# Munich Cancer Registry

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## ICD-10 C61: Prostate cancer

## Incidence and Mortality

| | |
|---|---|
| Year of diagnosis | 1998-2020 |
| Patients | 61,914 |
| Diseases | 61,915 |
| Creation date | 12/21/2021 |
| Database export | 12/20/2021 |
| Population (males) | 2.45 m |


Munich Cancer Registry
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https://www.tumorregister-muenchen.de/en

https://www.tumorregister-muenchen.de/en/facts/base/bC61__E-ICD-10-C61-Prostate-cancer-incidence-and-mortality.pdf

## Index of figures and tables

**Global Statements about the statistics on the Internet −**
**Baseline Statistics** (grey button ), **Survival** (red button )

In these analyses, the clinics and physicians of Upper Bavaria and the city and county of Landshut[#], with a total of 4.69 million inhabitants, account for the frequency of cancer diseases[##] and the achieved long term results. Additionally, the long term survival evaluated by the Munich Cancer Registry (MCR) is compared with the results of the population-based registry in the USA (SEER), which is useful for checking the consistency of the data on an international level.

In comparing several tables, inconsistent figures may be detected. This is based on the fact that different patient cohorts are included in the base calculation, for example when proportions of multiple tumors or DCO-cases[###] are concerned. In other cases the individual tumor diagnosis is the basis for calculation, for example with incidence.

The foot notes describe the currentness of the data. The baseline statistics and survival data are updated annually. This yearly analysis comprises the Annual Report of the MCR.

Clinics and physicians have access to essentially more detailed data, with which they can check, compare and in the best case optimize their own data and results.

We would be pleased to receive corrections, critique and useful suggestions. Just send an e-mail to tumor@ibe.med.uni-muenchen.de.

Munich Cancer Registry, December 2021

[#] Base data has been collected since 1998. An increase in new diseases is apparent, which is an effect of two extensions in the MCR catchment area (from a base population of 2.65 million to 4.10 in 2002, and to 4.69 million in 2007).

[##] Due to the high frequency and good prognosis of non-malignant skin cancer (C44), no systematic ascertainment is performed for this diagnosis. C44 is not designated as a primary, but rather as a secondary tumor.

[###] DCO (death certificate only) identifies a cancer case that first becomes available to the MCR through the death certificate.

## ICD-10 codes (ICD-10 2015) used for specifying cancer site

| Code | Description |
|---|---|
| C61 | Malignant neoplasm of prostate |

# INCIDENCE

Table 1

Cases with invasive cancer by year of diagnosis, proportions of DCO, further malignancies, deaths, and active follow-up (incl. DCO)

| Year of diagnosis | All cases n | DCO cases n | Prop. DCO % | Prop. at least 1 further malign. prior + synchron. % | Prop. at least 1 further malign. after % | Prop. deaths % | Prop. actively followed % |
|---|---|---|---|---|---|---|---|
| 1998 | 1569 | 161 | 10.3 | 10.2 | 14.9 | 76.7 | 96.7 |
| 1999 | 1531 | 120 | 7.8 | 9.6 | 14.8 | 74.5 | 97.2 |
| 2000 | 1719 | 152 | 8.8 | 9.6 | 14.6 | 69.9 | 97.0 |
| 2001 | 1797 | 123 | 6.8 | 9.6 | 14.4 | 66.1 | 96.5 |
| 2002 | 3384 | 315 | 9.3 | 9.7 | 14.2 | 66.7 | 96.6 # |
| 2003 | 3345 | 236 | 7.1 | 9.8 | 13.8 | 63.9 | 96.4 |
| 2004 | 3298 | 229 | 6.9 | 9.9 | 13.3 | 59.9 | 96.6 |
| 2005 | 3241 | 198 | 6.1 | 9.9 | 12.7 | 56.8 | 95.3 |
| 2006 | 3137 | 185 | 5.9 | 10.1 | 12.2 | 53.8 | 91.9 |
| 2007 | 3719 | 245 | 6.6 | 10.3 | 11.6 | 51.5 | 89.6 # |
| 2008 | 3417 | 201 | 5.9 | 10.5 | 11.0 | 50.7 | 97.5 |
| 2009 | 3188 | 175 | 5.5 | 10.8 | 10.3 | 47.8 | 97.9 |
| 2010 | 3084 | 195 | 6.3 | 11.0 | 9.5 | 44.3 | 97.3 |
| 2011 | 3305 | 192 | 5.8 | 11.3 | 8.9 | 41.6 | 97.5 |
| 2012 | 3363 | 163 | 4.8 | 11.5 | 8.3 | 37.0 | 97.3 |
| 2013 | 3060 | 150 | 4.9 | 11.6 | 7.8 | 36.1 | 96.6 |
| 2014 | 3078 | 164 | 5.3 | 11.7 | 7.1 | 32.9 | 95.1 |
| 2015 | 2484 | 157 | 6.3 | 11.9 | 6.5 | 32.4 | 93.8 |
| 2016 | 2546 | 150 | 5.9 | 12.2 | 6.0 | 27.8 | 99.4 |
| 2017 | 2454 | 156 | 6.4 | 12.4 | 5.0 | 24.5 | 99.8 |
| 2018 | 2206 | 81 | 3.7 | 12.6 | 4.2 | 16.3 | 99.5 |
| 2019 | 1842 | 7 | 0.4 | 12.8 | 3.4 | 11.4 | 99.6 |
| 2020 | 1148 | 1 | 0.1 | 12.8 | 2.7 | 7.1 | 99.7 ## |
| 1998-2020 | 61915 | 3756 | 6.1 | 12.8 | 14.9 | 46.3 | 96.4 |

61,915 cases diagnosed 1998-2020 are related to a total of 61,914 patients. Currently, in 16,612 (26.8 %) of these 61,914 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 12,843 / 2,771 / 998 (20.7 % / 4.5 % / 1.6 %) patients exist having 2 / 3 / 4+ malignancies.

# The increases of incident cases in 2002 and 2007 reflect the expansion to additional registry areas.

## Please be aware that data of recent annual patient cohorts may not yet be fully processed. The years under evaluation can be retreived from the respective headings.

How to interpret:
In 2018, a subgroup of 2,206 cases has been diagnosed, of which 12.6 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 4.2 % of cases, at least one new malignancy has occurred during the follow-up period (all numbers refer to the date of the database export, see cover sheet).

Table 2

Incidence measures by year of diagnosis including DCO cases
(with respect to registry area expansion from 2.65 to 4.10 m as of 2002,
and from 4.10 to 4.94 m as of 2007, respectively)

| Year of diagnosis | Cases n | Incidence raw | Incidence WS | Incidence ES | Incidence BRD-S |
|---|---|---|---|---|---|
| 1998 | 1569 | 141.6 | 84.0 | 129.5 | 175.7 |
| 1999 | 1531 | 136.8 | 79.8 | 121.8 | 160.6 |
| 2000 | 1719 | 150.9 | 86.7 | 132.9 | 176.4 |
| 2001 | 1797 | 155.1 | 88.3 | 135.0 | 177.9 |
| 2002 | 3384 | 181.6 | 99.2 | 151.4 | 198.3 |
| 2003 | 3345 | 178.4 | 96.3 | 145.7 | 189.2 |
| 2004 | 3298 | 175.3 | 92.6 | 139.1 | 179.9 |
| 2005 | 3241 | 171.1 | 88.5 | 133.0 | 172.6 |
| 2006 | 3137 | 163.8 | 83.3 | 125.2 | 162.1 |
| 2007 | 3719 | 167.9 | 85.8 | 128.2 | 164.5 |
| 2008 | 3417 | 153.5 | 75.6 | 113.6 | 147.4 |
| 2009 | 3188 | 142.8 | 70.1 | 104.6 | 134.1 |
| 2010 | 3084 | 136.8 | 66.8 | 99.9 | 127.8 |
| 2011 | 3305 | 147.7 | 69.9 | 104.8 | 135.8 |
| 2012 | 3363 | 148.2 | 70.2 | 104.8 | 135.1 |
| 2013 | 3060 | 132.9 | 61.9 | 92.9 | 120.1 |
| 2014 | 3078 | 132.0 | 62.3 | 92.9 | 118.8 |
| 2015 | 2484 | 104.4 | 48.7 | 73.1 | 94.5 |
| 2016 | 2546 | 105.9 | 49.3 | 73.8 | 95.2 |
| 2017 | 2454 | 101.7 | 46.3 | 69.8 | 90.5 |
| 2018 | 2206 | 90.6 | 41.9 | 62.6 | 80.8 |
| 2019 | 1842 | 75.7 | 35.0 | 52.2 | 67.6 |
| 2020 | 1148 | 47.2 | 22.0 | 32.6 | 42.2 |
| 1998–2020 | 61915 | 133.1 | 65.9 | 98.5 | 126.7 |

The computation of the incidence measures includes all cancers, irrespective of first or subsequent malignancy.

Table 3

Age distribution parameters by year of diagnosis
(incl. DCO)

| Year of diagnosis | Cases n | Mean | Std. dev. | Min. | Max. | 10% | 25% | Median 50% | 75% | 90% |
|---|---|---|---|---|---|---|---|---|---|---|
| 1998 | 1569 | 70.7 | 9.7 | 47.0 | 99.8 | 58.2 | 63.3 | 70.3 | 77.8 | 84.2 |
| 1999 | 1531 | 70.2 | 9.6 | 43.0 | 99.5 | 58.2 | 62.9 | 70.0 | 76.4 | 84.0 |
| 2000 | 1719 | 70.4 | 9.4 | 40.6 | 98.8 | 58.8 | 63.4 | 69.9 | 76.6 | 83.2 |
| 2001 | 1797 | 70.1 | 9.3 | 43.6 | 100 | 58.6 | 63.1 | 69.9 | 76.4 | 82.2 |
| 2002 | 3384 | 70.6 | 9.5 | 42.6 | 102 | 59.1 | 63.7 | 70.0 | 76.7 | 83.4 |
| 2003 | 3345 | 70.1 | 9.1 | 35.2 | 101 | 58.9 | 63.8 | 69.4 | 75.9 | 82.2 |
| 2004 | 3298 | 70.0 | 9.2 | 40.0 | 100 | 59.2 | 63.8 | 69.1 | 76.1 | 82.2 |
| 2005 | 3241 | 70.2 | 9.1 | 38.4 | 101 | 59.0 | 64.2 | 69.4 | 76.2 | 82.4 |
| 2006 | 3137 | 70.5 | 8.9 | 41.6 | 98.6 | 59.7 | 64.8 | 69.6 | 76.2 | 82.7 |
| 2007 | 3719 | 70.3 | 9.1 | 37.6 | 99.9 | 59.1 | 64.5 | 69.6 | 76.1 | 82.4 |
| 2008 | 3417 | 70.7 | 8.9 | 25.1 | 101 | 59.5 | 65.5 | 70.4 | 76.2 | 82.5 |
| 2009 | 3188 | 70.5 | 9.0 | 43.2 | 105 | 59.3 | 65.2 | 70.2 | 75.8 | 82.3 |
| 2010 | 3084 | 70.8 | 9.2 | 38.4 | 102 | 59.4 | 65.1 | 70.7 | 76.4 | 83.0 |
| 2011 | 3305 | 71.2 | 9.3 | 40.0 | 109 | 59.5 | 65.7 | 71.2 | 76.6 | 83.2 |
| 2012 | 3363 | 71.1 | 8.8 | 2.7 | 100 | 59.6 | 65.5 | 71.4 | 76.4 | 82.4 |
| 2013 | 3060 | 71.2 | 9.1 | 42.4 | 103 | 59.0 | 65.5 | 71.8 | 76.7 | 82.7 |
| 2014 | 3078 | 71.1 | 9.2 | 44.0 | 104 | 58.4 | 65.1 | 71.6 | 76.8 | 82.8 |
| 2015 | 2484 | 71.4 | 9.5 | 44.4 | 102 | 58.6 | 65.1 | 72.1 | 77.5 | 83.5 |
| 2016 | 2546 | 71.5 | 9.4 | 14.9 | 103 | 58.6 | 65.5 | 72.3 | 77.5 | 83.0 |
| 2017 | 2454 | 71.8 | 9.4 | 41.5 | 102 | 58.8 | 65.3 | 72.7 | 78.0 | 83.0 |
| 2018 | 2206 | 71.2 | 9.4 | 26.9 | 98.1 | 58.2 | 64.9 | 71.9 | 77.8 | 81.8 |
| 2019 | 1842 | 71.0 | 8.6 | 41.0 | 96.3 | 59.2 | 64.7 | 71.7 | 77.6 | 81.3 |
| 2020 | 1148 | 71.1 | 8.7 | 40.8 | 94.8 | 59.4 | 64.8 | 71.7 | 77.8 | 81.6 |
| 1998–2020 | 61915 | 70.8 | 9.2 | 2.7 | 109 | 59.0 | 64.6 | 70.7 | 76.7 | 82.7 |

Table 4

Age distribution by 5-year age group for period 2007-2020
(incl. DCO)

| Age at diagnosis Years | Cases n | % | Cum.% |
|---|---|---|---|
| 0-4 | 1 | 0.0 | 0.0 |
| 5-9 | 0 | 0.0 | 0.0 |
| 10-14 | 1 | 0.0 | 0.0 |
| 15-19 | 0 | 0.0 | 0.0 |
| 20-24 | 0 | 0.0 | 0.0 |
| 25-29 | 2 | 0.0 | 0.0 |
| 30-34 | 0 | 0.0 | 0.0 |
| 35-39 | 9 | 0.0 | 0.0 |
| 40-44 | 64 | 0.2 | 0.2 |
| 45-49 | 418 | 1.1 | 1.3 |
| 50-54 | 1242 | 3.2 | 4.5 |
| 55-59 | 2816 | 7.2 | 11.7 |
| 60-64 | 4910 | 12.6 | 24.3 |
| 65-69 | 7864 | 20.2 | 44.5 |
| 70-74 | 8842 | 22.7 | 67.3 |
| 75-79 | 6797 | 17.5 | 84.8 |
| 80-84 | 3450 | 8.9 | 93.6 |
| 85+ | 2478 | 6.4 | 100.0 |
| All ages | 38894 | 100.0 | |

Table 5

Age-specific incidence, DCO rate and proportion of all cancers for period 2007-2020

| Age at diagnosis Years | Cases n | Age-spec. incidence | DCO rate n=2037 % | Prop. all cancers n=153686 % |
|---|---|---|---|---|
| 0- 4 | 1 | 0.1 | 100.0 | 0.5 |
| 5- 9 | | 0.0 | | |
| 10-14 | 1 | 0.1 | 100.0 | 0.7 |
| 15-19 | | 0.0 | | |
| 20-24 | | 0.0 | | |
| 25-29 | 2 | 0.1 | | 0.2 |
| 30-34 | | 0.0 | | |
| 35-39 | 9 | 0.4 | 11.1 | 0.5 |
| 40-44 | 64 | 2.6 | | 2.3 |
| 45-49 | 418 | 15.6 | 0.2 | 8.3 |
| 50-54 | 1242 | 48.7 | 0.1 | 14.7 |
| 55-59 | 2816 | 132.7 | 0.2 | 22.2 |
| 60-64 | 4910 | 277.7 | 0.5 | 27.9 |
| 65-69 | 7864 | 481.8 | 0.7 | 32.4 |
| 70-74 | 8842 | 589.7 | 1.5 | 32.2 |
| 75-79 | 6797 | 561.7 | 3.3 | 28.3 |
| 80-84 | 3450 | 476.4 | 12.1 | 22.5 |
| 85+ | 2478 | 530.6 | 47.3 | 23.6 |
| All ages | 38894 | | 5.2 | 25.3 |
| Incidence | | | | |
| Raw | | 119.4 | | |
| WS | | 56.9 | | |
| ES | | 84.8 | | |
| BRD-S | | 108.9 | | |

The age-specific incidence characterizes the disease risk in a particular age group. The age distribution depends on the patient population frequency in each age group and reflects the tangible clinical picture of everyday patients care (see following chart).

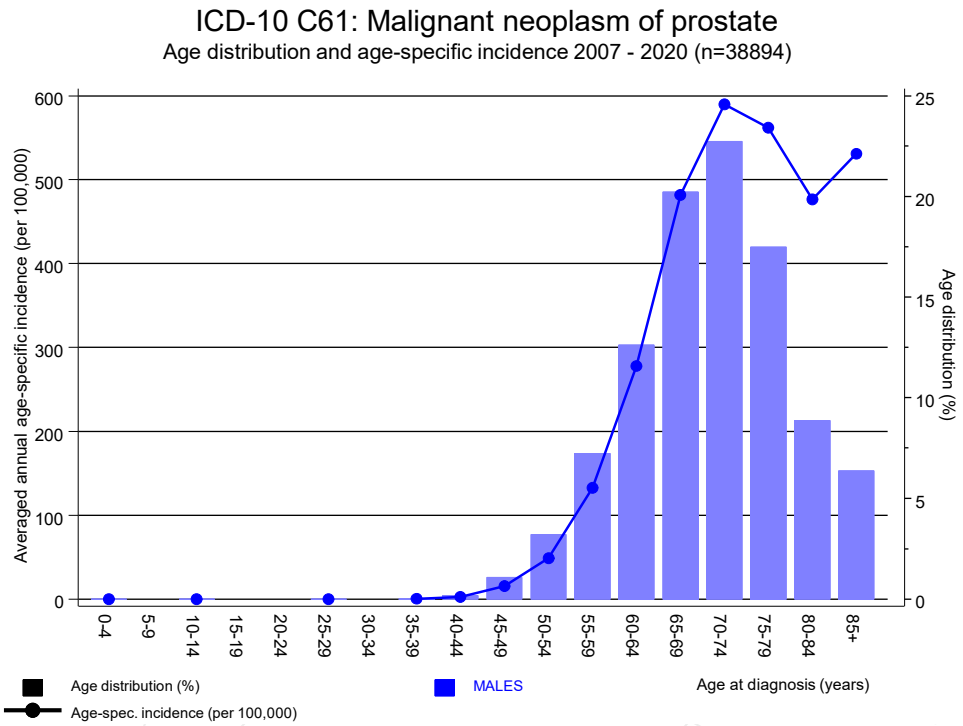


**Figure 6.** Age distribution (mean=71.0 yrs, median=71.2 yrs) and age-specific incidence.

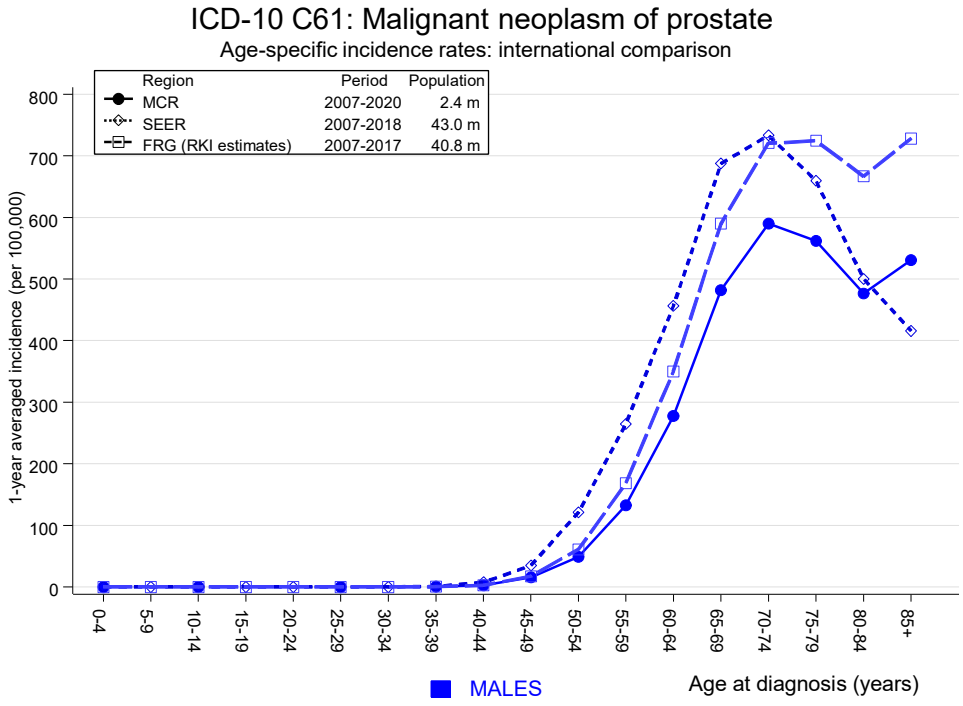


**Figure 6a.** Age-specific incidence in MCR registry areas compared to Germany (FRG, RKI estimates) and SEER (Surveillance, Epidemiology, and End Results, USA).

Reference:

Estimated age-specific patient population of Germany, latest update: 16 March 2021. German Centre for Cancer Registry Data, Robert Koch Institute (RKI), based on data of the population based cancer registries. http://www.krebsdaten.de. Last access: 08/17/2021
Surveillance, Epidemiology, and End Results (SEER) Program SEER*Stat Database: Incidence - SEER 21 Regs Research Data, released April 2021, based on the November 2020 submission. http://www.seer.cancer.gov.

Table 7

Standardized incidence ratio (SIR, with 95% confidence limits), excess absolute risk (EAR) and DCO rate of further malignancies for period 1998–2020

| Diagnosis | | Observed n | Expected n | SIR | CI 95% | CI 95% | | EAR | DCO % |
|---|---|---|---|---|---|---|---|---|---|
| C03–C06 | Oral cavity | 46 | 40.3 | 1.1 | 0.8 | 1.5 | | 0.2 | |
| C07–C08 | Salivary gland | 32 | 14.3 | 2.2 | 1.5 | 3.2 | # | 0.6 | 12.5 |
| C09–C10 | Oropharynx | 73 | 48.1 | 1.5 | 1.2 | 1.9 | # | 0.9 | |
| C12–C13 | Hypopharynx | 42 | 26.6 | 1.6 | 1.1 | 2.1 | # | 0.5 | 4.8 |
| C15 | Oesophagus | 198 | 107.7 | 1.8 | 1.6 | 2.1 | # | 3.1 | 5.1 |
| C16 | Stomach | 414 | 239.5 | 1.7 | 1.6 | 1.9 | # | 6.0 | 6.0 |
| C17 | Small intestine | 102 | 34.0 | 3.0 | 2.4 | 3.6 | # | 2.3 | 2.9 |
| C18 | Colon | 1021 | 589.2 | 1.7 | 1.6 | 1.8 | # | 14.7 | 4.7 |
| C19–C20 | Rectum | 506 | 303.7 | 1.7 | 1.5 | 1.8 | # | 6.9 | 3.6 |
| C21 | Anus/canal | 28 | 12.9 | 2.2 | 1.4 | 3.1 | # | 0.5 | |
| C22 | Liver | 221 | 168.8 | 1.3 | 1.1 | 1.5 | # | 1.8 | 14.0 |
| C23–C24 | Bile | 114 | 63.6 | 1.8 | 1.5 | 2.2 | # | 1.7 | 7.9 |
| C25 | Pancreas | 486 | 233.2 | 2.1 | 1.9 | 2.3 | # | 8.6 | 24.7 |
| C30–C31 | Sinuses | 17 | 10.3 | 1.7 | 1.0 | 2.7 | | 0.2 | 5.9 |
| C32 | Larynx | 83 | 53.5 | 1.6 | 1.2 | 1.9 | # | 1.0 | 8.4 |
| C33–C34 | Lung | 1094 | 681.4 | 1.6 | 1.5 | 1.7 | # | 14.1 | 9.1 |
| C38,C45 | Mesothelioma | 94 | 42.6 | 2.2 | 1.8 | 2.7 | # | 1.8 | 4.3 |
| C40–C41 | Bone | 18 | 4.3 | 4.2 | 2.5 | 6.6 | # | 0.5 | |
| C43 | Malign. melanoma | 597 | 255.7 | 2.3 | 2.2 | 2.5 | # | 11.7 | 1.3 |
| C46,C49 | Soft tissue | 58 | 33.2 | 1.7 | 1.3 | 2.3 | # | 0.8 | 1.7 |
| C50 | Breast | 36 | 16.0 | 2.3 | 1.6 | 3.1 | # | 0.7 | 8.3 |
| C60 | Penis | 38 | 14.8 | 2.6 | 1.8 | 3.5 | # | 0.8 | 5.3 |
| C62 | Testis | 16 | 7.7 | 2.1 | 1.2 | 3.4 | # | 0.3 | 6.3 |
| C64 | Kidney | 521 | 196.2 | 2.7 | 2.4 | 2.9 | # | 11.1 | 5.2 |
| C65 | Renal pelvis | 83 | 27.6 | 3.0 | 2.4 | 3.7 | # | 1.9 | |
| C66 | Ureter | 53 | 16.3 | 3.2 | 2.4 | 4.2 | # | 1.3 | |
| C67 | Bladder | 819 | 292.2 | 2.8 | 2.6 | 3.0 | # | 18.0 | 5.0 |
| C68 | Urethra | 35 | 5.6 | 6.2 | 4.3 | 8.7 | # | 1.0 | |
| C69 | Eye melanoma | 18 | 6.7 | 2.7 | 1.6 | 4.3 | # | 0.4 | |
| C70–C72 | CNS cancer | 144 | 70.3 | 2.0 | 1.7 | 2.4 | # | 2.5 | 9.0 |
| C73 | Thyroid | 72 | 30.6 | 2.4 | 1.8 | 3.0 | # | 1.4 | 1.4 |
| C76–C79 | CUP | 165 | 100.3 | 1.6 | 1.4 | 1.9 | # | 2.2 | 3.6 |
| C81 | Hodgkin lymphoma | 23 | 12.1 | 1.9 | 1.2 | 2.9 | # | 0.4 | |
| C82–C85 | NHL | 522 | 252.0 | 2.1 | 1.9 | 2.3 | # | 9.2 | 6.9 |
| C90 | Mult. myeloma | 158 | 79.7 | 2.0 | 1.7 | 2.3 | # | 2.7 | 10.8 |
| C91–C96 | Leukaemia | 185 | 92.8 | 2.0 | 1.7 | 2.3 | # | 3.1 | 29.2 |
| Others, specified | | 92 | 1740.8 | 0.1 | 0.0 | 0.1 | # | -56.3 | 21.7 |
| Not observed | | 0 | 1.9 | 0.0 | 0.0 | 2.0 | | -0.1 | |
| All further malignancies | | 8224 | 5926.2 | 1.4 | 1.4 | 1.4 | # | 78.5 | 7.4 |

| | |
|---|---|
| Patients | 58250 |
| Median age at next malignancy (years) | 76.0 |
| Person-years | 292764 |
| Mean observation time (years) | 5.0 |
| Median observation time (years) | 3.6 |

# The occurrence of further specified malignancy is statistically significant.

Further observed malignancies with count 1 to 14 are pooled in category “Others, specified”.

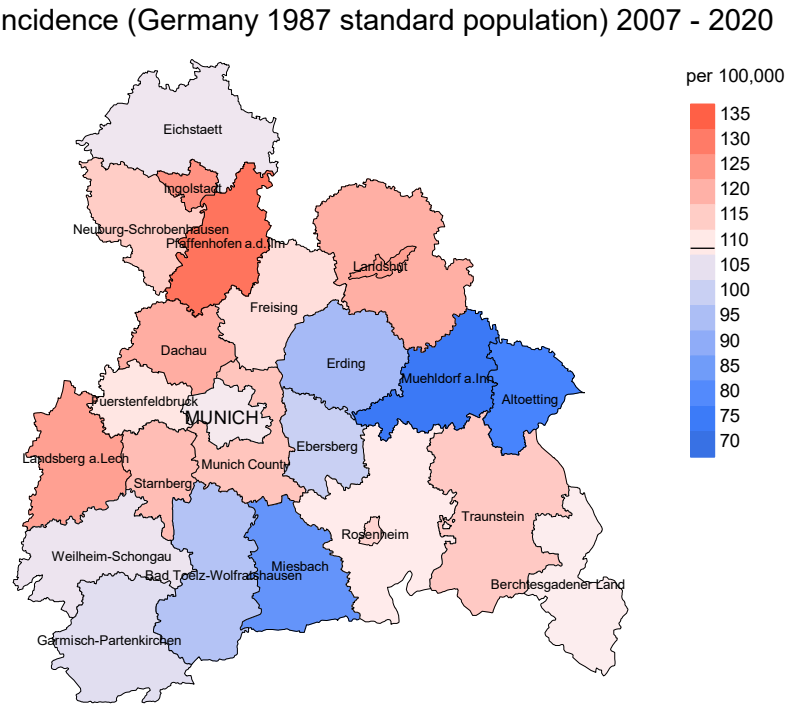


**Figure 8a.** Map of cancer incidence (german standard population, incl. DCO cases) by county averaged for period 2007 to 2020. According to their individual incidence rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (108.9/100,000 WS N=38,894).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 66,702 male residents (averaged) in the period from 2007 to 2020 a total of 1,023 men were identified with newly diagnosed prostate cancer. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 100.0/100,000 (german standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 92.1 and 108.4/100,000.

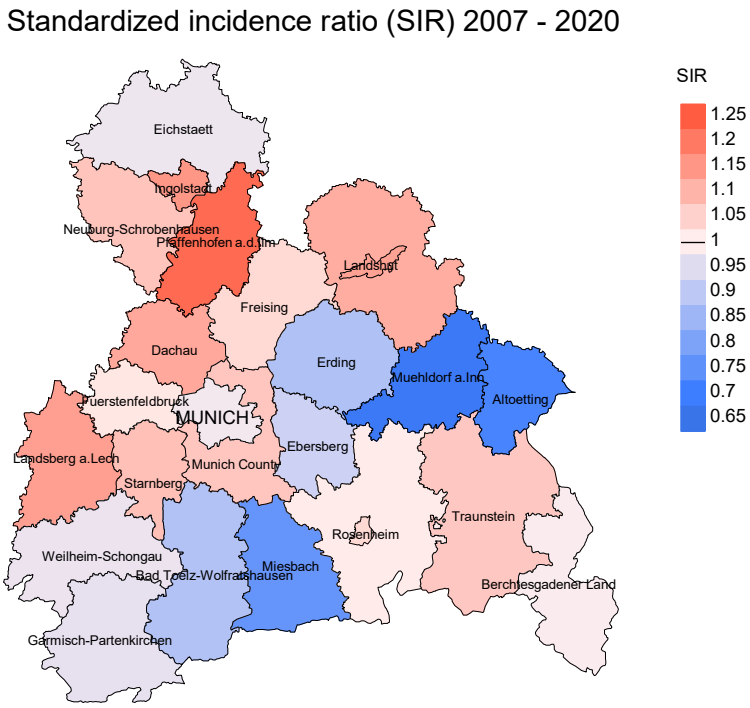


**Figure 8b.** Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2007 to 2020. According to their individual SIR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (N=38,894).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 65,991 male residents (averaged) in the period from 2007 to 2020 a total of 1,023 men were identified with newly diagnosed prostate cancer. Therefore, the mean standardized incidence ratio (SIR) for this cancer type in this area can be calculated at 0.92. Though, the value of this parameter may vary with an underlying probability of 99% between 0.85 and 1.00, and is therefore not statistically striking.

# MORTALITY

Table 9a

Annual cohorts: Incident cancers, follow-up status, proportion of DCO, deaths among the annual cohorts and proportion of available death certificates (with respect to registry area expansion from 2.65 to 4.10 m as of 2002, and from 4.10 to 4.94 m as of 2007, respectively)

| Year of diagnosis | Incident cases n | Prop. actively followed % | Prop. DCO % | Deaths n | Prop. deaths % | Prop. deaths with death certific. % |
|---|---|---|---|---|---|---|
| 1998 | 1569 | 96.7 | 10.3 | 1204 | 76.7 | 94.4 |
| 1999 | 1531 | 97.2 | 7.8 | 1140 | 74.5 | 93.5 |
| 2000 | 1719 | 97.0 | 8.8 | 1201 | 69.9 | 93.3 |
| 2001 | 1797 | 96.5 | 6.8 | 1188 | 66.1 | 93.5 |
| 2002 | 3384 | 96.6 | 9.3 | 2256 | 66.7 | 94.2 |
| 2003 | 3345 | 96.4 | 7.1 | 2136 | 63.9 | 93.4 |
| 2004 | 3298 | 96.6 | 6.9 | 1977 | 59.9 | 94.4 |
| 2005 | 3241 | 95.3 | 6.1 | 1840 | 56.8 | 94.3 |
| 2006 | 3137 | 91.9 | 5.9 | 1689 | 53.8 | 93.6 |
| 2007 | 3719 | 89.6 | 6.6 | 1915 | 51.5 | 93.5 |
| 2008 | 3417 | 97.5 | 5.9 | 1734 | 50.7 | 93.3 |
| 2009 | 3188 | 97.9 | 5.5 | 1525 | 47.8 | 92.9 |
| 2010 | 3084 | 97.3 | 6.3 | 1367 | 44.3 | 93.4 |
| 2011 | 3305 | 97.5 | 5.8 | 1374 | 41.6 | 91.8 |
| 2012 | 3363 | 97.3 | 4.8 | 1244 | 37.0 | 91.2 |
| 2013 | 3060 | 96.6 | 4.9 | 1104 | 36.1 | 90.4 |
| 2014 | 3078 | 95.1 | 5.3 | 1012 | 32.9 | 88.6 |
| 2015 | 2484 | 93.8 | 6.3 | 804 | 32.4 | 88.2 |
| 2016 | 2546 | 99.4 | 5.9 | 708 | 27.8 | 87.0 |
| 2017 | 2454 | 99.8 | 6.4 | 602 | 24.5 | 85.4 |
| 2018 | 2206 | 99.5 | 3.7 | 359 | 16.3 | 77.7 |
| 2019 | 1842 | 99.6 | 0.4 | 210 | 11.4 | 89.0 |
| 2020 | 1148 | 99.7 | 0.1 | 82 | 7.1 | 91.5 |
| 1998-2020 | 61915 | 96.4 | 6.1 | 28671 | 46.3 | 92.5 |

Table 9b

Annual cohorts of incident cancers and deaths, proportion of death certificates and cases deceased within the same year of being diagnosed with cancer (incl. DCO)
(with respect to registry area expansion from 2.65 to 4.10 m as of 2002, and from 4.10 to 4.94 m as of 2007, respectively)

| Year of diagnosis/ death | Incident cases n | Deaths n | Prop. deaths with death certific. % | Deaths in same year n | Prop. deaths in same year % |
|---|---|---|---|---|---|
| 1998 | 1569 | 659 | 94.5 | 209 | 13.3 |
| 1999 | 1531 | 614 | 94.0 | 151 | 9.9 |
| 2000 | 1719 | 634 | 95.0 | 169 | 9.8 |
| 2001 | 1797 | 666 | 92.3 | 163 | 9.1 |
| 2002 | 3384 | 991 | 95.5 | 372 | 11.0 |
| 2003 | 3345 | 1051 | 97.4 | 274 | 8.2 |
| 2004 | 3298 | 1044 | 97.3 | 258 | 7.8 |
| 2005 | 3241 | 1145 | 96.7 | 235 | 7.3 |
| 2006 | 3137 | 1213 | 97.0 | 233 | 7.4 |
| 2007 | 3719 | 1386 | 97.3 | 299 | 8.0 |
| 2008 | 3417 | 1500 | 98.7 | 265 | 7.8 |
| 2009 | 3188 | 1536 | 98.2 | 233 | 7.3 |
| 2010 | 3084 | 1655 | 98.2 | 255 | 8.3 |
| 2011 | 3305 | 1763 | 98.7 | 261 | 7.9 |
| 2012 | 3363 | 1815 | 98.3 | 232 | 6.9 |
| 2013 | 3060 | 1848 | 98.3 | 217 | 7.1 |
| 2014 | 3078 | 1931 | 98.0 | 233 | 7.6 |
| 2015 | 2484 | 2007 | 98.2 | 215 | 8.7 |
| 2016 | 2546 | 2148 | 98.5 | 228 | 9.0 |
| 2017 | 2454 | 2240 | 96.5 | 227 | 9.3 |
| 2018 | 2206 | 1893 | 70.5 | 132 | 6.0 |
| 2019 | 1842 | 1671 | 45.4 | 40 | 2.2 |
| 2020 | 1148 | 2127 | 88.4 | 49 | 4.3 |
| 1998–2020 | 61915 | 33537 | 92.7 | 4950 | 8.0 |

Table 9c

Annual cohorts of deaths, proportion of cancer-related and non-cancer-related deaths, and cancer recorded on death certificates (incl. DCO)
(with respect to registry area expansion from 2.65 to 4.10 m as of 2002, and from 4.10 to 4.94 m as of 2007, respectively)

| Year of death | Deaths n | Prop. cancer-related % | Prop. non-cancer-related % | Prop. cancer recorded on death certificate % |
|---|---|---|---|---|
| 1998 | 659 | 56.3 | 43.7 | 80.3 |
| 1999 | 614 | 58.1 | 41.9 | 77.8 |
| 2000 | 634 | 58.7 | 41.3 | 77.9 |
| 2001 | 666 | 53.9 | 46.1 | 75.9 |
| 2002 | 991 | 60.2 | 39.8 | 77.7 |
| 2003 | 1051 | 63.6 | 36.4 | 76.3 |
| 2004 | 1044 | 59.8 | 40.2 | 75.0 |
| 2005 | 1145 | 61.7 | 38.3 | 73.5 |
| 2006 | 1213 | 61.3 | 38.7 | 75.7 |
| 2007 | 1386 | 63.3 | 36.7 | 73.9 |
| 2008 | 1500 | 59.3 | 40.7 | 70.0 |
| 2009 | 1536 | 57.4 | 42.6 | 69.8 |
| 2010 | 1655 | 60.1 | 39.9 | 71.8 |
| 2011 | 1763 | 59.0 | 41.0 | 69.6 |
| 2012 | 1815 | 59.4 | 40.6 | 70.2 |
| 2013 | 1848 | 55.0 | 45.0 | 66.8 |
| 2014 | 1931 | 55.1 | 44.9 | 67.4 |
| 2015 | 2007 | 54.5 | 45.5 | 64.4 |
| 2016 | 2148 | 54.0 | 46.0 | 63.9 |
| 2017 | 2240 | 50.4 | 49.6 | 61.9 |
| 2018 | 1893 | 44.2 | 55.8 | 48.1 |
| 2019 | 1671 | 33.6 | 66.4 | 47.9 |
| 2020 | 2127 | 39.4 | 60.6 | 47.8 |
| 1998-2020 | 33537 | 54.4 | 45.6 | 67.3 |

Table 10

Medians of age at death according to the grouping in Table 9

| Year of death | Deaths n | Age at death (all causes) Years | Age at death (cancer-related) Years | Age at death (non-cancer-related) Years | Age at death (according to death certificate) Years |
|---|---|---|---|---|---|
| 1998 | 659 | 80.7 | 79.0 | 82.8 | 80.1 |
| 1999 | 614 | 80.4 | 78.0 | 83.2 | 79.7 |
| 2000 | 634 | 80.7 | 80.0 | 82.7 | 80.8 |
| 2001 | 666 | 80.5 | 78.7 | 82.6 | 80.9 |
| 2002 | 991 | 79.7 | 78.3 | 81.8 | 79.5 |
| 2003 | 1051 | 79.0 | 77.2 | 82.2 | 78.3 |
| 2004 | 1044 | 80.3 | 78.2 | 83.0 | 79.5 |
| 2005 | 1145 | 80.3 | 78.4 | 83.5 | 79.1 |
| 2006 | 1213 | 79.7 | 78.1 | 82.0 | 78.8 |
| 2007 | 1386 | 79.8 | 78.4 | 82.2 | 79.0 |
| 2008 | 1500 | 80.0 | 77.7 | 83.0 | 78.7 |
| 2009 | 1536 | 80.5 | 78.3 | 83.2 | 79.6 |
| 2010 | 1655 | 80.4 | 78.8 | 83.1 | 79.6 |
| 2011 | 1763 | 81.1 | 79.2 | 83.4 | 80.0 |
| 2012 | 1815 | 81.1 | 79.0 | 83.5 | 79.8 |
| 2013 | 1848 | 81.7 | 79.6 | 83.8 | 80.6 |
| 2014 | 1931 | 81.9 | 79.3 | 84.3 | 80.6 |
| 2015 | 2006 | 81.5 | 79.3 | 84.2 | 80.2 |
| 2016 | 2148 | 82.1 | 80.0 | 84.2 | 80.7 |
| 2017 | 2240 | 82.7 | 80.6 | 84.7 | 81.5 |
| 2018 | 1893 | 82.0 | 80.3 | 83.7 | 81.0 |
| 2019 | 1671 | 82.6 | 79.9 | 83.7 | 80.4 |
| 2020 | 2127 | 83.2 | 81.1 | 84.6 | 81.3 |
| 1998–2020 | 33536 | 81.3 | 79.2 | 83.6 | 80.1 |

By 2018, Bavarians' life expectancy at birth is estimated at 79.3 years for boys and 83.8 years for girls.

Deaths of patients are considered to be cancer-related, in case that fact was recorded on the death certificate, or patients had suffered from metastasis or recurrence.

Table 11

Mortality measures (cancer-related death) and mortality-incidence-index by year of death

| Year of death | Deaths n | Mort. raw | MI-Index raw | Mort. WS | MI-Index WS | Mort. ES | MI-Index ES | Mort. BRD-S | MI-Index BRD-S |
|---|---|---|---|---|---|---|---|---|---|
| 1998 | 371 | 33.5 | 0.24 | 18.3 | 0.22 | 31.7 | 0.24 | 48.6 | 0.28 |
| 1999 | 357 | 31.9 | 0.23 | 17.0 | 0.21 | 29.5 | 0.24 | 44.7 | 0.28 |
| 2000 | 372 | 32.7 | 0.22 | 17.0 | 0.20 | 30.1 | 0.23 | 45.9 | 0.26 |
| 2001 | 359 | 31.0 | 0.20 | 16.0 | 0.18 | 28.4 | 0.21 | 43.0 | 0.24 |
| 2002 | 597 | 32.0 | 0.18 | 15.8 | 0.16 | 27.2 | 0.18 | 40.2 | 0.20 |
| 2003 | 668 | 35.6 | 0.20 | 17.1 | 0.18 | 29.3 | 0.20 | 44.0 | 0.23 |
| 2004 | 624 | 33.2 | 0.19 | 15.2 | 0.16 | 26.3 | 0.19 | 39.9 | 0.22 |
| 2005 | 706 | 37.3 | 0.22 | 16.3 | 0.18 | 28.4 | 0.21 | 44.0 | 0.25 |
| 2006 | 743 | 38.8 | 0.24 | 16.8 | 0.20 | 29.2 | 0.23 | 43.9 | 0.27 |
| 2007 | 877 | 39.6 | 0.24 | 16.9 | 0.20 | 29.2 | 0.23 | 43.8 | 0.27 |
| 2008 | 889 | 39.9 | 0.26 | 16.4 | 0.22 | 28.1 | 0.25 | 42.4 | 0.29 |
| 2009 | 881 | 39.5 | 0.28 | 15.9 | 0.23 | 27.1 | 0.26 | 40.4 | 0.30 |
| 2010 | 994 | 44.1 | 0.32 | 17.1 | 0.26 | 29.3 | 0.29 | 44.1 | 0.34 |
| 2011 | 1041 | 46.5 | 0.31 | 17.5 | 0.25 | 30.6 | 0.29 | 46.0 | 0.34 |
| 2012 | 1079 | 47.5 | 0.32 | 17.4 | 0.25 | 30.3 | 0.29 | 45.9 | 0.34 |
| 2013 | 1017 | 44.2 | 0.33 | 15.9 | 0.26 | 27.7 | 0.30 | 41.6 | 0.35 |
| 2014 | 1064 | 45.6 | 0.35 | 16.2 | 0.26 | 28.0 | 0.30 | 41.5 | 0.35 |
| 2015 | 1093 | 45.9 | 0.44 | 15.9 | 0.33 | 27.5 | 0.38 | 41.3 | 0.44 |
| 2016 | 1159 | 48.2 | 0.46 | 16.0 | 0.33 | 28.0 | 0.38 | 42.4 | 0.45 |
| 2017 | 1128 | 46.7 | 0.46 | 15.1 | 0.33 | 26.6 | 0.38 | 40.0 | 0.44 |
| 2018 | 837 | 34.4 | 0.38 | 11.0 | 0.26 | 19.3 | 0.31 | 28.9 | 0.36 |
| 2019 | 561 | 23.0 | 0.30 | 7.4 | 0.21 | 12.8 | 0.25 | 19.4 | 0.29 |
| 2020 | 839 | 34.5 | 0.73 | 10.7 | 0.49 | 18.8 | 0.58 | 28.9 | 0.68 |
| 1998-2020 | 18256 | 39.2 | 0.29 | 15.2 | 0.23 | 26.3 | 0.27 | 39.5 | 0.31 |

Table 12

Age distribution of age at death (cancer-related) for period 2007-2020
(**incl. multiple malignancies**)

| Age at death Years | Cases n | % | Cum.% |
|---|---|---|---|
| 0-4 | | | |
| 5-9 | | | |
| 10-14 | | | |
| 15-19 | | | |
| 20-24 | | | |
| 25-29 | 2 | 0.0 | 0.0 |
| 30-34 | 0 | 0.0 | 0.0 |
| 35-39 | 0 | 0.0 | 0.0 |
| 40-44 | 3 | 0.0 | 0.0 |
| 45-49 | 21 | 0.2 | 0.2 |
| 50-54 | 62 | 0.5 | 0.7 |
| 55-59 | 197 | 1.5 | 2.1 |
| 60-64 | 506 | 3.8 | 5.9 |
| 65-69 | 1149 | 8.5 | 14.4 |
| 70-74 | 2123 | 15.8 | 30.2 |
| 75-79 | 2995 | 22.3 | 52.4 |
| 80-84 | 3077 | 22.9 | 75.3 |
| 85+ | 3324 | 24.7 | 100.0 |
| All ages | 13459 | 100.0 | |

Table 13

Age-specific mortality (cancer-related) and proportion of all cancers
for period 2007-2020
(**incl. multiple malignancies**)

| Age at death Years | Cases n | Age-spec. mortality | MI-index | Prop. all cancers % |
|---|---|---|---|---|
| 0- 4 | | 0.0 | | |
| 5- 9 | | 0.0 | | |
| 10-14 | | 0.0 | | |
| 15-19 | | 0.0 | | |
| 20-24 | | 0.0 | | |
| 25-29 | 2 | 0.1 | 1.00 | 2.2 |
| 30-34 | | 0.0 | | |
| 35-39 | | 0.0 | | |
| 40-44 | 3 | 0.1 | 0.05 | 0.5 |
| 45-49 | 21 | 0.8 | 0.05 | 1.5 |
| 50-54 | 62 | 2.4 | 0.05 | 2.3 |
| 55-59 | 197 | 9.3 | 0.07 | 4.5 |
| 60-64 | 506 | 28.6 | 0.10 | 7.9 |
| 65-69 | 1149 | 70.4 | 0.15 | 12.5 |
| 70-74 | 2123 | 141.6 | 0.24 | 17.9 |
| 75-79 | 2995 | 247.5 | 0.44 | 23.9 |
| 80-84 | 3077 | 424.9 | 0.89 | 29.4 |
| 85+ | 3324 | 711.8 | 1.34 | 36.6 |
| All ages | 13459 | | | 19.4 |
| Mortality | | | | |
| Raw | | 41.3 | 0.35 | |
| WS | | 14.8 | 0.26 | |
| ES | | 25.6 | 0.30 | |
| BRD-S | | 38.4 | 0.35 | |
| PYLL-70 | | | | |
| per 100,000 | | 37.9 | | |
| ES | | 31.7 | | |
| AYLL-70 | | 5.6 | | |

Table 14

Further malignancies in deaths in period 1998–2020

| Diagnosis | | Total n | Total %↓ | Pre n | Pre ←% | Syn-chron ±30d n | Syn-chron ±30d ←% | Post n | Post ←% |
|---|---|---|---|---|---|---|---|---|---|
| C03–C06 | Oral cavity | 58 | 0.6 | 25 | 43.1 | 2 | 3.4 | 31 | 53.4 |
| C07–C08 | Salivary gland | 25 | 0.3 | 5 | 20.0 | 4 | 16.0 | 16 | 64.0 |
| C09–C10 | Oropharynx | 72 | 0.8 | 35 | 48.6 | 2 | 2.8 | 35 | 48.6 |
| C12–C13 | Hypopharynx | 38 | 0.4 | 13 | 34.2 | 2 | 5.3 | 23 | 60.5 |
| C15 | Oesophagus | 176 | 1.9 | 31 | 17.6 | 12 | 6.8 | 133 | 75.6 |
| C16 | Stomach | 404 | 4.4 | 85 | 21.0 | 28 | 6.9 | 291 | 72.0 |
| C17 | Small intestine | 57 | 0.6 | 14 | 24.6 | 1 | 1.8 | 42 | 73.7 |
| C18 | Colon | 1005 | 10.8 | 366 | 36.4 | 70 | 7.0 | 569 | 56.6 |
| C19–C20 | Rectum | 571 | 6.2 | 218 | 38.2 | 50 | 8.8 | 303 | 53.1 |
| C21 | Anus/canal | 19 | 0.2 | 7 | 36.8 | 1 | 5.3 | 11 | 57.9 |
| C22 | Liver | 239 | 2.6 | 23 | 9.6 | 10 | 4.2 | 206 | 86.2 |
| C23–C24 | Bile | 106 | 1.1 | 13 | 12.3 | 5 | 4.7 | 88 | 83.0 |
| C25 | Pancreas | 517 | 5.6 | 36 | 7.0 | 24 | 4.6 | 457 | 88.4 |
| C32 | Larynx | 97 | 1.0 | 47 | 48.5 | 5 | 5.2 | 45 | 46.4 |
| C33–C34 | Lung | 1230 | 13.3 | 136 | 11.1 | 78 | 6.3 | 1016 | 82.6 |
| C38,C45 | Mesothelioma | 100 | 1.1 | 6 | 6.0 | 4 | 4.0 | 90 | 90.0 |
| C43 | Malign. melanoma | 421 | 4.5 | 207 | 49.2 | 17 | 4.0 | 197 | 46.8 |
| C44 | Skin others | 758 | 8.2 | 209 | 27.6 | 21 | 2.8 | 528 | 69.7 |
| C46,C49 | Soft tissue | 46 | 0.5 | 15 | 32.6 | 2 | 4.3 | 29 | 63.0 |
| C50 | Breast | 32 | 0.3 | 14 | 43.8 | 3 | 9.4 | 15 | 46.9 |
| C60 | Penis | 36 | 0.4 | 8 | 22.2 | 4 | 11.1 | 24 | 66.7 |
| C62 | Testis | 49 | 0.5 | 36 | 73.5 | 3 | 6.1 | 10 | 20.4 |
| C64 | Kidney | 467 | 5.0 | 216 | 46.3 | 58 | 12.4 | 193 | 41.3 |
| C65 | Renal pelvis | 70 | 0.8 | 16 | 22.9 | 10 | 14.3 | 44 | 62.9 |
| C66 | Ureter | 53 | 0.6 | 14 | 26.4 | 12 | 22.6 | 27 | 50.9 |
| C67 | Bladder | 1218 | 13.1 | 467 | 38.3 | 308 | 25.3 | 443 | 36.4 |
| C68 | Urethra | 36 | 0.4 | 11 | 30.6 | 11 | 30.6 | 14 | 38.9 |
| C68 | Urinary org. | 19 | 0.2 | 3 | 15.8 | 2 | 10.5 | 14 | 73.7 |
| C69 | Eye melanoma | 19 | 0.2 | 10 | 52.6 | 1 | 5.3 | 8 | 42.1 |
| C70–C72 | CNS cancer | 154 | 1.7 | 7 | 4.5 | 8 | 5.2 | 139 | 90.3 |
| C73 | Thyroid | 53 | 0.6 | 15 | 28.3 | | | 38 | 71.7 |
| C76–C79 | CUP | 207 | 2.2 | 24 | 11.6 | 24 | 11.6 | 159 | 76.8 |
| C81 | Hodgkin lymphoma | 27 | 0.3 | 10 | 37.0 | 1 | 3.7 | 16 | 59.3 |
| C82–C85 | NHL | 436 | 4.7 | 138 | 31.7 | 45 | 10.3 | 253 | 58.0 |
| C90 | Mult. myeloma | 156 | 1.7 | 34 | 21.8 | 11 | 7.1 | 111 | 71.2 |
| C91–C96 | Leukaemia | 200 | 2.2 | 16 | 8.0 | 10 | 5.0 | 174 | 87.0 |
| Others, specified | | 112 | 1.2 | 26 | 23.2 | 8 | 7.1 | 78 | 69.6 |
| All further malignancies | | 9283 | 100.0 | 2556 | 27.5 | 857 | 9.2 | 5870 | 63.2 |

Further malignancies with number of cases 1 to 16 are pooled in category “Others, specified”.

ICD-10 C44 (Other malignant neoplasms of skin) is not systematically recorded by MCR and therefore not considered for evaluation as a particular primary but at least as a further malignancy.

Table 15

Age-specific mortality (cancer-related) and proportion of all cancers
for period 2007-2020
(**First primaries only** *)

| Age at death Years | Cases n | Age-spec. mortality | MI-index | Prop. all cancers % |
|---|---|---|---|---|
| 0- 4 | | 0.0 | | |
| 5- 9 | | 0.0 | | |
| 10-14 | | 0.0 | | |
| 15-19 | | 0.0 | | |
| 20-24 | | 0.0 | | |
| 25-29 | 1 | 0.0 | 1.00 | 1.2 |
| 30-34 | | 0.0 | | |
| 35-39 | | 0.0 | | |
| 40-44 | 2 | 0.1 | 0.04 | 0.4 |
| 45-49 | 14 | 0.5 | 0.04 | 1.1 |
| 50-54 | 48 | 1.9 | 0.04 | 2.0 |
| 55-59 | 156 | 7.3 | 0.06 | 4.0 |
| 60-64 | 414 | 23.4 | 0.09 | 7.7 |
| 65-69 | 908 | 55.6 | 0.13 | 12.4 |
| 70-74 | 1715 | 114.4 | 0.23 | 18.9 |
| 75-79 | 2438 | 201.5 | 0.45 | 26.7 |
| 80-84 | 2539 | 350.6 | 0.96 | 34.1 |
| 85+ | 2765 | 592.1 | 1.46 | 42.5 |
| All ages | 11000 | | | 20.5 |
| Mortality | | | | |
| Raw | | 33.8 | 0.34 | |
| WS | | 12.0 | 0.25 | |
| ES | | 20.9 | 0.29 | |
| BRD-S | | 31.4 | 0.34 | |
| PYLL-70 | | | | |
| per 100,000 | | 29.9 | | |
| ES | | 25.0 | | |
| AYLL-70 | | 5.6 | | |

* See corresponding tables with multiple malignancies.

Table 16

Age-specific mortality (cancer-related) and proportion of all cancers
for period 2007-2020
(**Single primaries only** *)

| Age at death Years | Cases n | Age-spec. mortality | MI-index | Prop. all cancers % |
|---|---|---|---|---|
| 0- 4 | | 0.0 | | |
| 5- 9 | | 0.0 | | |
| 10-14 | | 0.0 | | |
| 15-19 | | 0.0 | | |
| 20-24 | | 0.0 | | |
| 25-29 | 1 | 0.0 | 1.00 | 1.2 |
| 30-34 | | 0.0 | | |
| 35-39 | | 0.0 | | |
| 40-44 | 1 | 0.0 | 0.02 | 0.2 |
| 45-49 | 14 | 0.5 | 0.04 | 1.1 |
| 50-54 | 44 | 1.7 | 0.04 | 1.9 |
| 55-59 | 136 | 6.4 | 0.06 | 3.6 |
| 60-64 | 326 | 18.4 | 0.08 | 6.2 |
| 65-69 | 622 | 38.1 | 0.10 | 8.7 |
| 70-74 | 1144 | 76.3 | 0.18 | 13.1 |
| 75-79 | 1572 | 129.9 | 0.33 | 18.1 |
| 80-84 | 1665 | 229.9 | 0.72 | 23.9 |
| 85+ | 1910 | 409.0 | 1.09 | 32.1 |
| All ages | 7435 | | | 14.5 |
| Mortality | | | | |
| Raw | | 22.8 | 0.26 | |
| WS | | 8.3 | 0.19 | |
| ES | | 14.3 | 0.22 | |
| BRD-S | | 21.2 | 0.26 | |
| PYLL-70 | | | | |
| per 100,000 | | 23.9 | | |
| ES | | 20.1 | | |
| AYLL-70 | | 6.0 | | |

* See corresponding tables with multiple malignancies.

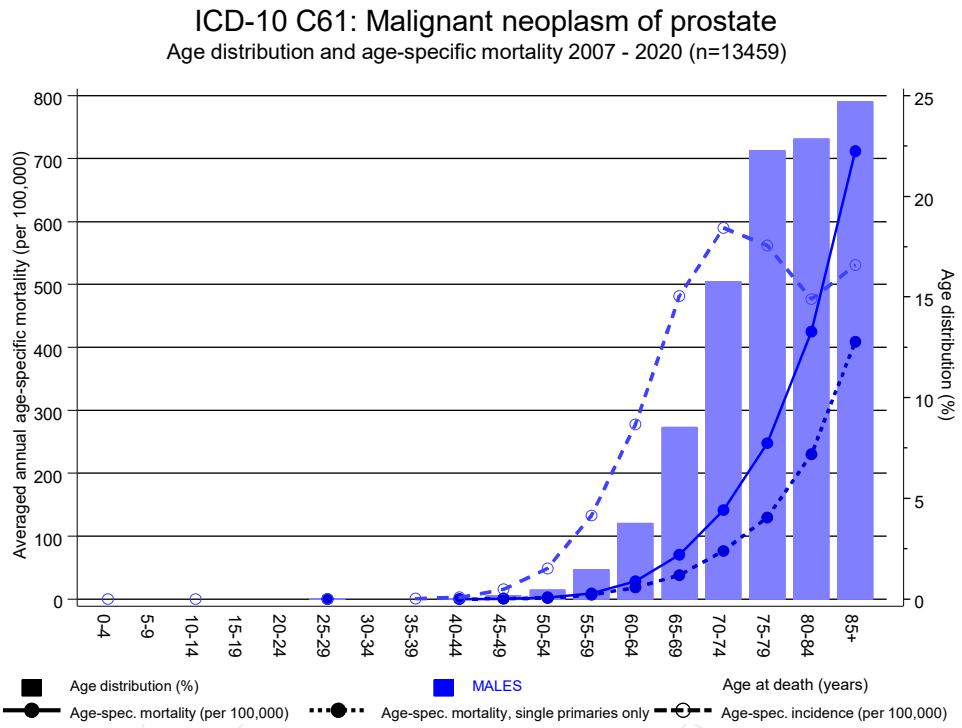


**Figure 17.** Distribution of age at death (bars; mean=72.1 yrs, median=72.2 yrs) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

The difference between age at diagnosis (Table 3) and age at prostate cancer-related death (see Table 10) should be considered.

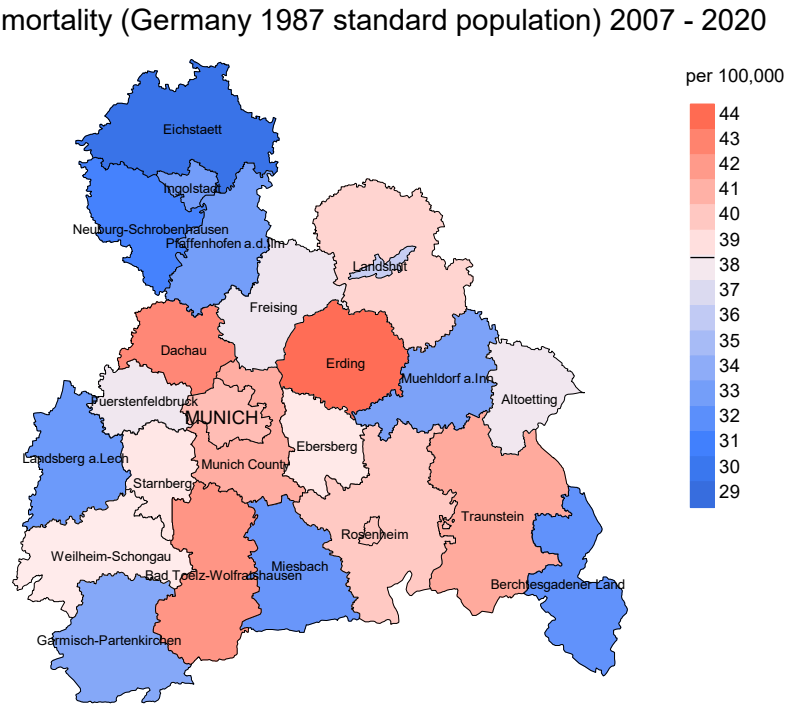


**Figure 18a.** Map of cancer mortality (german standard population) by county averaged for period 2007 to 2020. According to their individual mortality rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (38.4/100,000 WS N=13,459).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 66,702 male residents (averaged) in the period from 2007 to 2020 a total of 385 men died from prostate cancer. Therefore, the mean mortality rate for this cancer type in this area can be calculated at 38.6/100,000 (german standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 33.7 and 44.0/100,000.

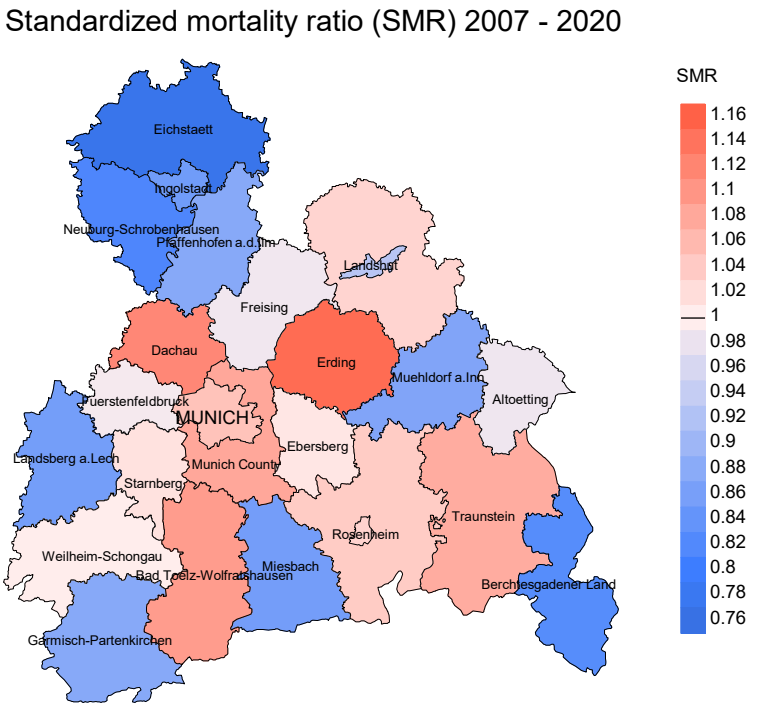


**Figure 18b.** Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2007 to 2020. According to their individual SMR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (N=13,459).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 65,991 male residents (averaged) in the period from 2007 to 2020 a total of 385 men died from prostate cancer. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 1.01. Though, the value of this parameter may vary with an underlying probability of 99% between 0.88 and 1.15, and is therefore not statistically striking.

**Statistical Notes**

In all tables and figures the respective reference values should be carefully considered. The incidence rates include diagnoses (with multiple primary), and death certificate only (DCO) cases, where applicable. For mortality statistics patients, diagnoses and progressive course of disease are presented. In the calculations, all courses of disease are considered whereby progressions occurred and/or death certificate identified progressive cancers were ascertained. Additionally there are three groups of disease course to consider:

1. **All multiple primaries included**

   The mortality statistic describes the tumor-specific death, independent of any malignancy. The patient perspective, induced secondary malignancies, and the problem of multiple malignancies from the same primary tumor all have reasons for their inclusion.

2. **First singular primary** (no information about other prior or synchronous malignancy)

   The mortality statistic describes the cancer-related death for patients who have no therapeutic restrictions due to a previous or synchronous cancer. These statistics are comparable to studies that have exclusion criteria based on a second malignancy.

3. **Single primary** (no information about other prior, syn- or metachronous malignancy)

   The mortality statistic describes the tumor-specific death that occurs without any impact through secondary primaries, earlier, synchronous, later or induced. Precisely the difference between disease group 1 and 2 highlight the magnitude of the problem of secondary malignancies.

For this reason differences appear concerning official mono-causal mortality statistics. To judge the maximum deviation, 2 further tables are presented. In the first table the distribution of secondary malignancies before, at or after the described cancer are shown, that could be an alternative cause of death. In the second table, the age-specific mortality rates for all courses of disease, without designation of secondary malignancies are shown.

A previously minimally acknowledged statistic is the **age at death**, which allows for a good assessment of the quality of classification of the apparent tumor-specific death. For assumed tumor-independent deaths, the age of death should be estimated from the age of diagnosis and the normal life expectancy, whereas tumor-dependent deaths can be estimated from the age of diagnosis plus the average tumor-specific life expectancy. The comparison of different tumors demonstrates this association, if the causes of cancer and the competing cause of death are independent of each other (e.g. breast and colon versus head&neck and lung).

The ratio of mortality and incidence (mortality-to-incidence ratio, **MIR**, **MI-Index**) is a statistical index that allows for the evaluation of the quality of data. For diseases with poor prognoses, comparable values are obtained from all age groups, because to a large extent, the numerator and denominator contain the same cases. For tumors with a good prognosis, increasing and decreasing incidence and age-specific differences in prognosis can more strongly alter the MIR. Additionally, attention should be paid to the confidence intervals where fewer cases are reported.

The complexity of problems identified here emphasizes the importance of relative survival data for the appropriate analysis of long term results.

As a measurement of the burden of disease, the number of potential life years loss due to premature deaths in a cohort can be calculated (**PYLL**, potential years of life lost, standardized per 100,000 persons or per European standard) as well as the average loss of life years per individual (**AYLL**, average years of life lost). Depending upon the analytic aim (health economy, prevention, health care research) different methods exist for the generation of these measurements. In the results presented here, the age for a premature death is considered to be before 70 years, according to the guidelines of the OECD and the WHO (as seen in the abbreviation PYLL-70 or AYLL-70).

**Shortcuts**

| | |
|---|---|
| MCR | Munich Cancer Registry (Tumorregister München) |
| GEKID | Association of Population-based Cancer Registries in Germany (Gesellschaft der epidemiologischen Krebsregister in Deutschland e.V.) |
| SEER | Surveillance, Epidemiology, and End Results (USA) |
| DCO | Death certificate only |
| BRD-S | German (FRG) standard population |
| ES | European standard population (old) |
| WS | World standard population |
| SIR | Standardized incidence ratio |
| CI | Confidence interval |
| EAR | Excess absolute risk = excess cancer cases (O - E) per 10,000 person-years |
| PYLL-70 | Potential years of life lost prior to age 70 given a person dies before that age |
| AYLL-70 | Average years of life lost prior to age 70 given a person dies before that age |
| SMR | Standardized mortality ratio |
| MI-index | Ratio of mortality to incidence, MIR |
| FRG | Federal Republic of Germany |

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