National Cancer Registry Ireland

Cancer Trends

Cancers of the brain and central nervous system

Incidence trends

Cancers of the brain and other central nervous system (CNS) sites (including benign intracranial and intraspinal tumours) have made up a fairly constant 1.2% of all cancers since 1994. Brain tumours are initially diagnosed by brain scan. Most are then biopsied or removed, so the diagnosis can be confirmed by histology (histological verification; HV). Between 1994 and 2008, 72% of CNS cancers (100% of benign) were diagnosed by histology, 24% by radiology/scan and the remaining 4% clinically. 97% of tumours were invasive and 3% benign; this proportion has been constant since 1994. Although numbers of cases increased by an annual average of 2.3% since 1994, due to population increases and ageing, the age-standardised incidence rate has not changed (annual percentage change=0.4%±0.6%) (Figure 1).

The median age at diagnosis for cancers of the brain and CNS was 57, compared to 67 for all cancers combined. The largest number of male cases was at age 65-69 and female at age 70-74. The HV proportion fell rapidly after age 60 (Figure 2).

Anatomical sites

2.5% of tumours (1.4% of HV cases) were meningeal and 3.2% were in cranial nerves or spinal cord (Table 1). The commonest site in the brain was the frontal lobe (23% of HV tumours) but the parietal lobe was the most frequent site in those aged 50 and over (25% of cases).

Cancer types

Astrocytic tumours (56% of which are glioblastoma and 26% astrocytoma) were by far the commonest type, making up 66% of all cancers, and 81% of HV cancers (Table 2). The percentage of astrocytic tumours increased with age, from 69% in women under 35 to 88% in those over 65, and from 64% to 93% for men. Of the other cancers, oligodendroglial tumours were the next most common type overall, in persons aged 35-49 (12% of the total) and those of 50 and over (4%).

1. *HV: histologically verified*
2. *NOS: not otherwise specified*

Figure 1. Cancers of brain and other CNS 1994-2008— European age-standardised incidence rate

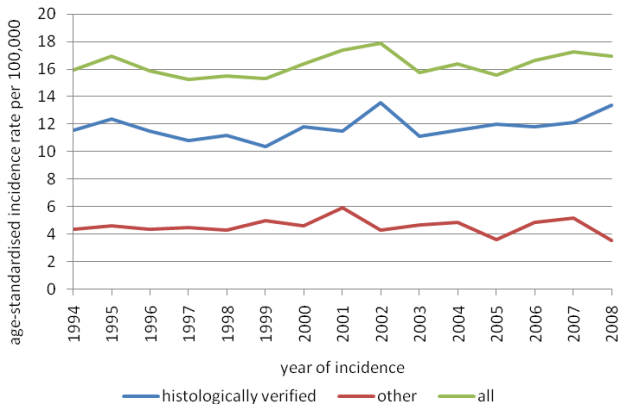


Figure 2. Age distribution of cancers of brain and other CNS 1994-2008

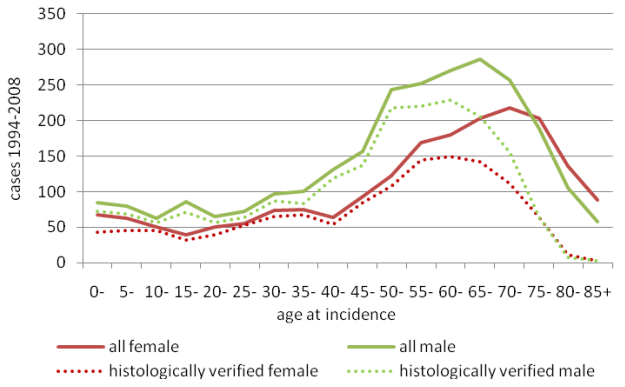


Table 1. Anatomical site of tumours, 1994-2008

		all	HV[1]
meninges	cerebral meninges	69 (1.5%)	29 (0.9%)
	spinal meninges	12 (0.3%)	8 (0.3%)
	meninges NOS[2]	31 (0.7%)	6 (0.2%)
brain	cerebrum	248 (5.5%)	152 (4.8%)
	frontal lobe	926 (20.4%)	744 (23.4%)
	temporal lobe	700 (15.4%)	586 (18.4%)
	parietal lobe	822 (18.1%)	625 (19.7%)
	occipital lobe	175 (3.8%)	136 (4.3%)
	ventricle NOS[2]	63 (1.4%)	47 (1.5%)
	cerebellum, NOS[2]	167 (3.7%)	132 (4.2%)
	brain stem	166 (3.7%)	88 (2.8%)
	overlapping lesion of brain	402 (8.8%)	282 (8.9%)
	brain NOS[2]	604 (13.3%)	237 (7.5%)
cranial and spinal	spinal cord	94 (2.1%)	85 (2.7%)
	cauda equina	6 (0.1%)	6 (0.2%)
	olfactory nerve	1 (0.0%)	1 (0.0%)
	optic nerve	26 (0.6%)	6 (0.2%)
	acoustic nerve	6 (0.1%)	0 (0.0%)
	cranial nerve, NOS[2]	12 (0.3%)	3 (0.1%)
NOS[2]	overlapping lesion	8 (0.2%)	4 (0.1%)
	nervous system NOS[2]	7 (0.2%)	3 (0.1%)

Table 2. Histological types of tumour, 1994-2008

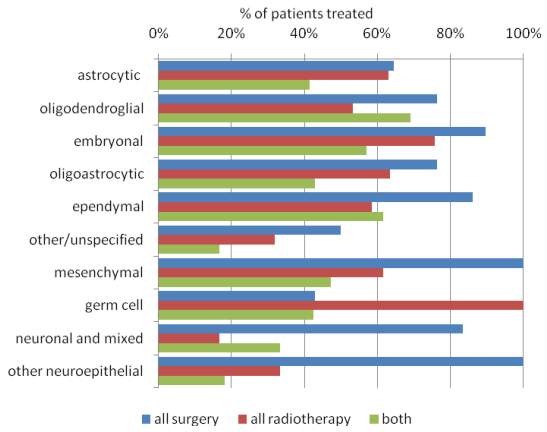
	all	HV[1]
all brain and CNS cancers	4546 (100.0%)	3180 (100.0%)
astrocytic	3012 (66.3%)	2578 (81.1%)
oligodendroglial	206 (4.5%)	195 (6.1%)
embryonal	123 (2.7%)	118 (3.7%)
ependymal	99 (2.2%)	93 (2.9%)
oligoastrocytic	96 (2.1%)	94 (3.0%)
meningothelial	31 (0.7%)	25 (0.8%)
mesenchymal	31 (0.7%)	27 (0.8%)
germ cell	8 (0.2%)	7 (0.2%)
cranial/paraspinal	6 (0.1%)	6 (0.2%)
neuronal and mixed	6 (0.1%)	6 (0.2%)
primary melanocytic	4 (0.1%)	4 (0.1%)
other neuroepithelial	3 (0.1%)	3 (0.1%)
other and unspecified	921 (20.3%)	24 (0.8%)

Embryonal tumours were the third commonest type overall and the second commonest in those under 35 (13% of the total).

Treatment

Of the HV cases, 67% had surgery, 62% had radiotherapy and 43% had both of these treatments. With the exception of germ cell tumours, surgery was more commonly used than radiotherapy in all tumour types (Figure 3). 38% of those with astrocytic tumours had surgery in 1994; this rose to 64% in 1998, and has averaged 70% since then. 56% of those with astrocytic tumours had radiotherapy in 1994; this increased, year on year, to 73% in 2007.

Figure 3. Surgery and radiotherapy treatment 1994-2008, histologically confirmed cases only



Survival

Survival for the commonest, astrocytic, tumours was poor: 24% at 5 years from diagnosis (Figure 4). Survival for some of the other common types was somewhat better, with survival almost 70% at 5 years in those with embryonal or ependymal tumours.

Mortality

There was a steady upward trend in brain cancer mortality from the mid 1950s to about 1990, with annual percentage increases, between 1960 and 1990, of 2.5% for males and 2.4% for females (Figure 5). The trend has been slightly downwards since the early 1990s. Similar trends were seen for females under 65 (Figure 6), while for males under 65 the downward trend began in 1979. This pattern of increase followed by levelling off was not unique to Ireland (Figure 7). Although there may have been a real increase in incidence and mortality, it has been suggested that more accurate diagnosis by CT scans may explain the apparent increase in mortality; however, the number of CT scanners began to increase in Ireland only in the 1980s, so this is not an adequate explanation for the observed trends. Changing practices in death certification may have also played a part.

Figure 4. Five year survival (all causes) by histological group, 1994-2008

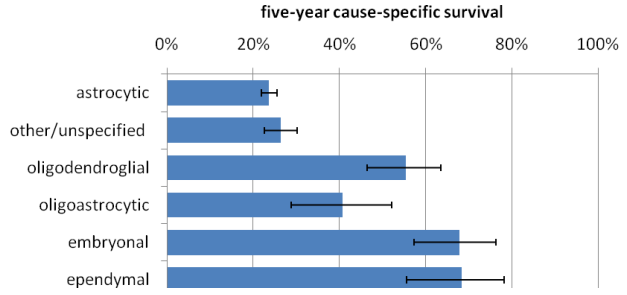


Figure 5. Brain cancer deaths all ages, 1950-2006

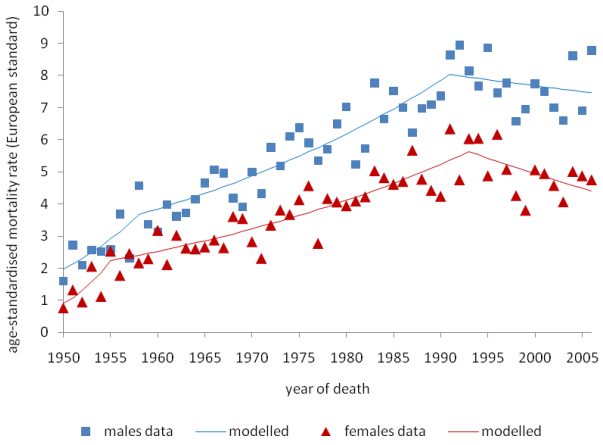


Figure 6. Brain cancer deaths aged 0-64 years, 1950-2006

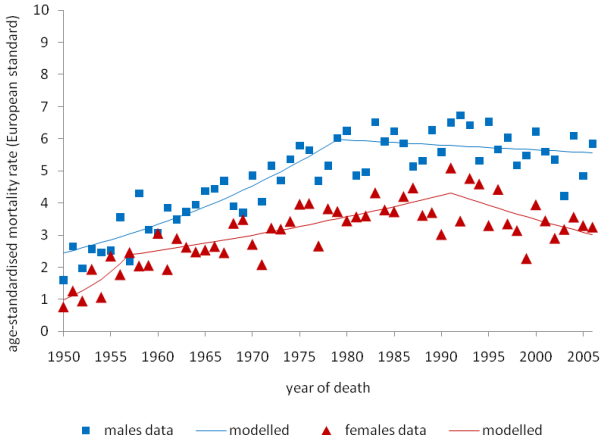


Figure 7. Brain cancer death rates in the US and some European countries, males, 1950-2006 (five-year moving average)