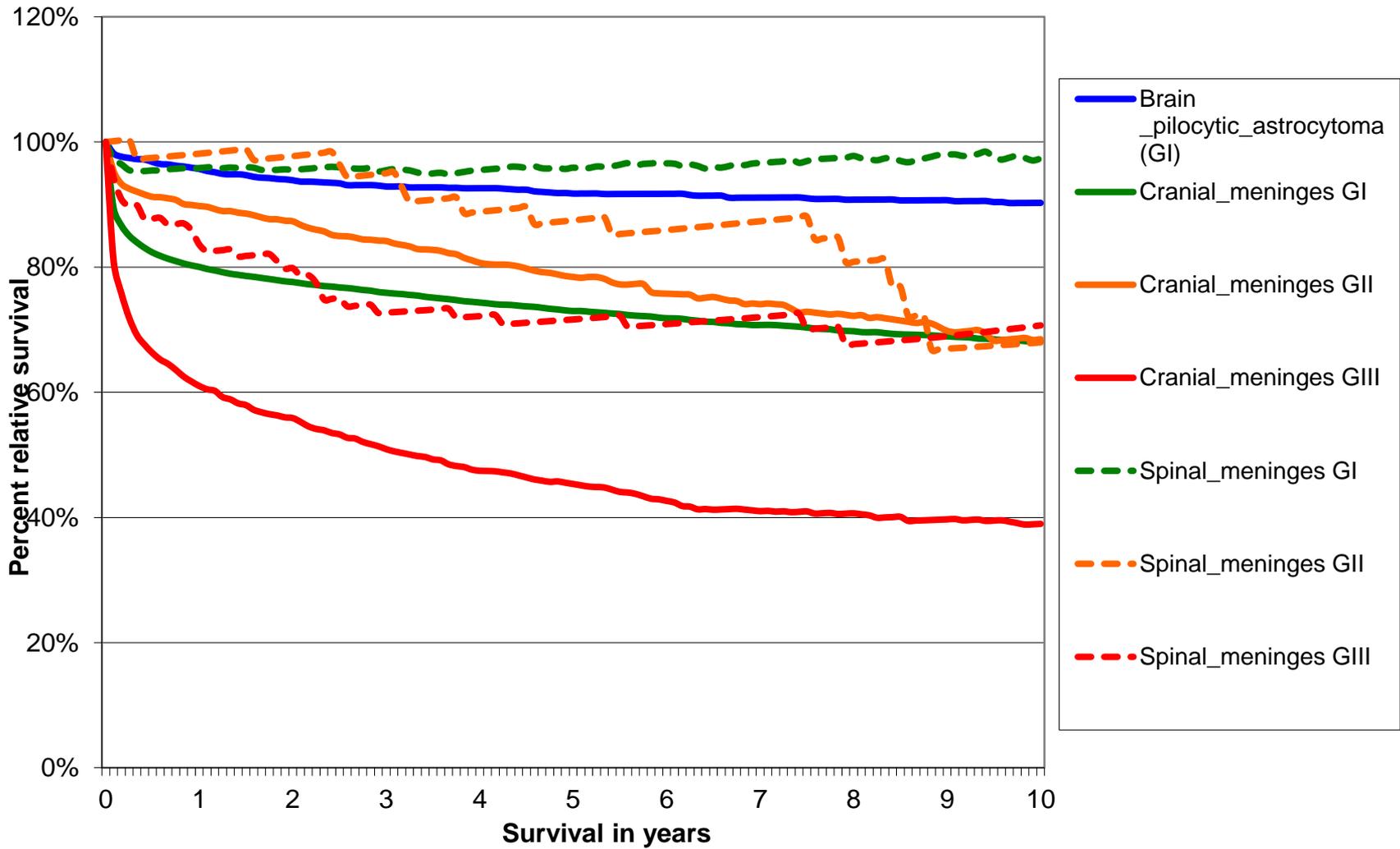
WHO grade 1 cranial meningioma age standardised incidence rates in England, by period of diagnosis and gender, 1999-2013



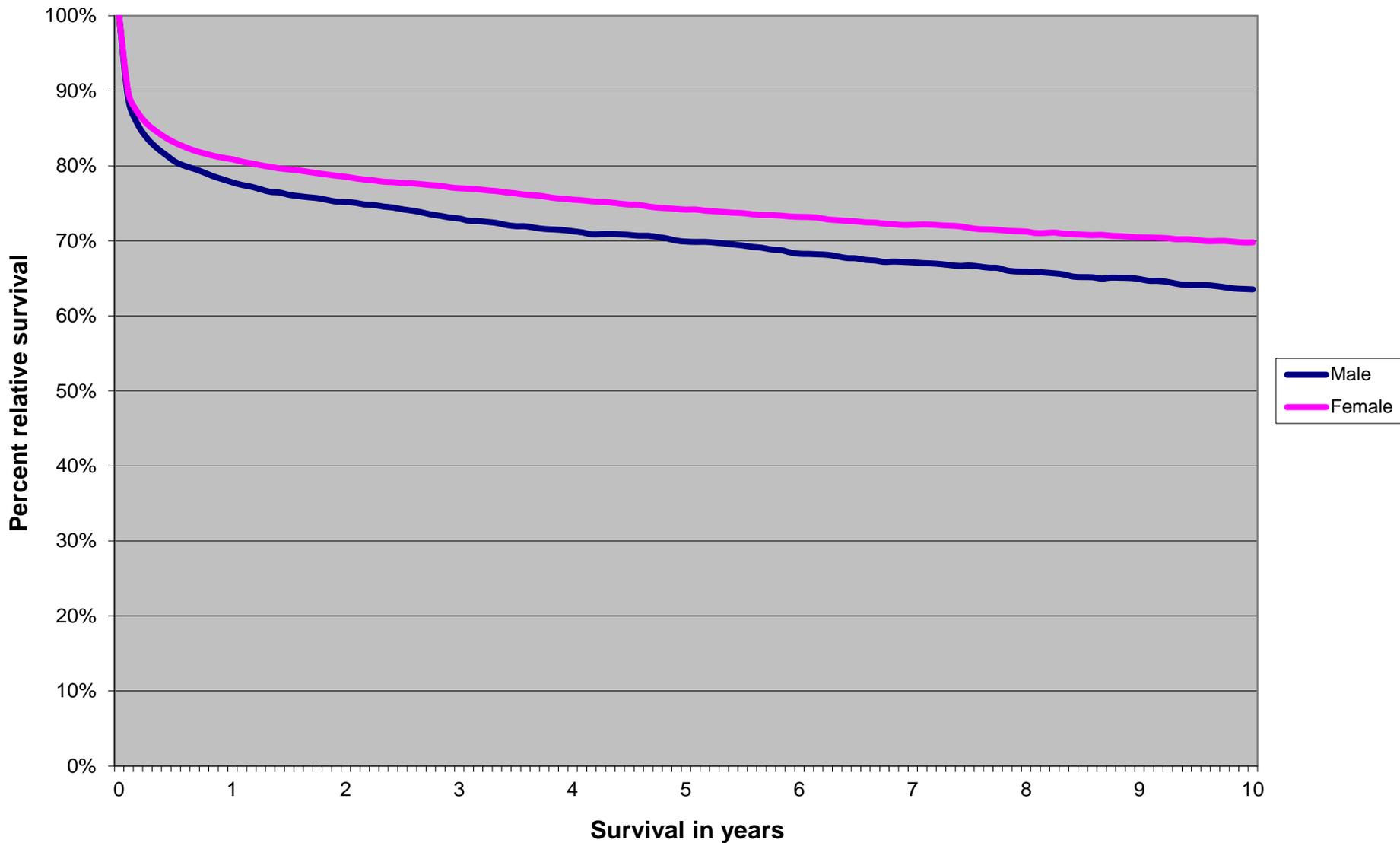
Relative survival

- Meningiomas are a moderately long survival tumour
 - so we cannot use survival metrics such as median survival because >50% of cases are still alive
 - and we should not use Kaplan Meier survival because a high proportion of patients are quite elderly at diagnosis and would have reduced life expectancy in the absence of disease
- So Relative survival is generally used in epidemiological studies.
- Relative survival is defined as the ratio of the proportion of observed survivors in a cohort of cancer patients to the proportion of expected survivors in a comparable set of cancer free individuals. This is generally the overall population matched by age, sex, region of residence, deprivation.

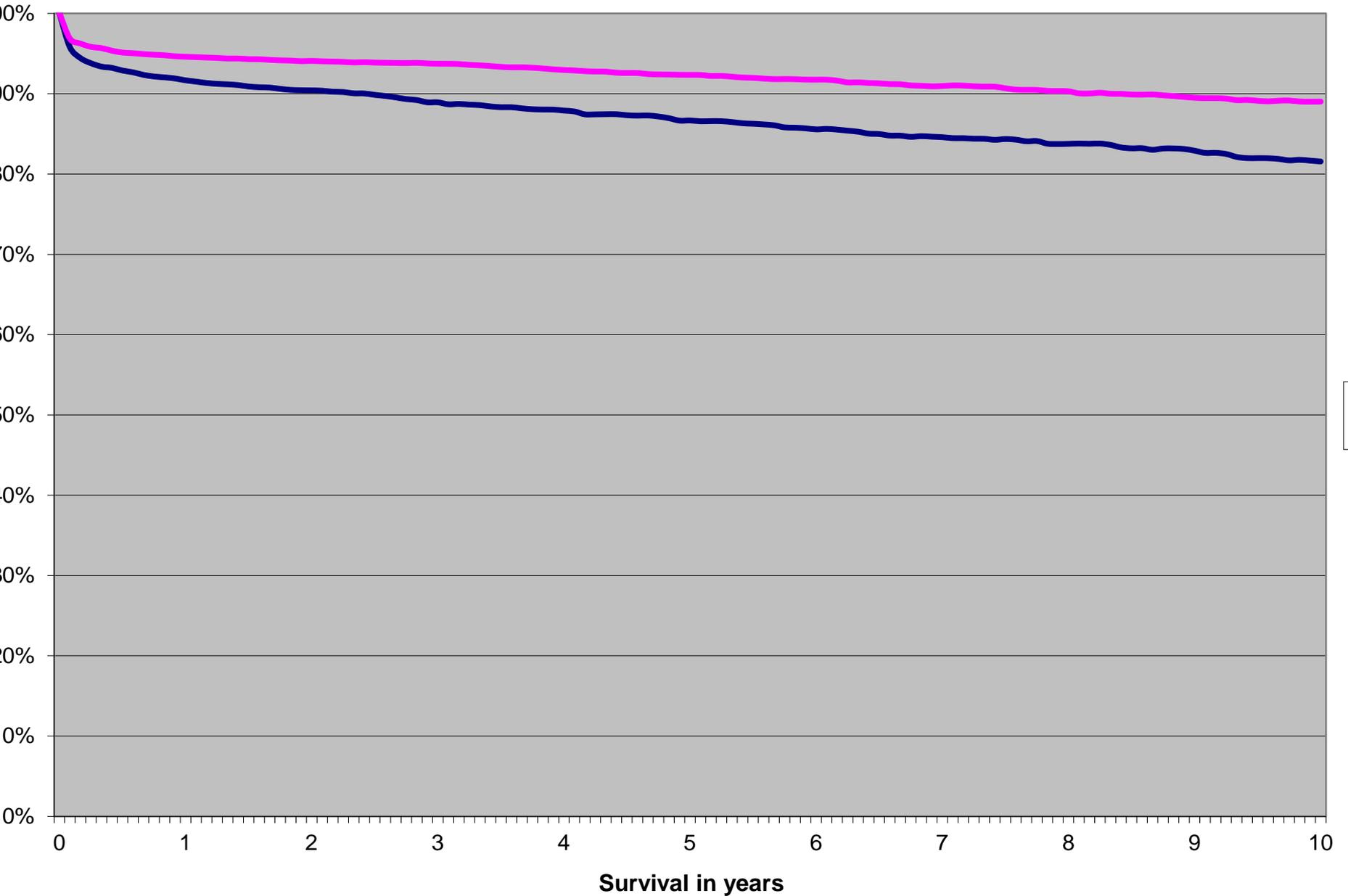
Relative survival for meningiomas (all sites and WHO grades) diagnosed in England residents 1999-2013



Relative survival for WHO Grade I cranial meningiomas diagnosed in England residents 1999-2013 by gender



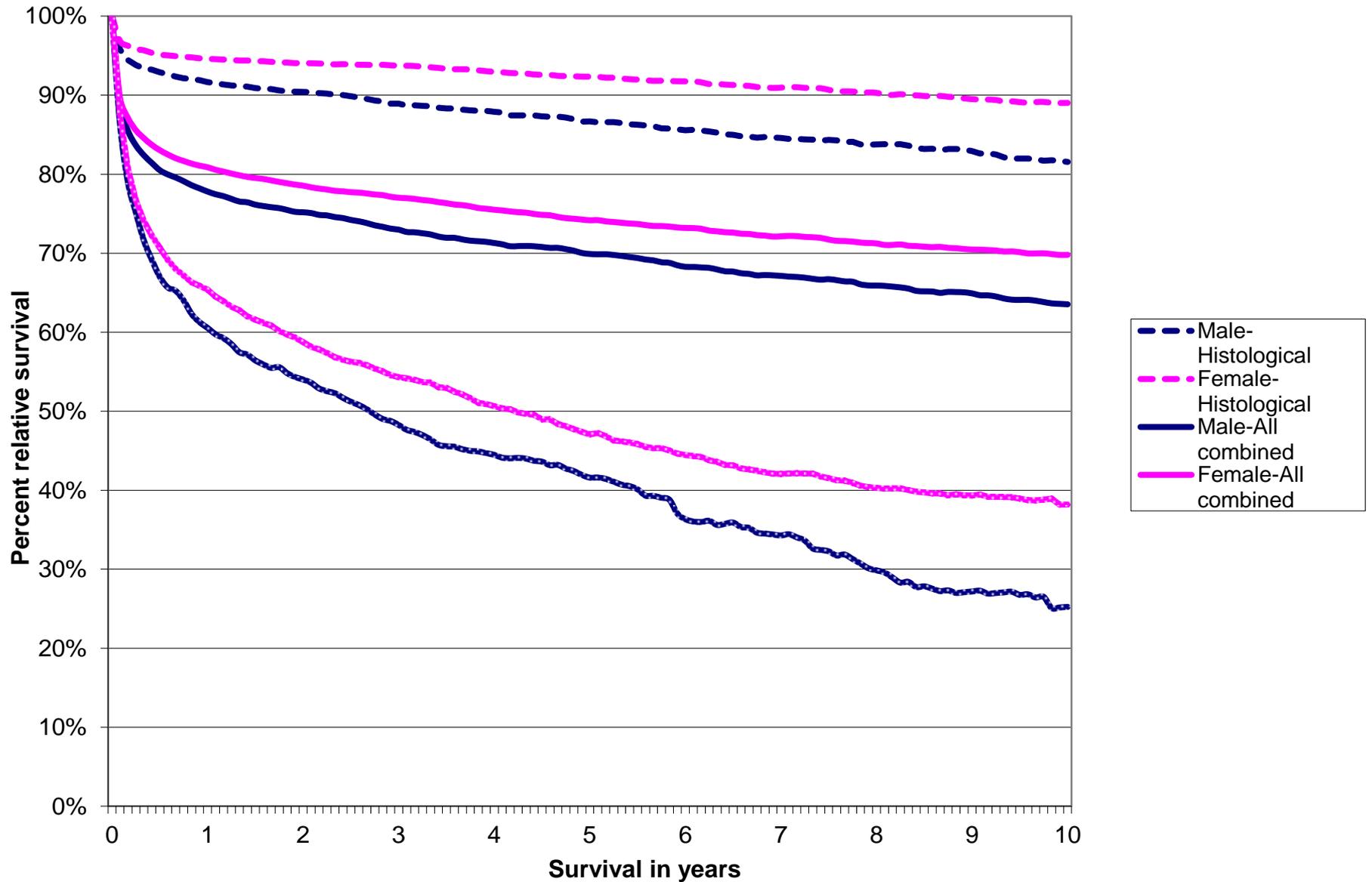
Relative survival for histologically diagnosed WHO Grade I cranial meningiomas diagnosed in England residents 1999-2013 by gender



Relative survival for cranial meningiomas diagnosed in residents of England 1999-2009 (5 year survival) or 1999-2004 (10 year survival)

Survival years	Basis of diagnosis	Cranial meninges GI	Cranial meninges GII	Cranial meninges GIII
5	Histologically confirmed only	90.7%	84.6%	62.2%
5	All cases	73.0%	78.4%	45.4%
10	Histologically confirmed only	86.9%	75.1%	54.1%
10	All cases	68.1%	68.5%	39.0%

Relative survival for WHO Grade I cranial meningiomas diagnosed in England residents 1999-2013 by gender and basis of diagnosis



Age standardised incidence rates per 100,000 population for Grade 1 cranial meningiomas

Year of diagnosis	Males	Females	Persons
1999-2003	1.11	1.72	1.51
2004-2008	1.99	3.19	2.78
2009-2013	2.11	3.45	3.00

The american data: Epidemiology of meningiomas post-Public Law 107-206: The Benign Brain Tumor Cancer Registries Amendment Act.

- The average annual age-adjusted incidence rate per 100,000 population was 7.62 for all meningiomas, 7.18 for benign meningiomas, 0.32 for borderline malignant meningiomas, and 0.12 for malignant meningiomas
- Diagnostic confirmation through pathology occurred for approximately 50% of benign tumors, 90% of borderline malignant tumors, and 80% of malignant tumors. No initial treatment was reported for greater than 60% of benign tumors, 29% of borderline malignant tumors, or 31% of malignant tumors.

The american data:

- The 5-year relative survival estimates for benign tumors, borderline malignant tumors, and malignant tumors were 85.6% ,82.3%, and 66% respectively. Predictors of poorer survival were advanced age, being male gender, black race, no initial treatment, and malignant tumor behavior

Cancer. 2015 Apr 14. Dolecek TA1, Dressler EV, Thakkar JP, Liu M, Al-Qaisi A, Villano JL.

Conclusion

- Even in 'benign' (WHO grade 1) cranial meningioma patients, 5 year survival is 73%
- Our analysis demonstrates an increasing incidence of meningiomas, maybe due to increased reporting and ageing population.
- Patient survival has improved over time, and is it remains better for surgically treated meningiomas, and poorer for older people.

Limitations

Limitations of the present study include the lack of detailed data re:

- tumour site (i.e. skull base)
- Comorbidities
- Radiotherapy, SRS, chemotherapy
- Data on recurrences .
- Morbidity

Further data sub-analysis on the way