# 3.26 Central nervous system

## Epidemiology

In 95% of cases, cancers of the central nervous system (CNS) affect the brain; the remaining 5% are diagnosed in the meninges and spinal membranes, cranial nerves and spinal cord.

CNS tumours can occur at any age. Adults predominantly develop gliomas originating from the supportive tissue of the nerve cells, of which almost three quarters are glioblastomas (grade IV astrocytomas) with an unfavourable prognosis. In contrast, embryonic tumours predominate in infants and toddlers.

In 2016, around 3,460 women and 3,970 men in Germany contracted malignant CNS tumours. No substantial changes in age-standardised incidence and death rates have been observed since 1999. The relative 5-year survival rates for malignant CNS tumours are 21% for men and 24% for women. These figures do not include histologically benign CNS tumours or tumours with uncertain or unknown behaviour that, depending on their location, can also lead to complications or even death. Around 6,000 such cases occur each year, of which almost two thirds originate from the meninges. Women are affected much more often than men.

## Risk factors

The majority of risk factors associated with the various types of brain tumours have yet to be determined. However, patients with very rare hereditary tumour syndromes have a significantly increased risk. Radiation therapy to the head slightly increases the risk of developing a brain tumour but comes with a long latency period. This particularly applies to radiation therapy in childhood and adolescence. Computed tomography imaging in childhood may also slightly increase the risk of a brain tumour.

There is no clear connection between cell phone use and brain tumours. However, an increased risk cannot be ruled out. This particularly applies to people who make long and frequent calls using mobile phones. Current research suggests that viruses, toxic substances and lifestyle factors such as smoking and alcohol do not increase the risk of cancer of the central nervous system. However, first-degree relatives of patients who have had brain tumours have a slightly increased risk of developing the condition themselves. Hereditary gene mutations are probably involved in these cases.
Figure 3.26.1a
Age-standardised incidence and mortality rates by sex, ICD-10 C70–C72, Germany 1999 – 2016/2017, projection (incidence) through 2020
per 100,000 (old European Standard)

Figure 3.26.1b
Absolute numbers of incident cases and deaths by sex, ICD-10 C70–C72, Germany 1999 – 2016/2017, projection (incidence) through 2020

Figure 3.26.2
Age-specific incidence rates by sex, ICD-10 C70–C72, Germany 2015 – 2016
per 100,000
### Table 3.26.2
Cancer incidence and mortality risks in Germany by age and sex, ICD-10 C70–C72, database 2016

<table>
<thead>
<tr>
<th>Age</th>
<th>Risk of developing cancer</th>
<th>Mortality risk</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>in the next ten years</td>
<td>ever</td>
</tr>
<tr>
<td>Women</td>
<td></td>
<td></td>
</tr>
<tr>
<td>35 years</td>
<td>&lt; 0.1% (1 in 2,500)</td>
<td>0.6% (1 in 180)</td>
</tr>
<tr>
<td>45 years</td>
<td>0.1% (1 in 1,600)</td>
<td>0.5% (1 in 190)</td>
</tr>
<tr>
<td>55 years</td>
<td>0.1% (1 in 920)</td>
<td>0.5% (1 in 210)</td>
</tr>
<tr>
<td>65 years</td>
<td>0.2% (1 in 590)</td>
<td>0.4% (1 in 250)</td>
</tr>
<tr>
<td>75 years</td>
<td>0.2% (1 in 570)</td>
<td>0.3% (1 in 400)</td>
</tr>
<tr>
<td>Lifetime risk</td>
<td>0.6% (1 in 160)</td>
<td></td>
</tr>
<tr>
<td>Men</td>
<td></td>
<td></td>
</tr>
<tr>
<td>35 years</td>
<td>0.1% (1 in 1,900)</td>
<td>0.6% (1 in 160)</td>
</tr>
<tr>
<td>45 years</td>
<td>0.1% (1 in 1,100)</td>
<td>0.6% (1 in 170)</td>
</tr>
<tr>
<td>55 years</td>
<td>0.1% (1 in 680)</td>
<td>0.5% (1 in 190)</td>
</tr>
<tr>
<td>65 years</td>
<td>0.2% (1 in 490)</td>
<td>0.4% (1 in 240)</td>
</tr>
<tr>
<td>75 years</td>
<td>0.2% (1 in 500)</td>
<td>0.3% (1 in 380)</td>
</tr>
<tr>
<td>Lifetime risk</td>
<td>0.7% (1 in 140)</td>
<td></td>
</tr>
</tbody>
</table>

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**Figure 3.26.3**
Distribution of histologic types in malignant brain tumours (C71) according to WHO-classification (2016), by sex, (DCO cases excluded), Germany 2015–2016

- Women
  - Astrocytoma grade IV: 67%
  - Astrocytoma grade III: 10%
  - Astrocytoma grade II: 9%
  - Astrocytoma grade I: 3%
  - Other or not further specified gliomas: 1%
  - Ependymoma: 2%
  - Embryonal tumours: 2%
  - Unspecified information: 4%

- Men
  - Astrocytoma grade IV: 68%
  - Astrocytoma grade III: 10%
  - Astrocytoma grade II: 8%
  - Other or not further specified gliomas: 3%
  - Ependymoma: 2%
  - Embryonal tumours: 2%
  - Unspecified information: 4%

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**Figure 3.26.4**
Absolute and relative survival rates up to 10 years after first diagnosis, by sex, ICD-10 C70–C72, Germany 2015–2016

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**Figure 3.26.5**
Relative 5-year survival by histology and sex, ICD-10 C70–C72, Germany 2015–2016

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1 including oligodendrogliomas

Astrocytomas grade I are histologically benign tumours and are therefore not included.
Figure 3.26.6
Age-standardised incidence and mortality rates in German federal states by sex, ICD-10 C70–C72, 2015–2016
(Incidence in Bremen for 2014 and 2016, incidence in eastern Germany for 2014 to 2015)
per 100,000 (old European Standard)

Figure 3.26.7
International comparison of age-standardised incidence and mortality rates by sex, ICD-10 C70–C72, 2015–2016 or latest available year (details and sources, see appendix)
per 100,000 (old European Standard)

¹ No comparable data available