[PART 1] A multicenter study of primary brain tumor incidence in Australia (2000-2008). Martin Dobes, Bruce Shadbolt, Vini G. Khurana, Sanjiv Jain, Sarah F. Smith, Robert Smee, Mark Dexter, Raymond Cook. *Neuro Oncology* 2011; 13: 783-90.

[PART 2] Increasing incidence of glioblastoma multiforme and meningioma, and decreasing incidence of Schwannoma (2000-2008): Findings of a multicenter Australian Study. Martin Dobes, Vini G. Khurana, Bruce Shadbolt, Sanjiv Jain, Sarah F. Smith, Robert Smee, Mark Dexter, Raymond Cook. *Surgical Neurology International* 2011; 2: 176.

- **PRINCIPAL QUESTIONS ADDRESSED BY THIS TWO-PART STUDY**: How common are primary brain tumors, including brain cancer, in Australia, and has their incidence significantly changed between January 2000 and December 2008?

- **METHODS**: The project was a two-year multicenter investigation that involved the mining of data directly from 13 pathology databases servicing 24 neurosurgical centers (including all major teaching / tertiary referral hospitals) in the Australian Capital Territory (ACT) and New South Wales (NSW). The combined population of these two regions is > 7 million, representing one-third of the Australian population. Only 3% of people in these regions cross state borders to obtain health care interstate ("outflow"). Data were weighted for patient outflow and record completeness, and adjusted for population growth and ageing. The classification of primary brain tumors was according to the World Health Organisation (WHO) grading system. Primary brain tumors of WHO Grade 3 (e.g., anaplastic astrocytoma and anaplastic oligodendroglioma) and Grade 4 (e.g., glioblastoma multiforme / GBM and gliosarcoma) were defined as brain cancer. Primary brain tumors diagnosed histologically between January 2000 and December 2008 were analyzed, while metastases, systemic lymphoma, and extracerebral and germ cell tumours were excluded from the analysis.

- **KEY RESULTS**: A weighted total of 7,651 primary brain tumors were analyzed. The overall US-standardized incidence of primary brain tumors was 11.3 cases per 100,000 people per year (varying non significantly from 9.8 to 12.3 per 100,000 person-years) during the study period. A significant increase in primary malignant brain tumors between 2000 and 2008 was observed (**FIG. A**, below). Brain cancer incidence was found to have increased by approximately 35% between 2000 and 2008 (annual percentage change / APC of +3.9%), with the greatest increase occurring after 2006. A significant increasing incidence in GBM was observed (APC, +2.5%) particularly after 2006. In GBM patients in the ≥ 65-year age group, significantly increasing incidence for men and women combined (APC, +3.0%) and men only (APC, +2.9%) were seen. Rising trends in incidence were also seen in meningioma for total male population (APC, +5.3%) and males aged 20-64 years (APC, +6.3%). Significantly decreasing incidence trends were observed for Schwannoma for the total study population (APC, -3.5%) significant in women (APC, -5.3%) but not men (**FIG. B**, below).

- **CONCLUSIONS**: This project represents the most contemporary collection of primary brain tumors in Australia and highlights the need for continued monitoring. Despite certain methodological limitations of the study discussed by the authors, the method of directly mining data from pathology units, as used in this study, can overcome the potential limitations of late, incomplete or non-uniform data reporting to local cancer registries. Significant increases in incidence rates for GBM, particularly after 2006, and meningioma, were observed with overall incidence rates comparable to recent US and European data. Incidence trends for Schwannoma, in contrast to the European experience, were observed to be significantly decreasing, but were akin to overall Schwannoma incidence rates from the US. The authors are unaware of any recent peer-reviewed publications reporting a significant increase in primary brain tumor incidence, including GBM, during surveillance years as recent as those reported in this two-part study, which distinctively analyses primary brain tumour incidence data as recent as December 2008. They recommend a direct, uniform and centralized approach to monitoring primary brain tumor incidence including the introduction of non-malignant primary brain tumor data collection in Australia and elsewhere. Now is an optimal time to begin robust data collection globally, akin to that of the Central Brain Tumor Registry of the United States (CBTRUS), to pave the way for future association studies.

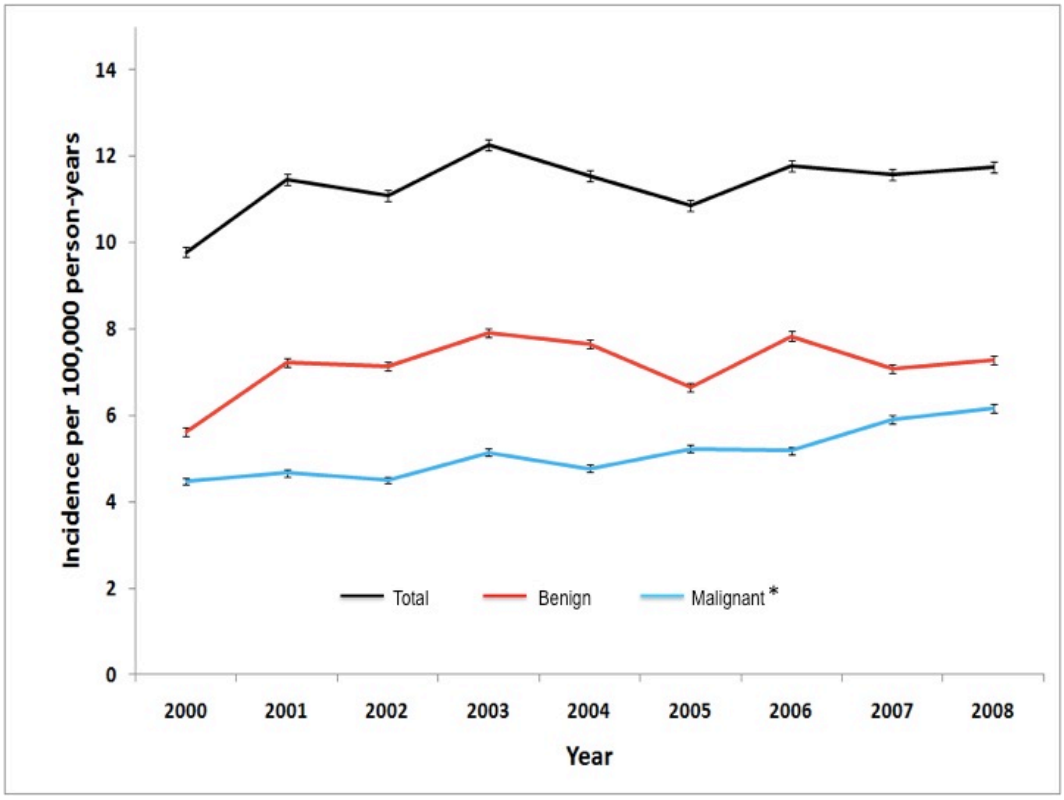

FIG. A (above): US-standardized primary brain tumor incidence rates by WHO Grade by calendar year from the ACT and NSW populations. Confidence intervals are displayed. Asterisk denotes statistical significance. Benign = WHO Grades 1 and 2; Malignant = WHO Grades 3 and 4. Adapted from M. Dobes et al., *Neuro Oncology* 2011; 13: 783-90.

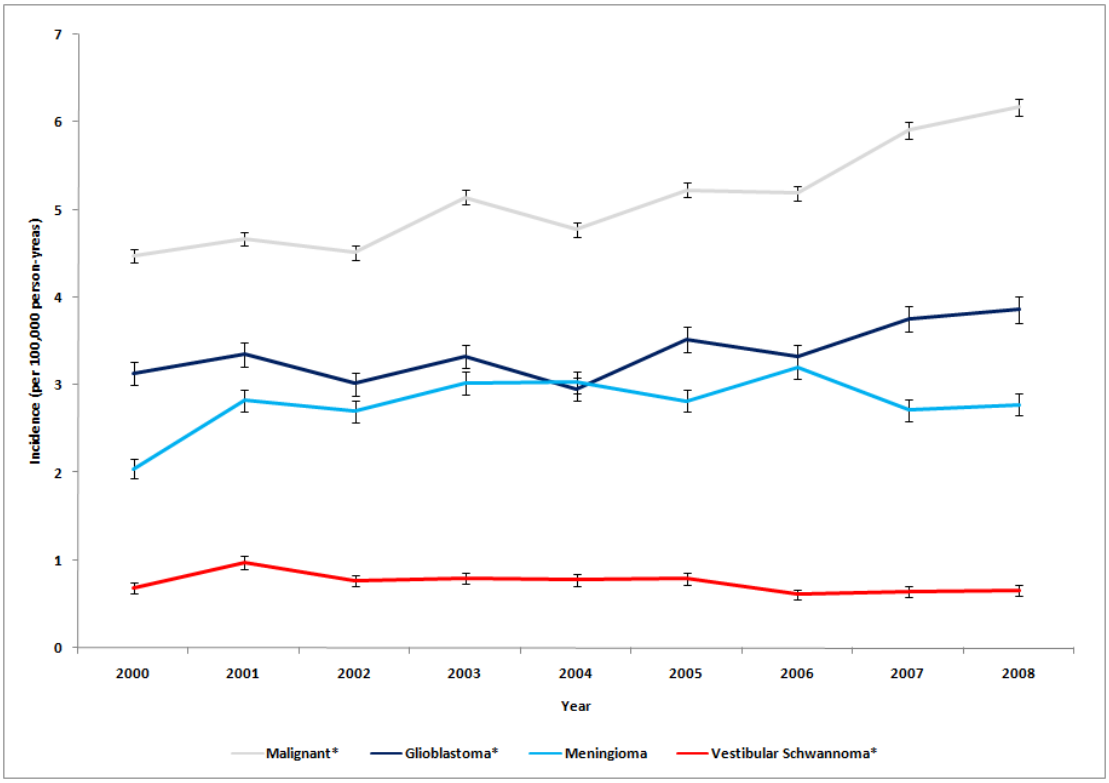

FIG. B (above): US-standardized primary brain tumor incidence rates by major histological groupings by calendar year in the total ACT and NSW populations. Confidence intervals are displayed. Asterisk denotes statistical significance. From M. Dobes et al., *Surgical Neurology International* 2011; 2: 176.