

# Munich Cancer Registry



- ▶ Survival
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- ▶ *Deutsch*

## ICD-10 C61: Prostate cancer

### Incidence and Mortality

Year of diagnosis	1998-2016
Patients	51,786
Diseases	51,786
Creation date	08/21/2018
Export date	08/09/2018
Population (males)	2.38 m





Munich Cancer Registry  
Cancer Registry Bavaria - Upper Bavaria Regional Center  
at Klinikum Grosshadern/IBE  
Marchioninstr. 15  
Munich, 81377  
Germany

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

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**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<sup>#</sup>, with a total of 4.69 million inhabitants, account for the frequency of cancer diseases<sup>##</sup> 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<sup>###</sup> 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](mailto:tumor@ibe.med.uni-muenchen.de).

Munich Cancer Registry, August 2018

<sup>#</sup> 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).

<sup>##</sup> 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.

<sup>###</sup> 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	1568	157	10.0	10.2	13.3	69.8	96.5
1999	1524	116	7.6	9.6	13.1	66.1	96.9
2000	1712	146	8.5	9.6	12.9	61.3	96.6
2001	1795	121	6.7	9.6	12.7	56.9	95.7
2002	3370	311	9.2	9.7	12.5	55.6	94.9 #
2003	3326	228	6.9	9.9	12.0	51.3	94.3
2004	3267	224	6.9	9.9	11.4	47.4	95.0
2005	3201	195	6.1	10.0	10.9	44.0	92.3
2006	3106	182	5.9	10.2	10.3	41.7	87.0
2007	3665	241	6.6	10.4	9.7	39.0	66.6 #
2008	3353	197	5.9	10.6	9.0	37.3	60.0
2009	3103	169	5.4	10.9	8.1	35.5	59.6
2010	3029	194	6.4	11.1	7.2	31.8	59.7
2011	3247	189	5.8	11.4	6.6	28.0	57.6
2012	3307	160	4.8	11.6	5.9	23.7	56.7
2013	2900	148	5.1	11.7	5.3	22.4	56.9
2014	2913	160	5.5	11.8	4.6	18.0	60.9
2015	1857	154	8.3	12.0	4.0	18.2	98.0
2016	1543	133	8.6	12.1	3.4	13.3	63.3 ##
1998-2016	51786	3425	6.6	12.1	13.3	38.9	76.3

51,786 cases diagnosed 1998-2016 are related to a total of 51,786 patients. Currently, in 12,894 (24.9 %) of these 51,786 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 10,210 / 2,036 / 648 (19.7 % / 3.9 % / 1.3 %) 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 retrieved from the respective headings.

How to interpret:

In 2014, a subgroup of 2,913 cases has been diagnosed, of which 11.8 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 4.6 % 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 4.81 m as of 2007, respectively)

Year of diagnosis	Cases n	Incidence raw	Incidence WS	Incidence ES	Incidence BRD-S
1998	1568	141.5	83.9	129.4	175.6
1999	1524	136.2	79.4	121.2	159.8
2000	1712	150.3	86.3	132.3	175.6
2001	1795	154.9	88.2	134.9	177.7
2002	3370	180.9	98.8	150.7	197.4
2003	3326	177.4	95.8	144.9	188.2
2004	3267	173.6	91.8	137.8	178.1
2005	3201	169.0	87.5	131.5	170.4
2006	3106	162.2	82.6	124.0	160.4
2007	3665	165.5	84.5	126.4	162.0
2008	3353	150.6	74.3	111.5	144.5
2009	3103	139.0	68.3	101.8	130.3
2010	3029	134.4	65.7	98.1	125.4
2011	3247	145.1	68.8	103.0	133.3
2012	3307	145.7	69.0	103.1	132.8
2013	2900	126.0	58.7	88.1	113.9
2014	2913	124.9	59.0	88.1	112.5
2015	1857	78.1	36.7	55.0	70.6
2016	1543	64.2	30.2	45.2	57.6
1998-2016	51786	140.7	70.9	106.2	136.7

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		
				Min.	Max.	10%	25%	50%	75%	90%
1998	1568	70.8	9.7	47.0	99.8	58.2	63.3	70.3	77.8	84.2
1999	1524	70.2	9.6	43.0	99.5	58.2	62.9	70.0	76.4	84.0
2000	1712	70.4	9.4	40.6	98.8	58.8	63.4	69.9	76.6	83.2
2001	1795	70.1	9.3	43.6	100	58.6	63.1	69.9	76.4	82.2
2002	3370	70.6	9.5	42.6	102	59.1	63.7	70.0	76.7	83.4
2003	3326	70.1	9.1	35.2	101	58.9	63.8	69.3	75.9	82.2
2004	3267	70.0	9.2	40.0	100	59.2	63.8	69.1	76.1	82.2
2005	3201	70.2	9.1	38.4	101	58.9	64.2	69.4	76.2	82.5
2006	3106	70.5	8.9	41.6	98.6	59.6	64.8	69.5	76.2	82.7
2007	3665	70.3	9.2	37.6	99.9	59.1	64.5	69.6	76.1	82.5
2008	3353	70.7	9.0	25.1	101	59.5	65.5	70.4	76.2	82.5
2009	3103	70.5	9.0	43.2	105	59.3	65.2	70.2	75.7	82.4
2010	3029	70.8	9.2	38.4	102	59.5	65.1	70.7	76.3	83.0
2011	3247	71.1	9.3	40.0	109	59.5	65.7	71.2	76.5	83.1
2012	3307	71.1	8.8	2.7	100	59.7	65.5	71.3	76.4	82.4
2013	2900	71.2	9.2	42.4	103	59.0	65.5	71.8	76.7	82.8
2014	2913	71.1	9.3	44.0	104	58.3	65.0	71.6	76.8	82.8
2015	1857	71.4	9.7	44.4	102	58.4	64.9	71.9	77.5	84.0
2016	1543	71.5	9.7	44.1	103	58.5	65.4	72.1	77.3	83.9
1998-2016	51786	70.6	9.2	2.7	109	59.1	64.5	70.4	76.5	82.8

Table 4

Age distribution by 5-year age group for period 2007-2016  
(incl. DCO)

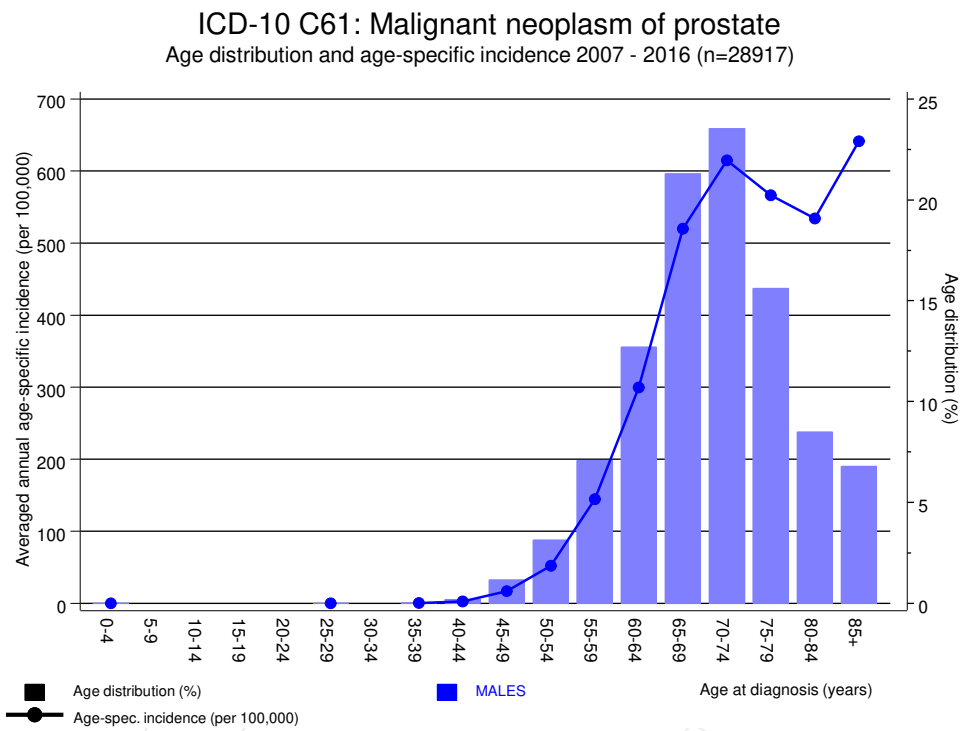
Age at diagnosis Years	Cases n	%	Cum.%
0-4	1	0.0	0.0
5-9	0	0.0	0.0
10-14	0	0.0	0.0
15-19	0	0.0	0.0
20-24	0	0.0	0.0
25-29	1	0.0	0.0
30-34	0	0.0	0.0
35-39	7	0.0	0.0
40-44	54	0.2	0.2
45-49	335	1.2	1.4
50-54	907	3.1	4.5
55-59	2047	7.1	11.6
60-64	3671	12.7	24.3
65-69	6159	21.3	45.6
70-74	6800	23.5	69.1
75-79	4515	15.6	84.7
80-84	2456	8.5	93.2
85+	1964	6.8	100.0
All ages	28917	100.0	

Table 5

Age-specific incidence, DCO rate and proportion of all cancers for period 2007-2016

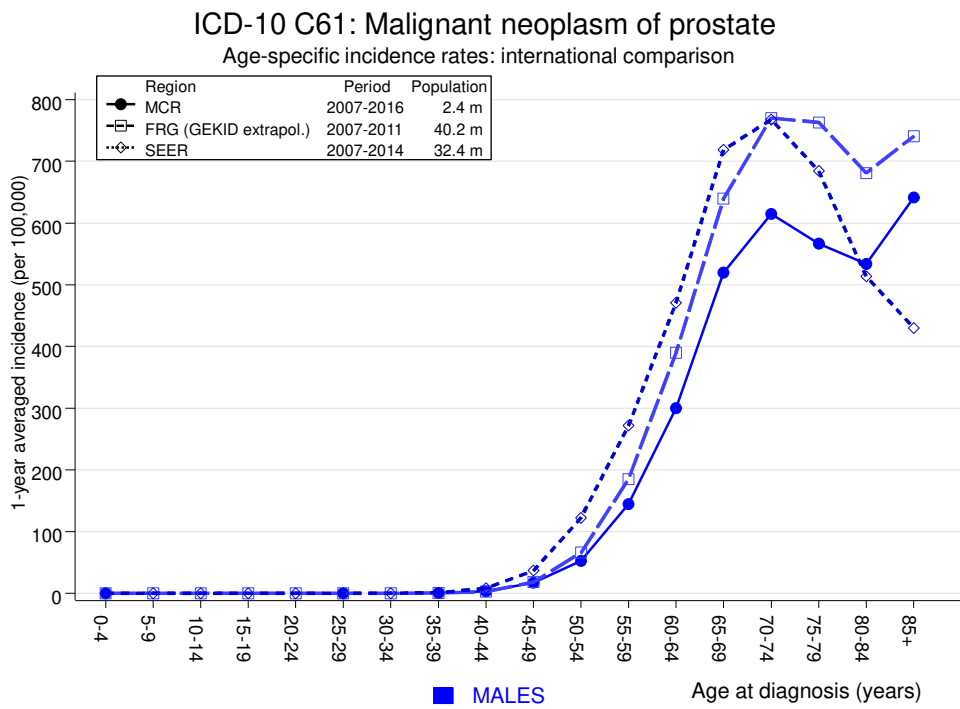
Age at diagnosis Years	Cases n	Age-spec. incidence	DCO rate n=1745 %	Prop. all cancers n=113978 %
0- 4	1	0.1	100.0	0.5
5- 9		0.0		
10-14		0.0		
15-19		0.0		
20-24		0.0		
25-29	1	0.1		0.1
30-34		0.0		
35-39	7	0.4		0.5
40-44	54	2.9		2.5
45-49	335	17.0	0.3	8.5
50-54	907	52.5	0.1	14.7
55-59	2047	144.6	0.2	22.2
60-64	3671	299.7	0.6	27.9
65-69	6159	519.7	0.7	32.9
70-74	6800	614.7	1.6	32.3
75-79	4515	566.7	4.3	27.3
80-84	2456	534.0	15.0	22.3
85+	1964	641.5	50.9	24.8
All ages	28917		6.0	25.4
Incidence				
Raw		126.6		
WS		61.1		
ES		91.1		
BRD-S		116.7		

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=70.9 yrs, median=70.9 yrs) and age-specific incidence.





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

Reference:

Extrapolated age-specific patient population of Germany, data status middle of 2010. Association of Population-based Cancer Registries in Germany (GEKID e.V.). Berlin, 2014. <http://www.gekid.de>. Last access: 02/11/2015  
 Surveillance, Epidemiology, and End Results (SEER) Program SEER\*Stat Database: Incidence - SEER 18 Regs Research Data, released April 2014, based on the November 2013 submission. <http://www.seer.cancer.gov>.

Table 7

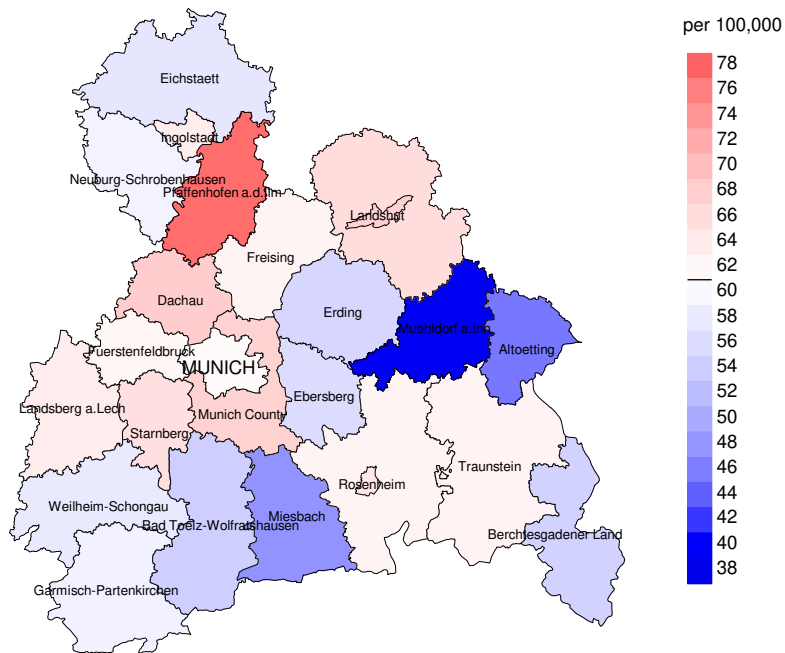
Standardized incidence ratio (SIR, with 95% confidence limits), excess absolute risk (EAR) and DCO rate of further malignancies for period 1998–2016

Diagnosis	Observed n	Expected n	SIR	CI 95%	CI 95%	EAR	DCO %
C03-C06 Oral cavity	31	29.9	1.0	0.7	1.5	0.1	
C07-C08 Salivary gland	21	10.0	2.1	1.3	3.2 #	0.5	19.0
C09-C10 Oropharynx	49	36.3	1.4	1.0	1.8	0.6	
C12-C13 Hypopharynx	30	20.1	1.5	1.0	2.1 #	0.5	6.7
C15 Oesophagus	136	75.6	1.8	1.5	2.1 #	2.9	7.4
C16 Stomach	299	180.3	1.7	1.5	1.9 #	5.6	7.0
C17 Small intestine	65	22.6	2.9	2.2	3.7 #	2.0	3.1
C18 Colon	778	433.2	1.8	1.7	1.9 #	16.4	4.9
C19-C20 Rectum	377	228.2	1.7	1.5	1.8 #	7.1	4.2
C21 Anus/canal	19	8.8	2.2	1.3	3.4 #	0.5	
C22 Liver	157	122.3	1.3	1.1	1.5 #	1.6	17.2
C23-C24 Bile	63	43.7	1.4	1.1	1.8 #	0.9	14.3
C25 Pancreas	345	164.0	2.1	1.9	2.3 #	8.6	27.8
C30-C31 Sinuses	13	7.3	1.8	0.9	3.1	0.3	7.7
C32 Larynx	66	40.8	1.6	1.3	2.1 #	1.2	12.1
C33-C34 Lung	821	507.9	1.6	1.5	1.7 #	14.9	9.6
C38,C45 Mesothelioma	68	30.3	2.2	1.7	2.8 #	1.8	5.9
C40-C41 Bone	13	3.2	4.1	2.2	6.9 #	0.5	
C43 Malign. melanoma	434	177.0	2.5	2.2	2.7 #	12.2	1.2
C46,C49 Soft tissue	41	23.5	1.7	1.3	2.4 #	0.8	2.4
C50 Breast	20	11.0	1.8	1.1	2.8 #	0.4	5.0
C60 Penis	25	10.1	2.5	1.6	3.7 #	0.7	4.0
C62 Testis	13	5.6	2.3	1.2	4.0 #	0.4	7.7
C64 Kidney	407	146.9	2.8	2.5	3.1 #	12.3	5.9
C65 Renal pelvis	62	19.4	3.2	2.4	4.1 #	2.0	
C66 Ureter	34	10.9	3.1	2.2	4.3 #	1.1	
C67 Bladder	607	205.4	3.0	2.7	3.2 #	19.1	6.3
C68 Urethra	20	3.4	5.9	3.6	9.1 #	0.8	
C69 Eye melanoma	12	4.1	2.9	1.5	5.1 #	0.4	
C70-C72 CNS cancer	112	53.1	2.1	1.7	2.5 #	2.8	10.7
C73 Thyroid	54	23.2	2.3	1.8	3.0 #	1.5	1.9
C76-C79 CUP	122	74.0	1.6	1.4	2.0 #	2.3	3.3
C81 Hodgkin lymphoma	14	8.6	1.6	0.9	2.7	0.3	
C82-C85 NHL	358	178.2	2.0	1.8	2.2 #	8.5	7.8
C90 Mult. myeloma	117	58.0	2.0	1.7	2.4 #	2.8	10.3
C91-C96 Leukaemia	147	73.7	2.0	1.7	2.3 #	3.5	34.0
Others, specified	67	37.5	1.8	1.4	2.3 #	1.4	25.4
Not observed	0	1275.4	0.0	0.0	0.0 #	-60.5	
All further malignancies	6017	4363.5	1.4	1.3	1.4 #	78.5	8.5
Patients		47189					
Median age at next malignancy (years)		75.2					
Person-years		210640					
Mean observation time (years)		4.5					
Median observation time (years)		3.3					

# The occurrence of further malignancy listed is statistically significant.

Observed further malignancies with count 1 to 10 are pooled in category "Others, specified".

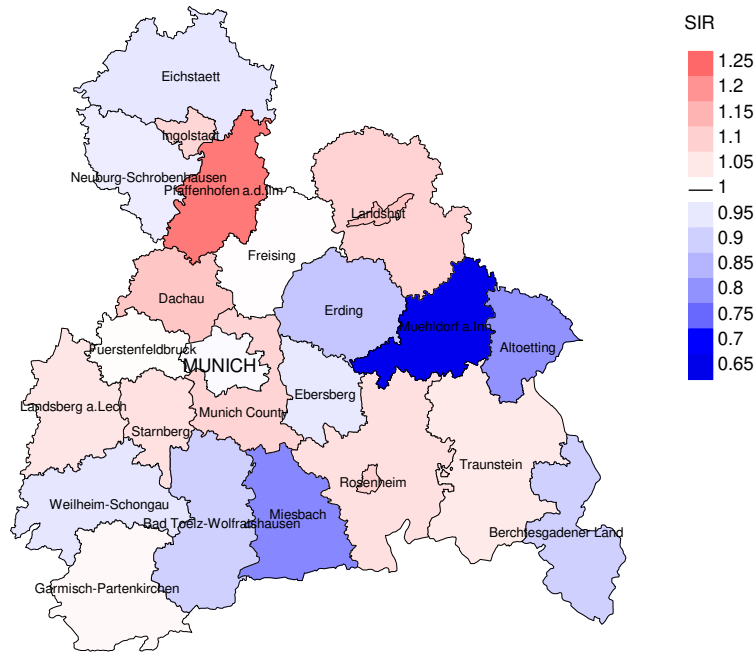
Average incidence (world standard population) 2007 - 2016



**Figure 8a.** Map of cancer incidence (world standard population, incl. DCO cases) by county averaged for period 2007 to 2016. 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 (61.1/100,000 WS N=28,917).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 65,063 male residents (averaged) in the period from 2007 to 2016 a total of 782 men were identified with newly diagnosed prostate cancer. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 56.1/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 50.7 and 61.9/100,000.

Standardized incidence ratio (SIR) 2007 - 2016



**Figure 8b.** Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2007 to 2016. 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=28,917).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 65,063 male residents (averaged) in the period from 2007 to 2016 a total of 782 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 0.95. Though, the value of this parameter may vary with an underlying probability of 99% between 0.86 and 1.04, 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 4.81 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	1568	96.5	10.0	1095	69.8	96.3
1999	1524	96.9	7.6	1007	66.1	96.0
2000	1712	96.6	8.5	1049	61.3	95.9
2001	1795	95.7	6.7	1021	56.9	96.1
2002	3370	94.9	9.2	1873	55.6	97.3
2003	3326	94.3	6.9	1705	51.3	97.8
2004	3267	95.0	6.9	1549	47.4	98.2
2005	3201	92.3	6.1	1409	44.0	97.6
2006	3106	87.0	5.9	1296	41.7	98.7
2007	3665	66.6	6.6	1429	39.0	98.0
2008	3353	60.0	5.9	1250	37.3	98.4
2009	3103	59.6	5.4	1101	35.5	98.2
2010	3029	59.7	6.4	964	31.8	97.9
2011	3247	57.6	5.8	910	28.0	96.4
2012	3307	56.7	4.8	784	23.7	95.2
2013	2900	56.9	5.1	649	22.4	95.5
2014	2913	60.9	5.5	523	18.0	94.1
2015	1857	98.0	8.3	338	18.2	92.9
2016	1543	63.3	8.6	205	13.3	90.7
1998-2016	51786	76.3	6.6	20157	38.9	97.1

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 4.81 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	1568	658	94.5	209	13.3
1999	1524	614	94.0	151	9.9
2000	1712	634	95.0	169	9.9
2001	1795	666	92.3	163	9.1
2002	3370	990	95.5	372	11.0
2003	3326	1050	97.4	274	8.2
2004	3267	1045	97.3	258	7.9
2005	3201	1145	96.7	235	7.3
2006	3106	1213	97.0	233	7.5
2007	3665	1386	97.3	299	8.2
2008	3353	1500	98.7	265	7.9
2009	3103	1534	98.3	232	7.5
2010	3029	1655	98.2	255	8.4
2011	3247	1761	98.8	261	8.0
2012	3307	1815	98.3	232	7.0
2013	2900	1845	98.3	217	7.5
2014	2913	1926	98.0	234	8.0
2015	1857	1983	98.2	211	11.4
2016	1543	1864	98.8	189	12.2
1998-2016	51786	25284	97.5	4459	8.6

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 4.81 m as of 2007, respectively)

Year of death	Deaths n	Prop. cancer- related %	Prop. non-cancer- related %	Prop. cancer recorded on death certificate %
1998	658	56.4	43.6	80.4
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	990	60.3	39.7	77.7
2003	1050	63.5	36.5	76.2
2004	1045	59.7	40.3	74.9
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	1534	57.4	42.6	69.8
2010	1655	60.1	39.9	71.8
2011	1761	59.1	40.9	69.6
2012	1815	59.4	40.6	70.2
2013	1845	55.0	45.0	66.8
2014	1926	54.9	45.1	67.3
2015	1983	54.1	45.9	64.3
2016	1864	51.3	48.7	63.2
1998-2016	25284	58.0	42.0	70.9

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	658	80.7	79.0	82.9	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	990	79.7	78.3	81.7	79.5
2003	1050	79.0	77.1	82.2	78.3
2004	1045	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	1534	80.5	78.3	83.2	79.6
2010	1655	80.4	78.8	83.1	79.6
2011	1761	81.1	79.2	83.4	80.0
2012	1815	81.1	79.0	83.5	79.9
2013	1845	81.7	79.7	83.8	80.7
2014	1926	81.9	79.3	84.3	80.7
2015	1982	81.5	79.2	84.1	80.1
2016	1864	82.1	79.7	84.3	80.8
1998-2016	25283	80.8	78.7	83.3	79.7

By 2010, life expectancy at birth was 77.5 years for boys and 82.6 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	667	35.6	0.20	17.0	0.18	29.3	0.20	43.9	0.23
2004	624	33.2	0.19	15.2	0.17	26.3	0.19	39.9	0.22
2005	706	37.3	0.22	16.3	0.19	28.4	0.22	44.0	0.26
2006	743	38.8	0.24	16.8	0.20	29.2	0.24	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	0.27	16.4	0.22	28.1	0.25	42.4	0.29
2009	880	39.4	0.28	15.8	0.23	27.0	0.27	40.4	0.31
2010	994	44.1	0.33	17.1	0.26	29.3	0.30	44.1	0.35
2011	1040	46.5	0.32	17.5	0.25	30.6	0.30	46.0	0.35
2012	1079	47.5	0.33	17.4	0.25	30.3	0.29	45.9	0.35
2013	1014	44.1	0.35	15.9	0.27	27.6	0.31	41.5	0.36
2014	1057	45.3	0.36	16.1	0.27	27.8	0.32	41.2	0.37
2015	1073	45.1	0.58	15.6	0.43	27.1	0.49	40.5	0.57
2016	956	39.8	0.62	13.3	0.44	23.1	0.51	35.0	0.61
1998-2016	14655	39.8	0.28	16.2	0.23	28.1	0.26	42.3	0.31

Table 12

Age distribution of age at death (cancer-related) for period 2007-2016  
(incl. multiple malignancies)

Age at death Years	Cases n	%	Cum.%
0-4			
5-9			
10-14			
15-19			
20-24			
25-29	1	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	19	0.2	0.2
50-54	43	0.4	0.7
55-59	150	1.5	2.2
60-64	391	4.0	6.2
65-69	936	9.5	15.7
70-74	1677	17.0	32.7
75-79	2153	21.8	54.5
80-84	2150	21.8	76.3
85+	2336	23.7	100.0
All ages	9859	100.0	

Table 13

Age-specific mortality (cancer-related) and proportion of all cancers  
for period 2007-2016  
(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	1	0.1	1.00	1.4
30-34		0.0		
35-39		0.0		
40-44	3	0.2	0.06	0.6
45-49	19	1.0	0.06	1.7
50-54	43	2.5	0.05	2.1
55-59	150	10.6	0.07	4.4
60-64	391	31.9	0.11	7.8
65-69	936	79.0	0.15	12.8
70-74	1677	151.6	0.25	18.0
75-79	2153	270.2	0.48	24.0
80-84	2150	467.5	0.88	28.5
85+	2336	762.9	1.19	35.8
All ages	9859			18.9
Mortality				
Raw		43.1	0.34	
WS		16.2	0.26	
ES		27.9	0.31	
BRD-S		41.9	0.36	
PYLL-70				
per 100,000		41.9		
ES		35.4		
AYLL-70		5.5		

Table 14

Further malignancies in deaths in period 1998-2016

Diagnosis	Total n	Total %↓	Pre n	Pre ←%	Syn- chron ±30d n	Syn- chron ±30d ←%	Post n	Post ←%
C15 Oesophagus	143	1.9	22	15.4	7	4.9	114	79.7
C16 Stomach	336	4.5	71	21.1	24	7.1	241	71.7
C18 Colon	811	11.0	291	35.9	53	6.5	467	57.6
C19-C20 Rectum	462	6.2	171	37.0	41	8.9	250	54.1
C22 Liver	198	2.7	15	7.6	7	3.5	176	88.9
C23-C24 Bile	78	1.1	10	12.8	4	5.1	64	82.1
C25 Pancreas	413	5.6	28	6.8	20	4.8	365	88.4
C32 Larynx	84	1.1	41	48.8	5	6.0	38	45.2
C33-C34 Lung	1030	13.9	113	11.0	64	6.2	853	82.8
C38,C45 Mesothelioma	78	1.1	4	5.1	3	3.8	71	91.0
C43 Malign. melanoma	320	4.3	154	48.1	14	4.4	152	47.5
C44 Skin others	500	6.8	141	28.2	16	3.2	343	68.6
C64 Kidney	369	5.0	171	46.3	49	13.3	149	40.4
C67 Bladder	1006	13.6	389	38.7	265	26.3	352	35.0
C70-C72 CNS cancer	127	1.7	5	3.9	7	5.5	115	90.6
C76-C79 CUP	168	2.3	21	12.5	19	11.3	128	76.2
C82-C85 NHL	331	4.5	100	30.2	40	12.1	191	57.7
C90 Mult. myeloma	127	1.7	23	18.1	8	6.3	96	75.6
C91-C96 Leukaemia	176	2.4	13	7.4	12	6.8	151	85.8
Others, specified	640	8.7	216	33.8	52	8.1	372	58.1
All further malignancies	7397	100.0	1999	27.0	710	9.6	4688	63.4

Further malignancies with number of cases 1 to 60 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 2007-2016  
(**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		0.0		
30-34		0.0		
35-39		0.0		
40-44	2	0.1	0.04	0.4
45-49	13	0.7	0.04	1.2
50-54	33	1.9	0.04	1.8
55-59	118	8.3	0.06	4.0
60-64	320	26.1	0.10	7.7
65-69	741	62.5	0.14	12.7
70-74	1368	123.7	0.24	19.0
75-79	1761	221.0	0.48	26.6
80-84	1774	385.7	0.93	32.3
85+	1953	637.9	1.27	40.9
All ages	8083			19.8
Mortality				
Raw		35.4	0.33	
WS		13.2	0.25	
ES		22.9	0.29	
BRD-S		34.3	0.35	
PYLL-70				
per 100,000		33.0		
ES		27.8		
AYLL-70		5.4		

\* See corresponding tables with multiple malignancies.

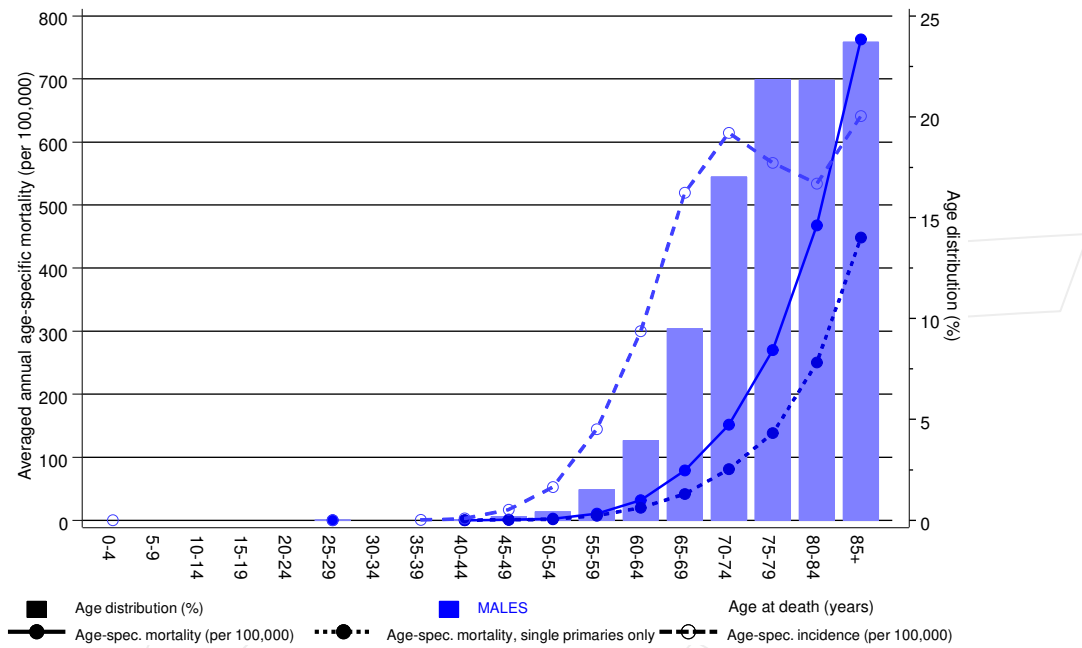
Table 16

Age-specific mortality (cancer-related) and proportion of all cancers  
for period 2007-2016  
(**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		0.0		
30-34		0.0		
35-39		0.0		
40-44	1	0.1	0.02	0.2
45-49	13	0.7	0.04	1.3
50-54	30	1.7	0.04	1.7
55-59	104	7.3	0.06	3.6
60-64	245	20.0	0.08	6.0
65-69	495	41.8	0.10	8.7
70-74	895	80.9	0.17	12.9
75-79	1101	138.2	0.34	17.4
80-84	1150	250.0	0.68	22.3
85+	1372	448.1	0.95	31.1
All ages	5406			13.7
Mortality				
Raw		23.7	0.24	
WS		9.0	0.19	
ES		15.5	0.22	
BRD-S		22.9	0.26	
PYLL-70				
per 100,000		25.9		
ES		22.0		
AYLL-70		5.9		

\* See corresponding tables with multiple malignancies.

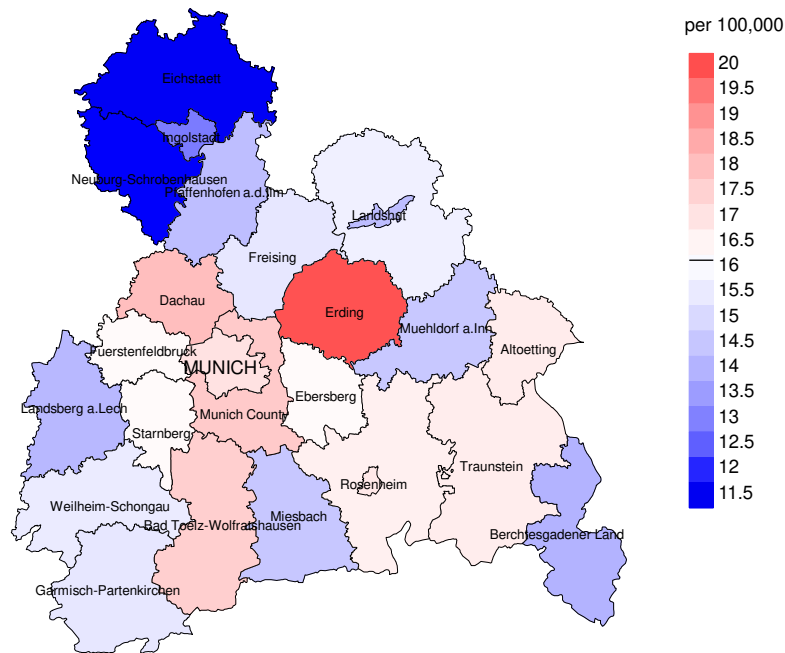
ICD-10 C61: Malignant neoplasm of prostate  
 Age distribution and age-specific mortality 2007 - 2016 (n=9859)



**Figure 17.** Distribution of age at death (bars; mean=72.2 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.

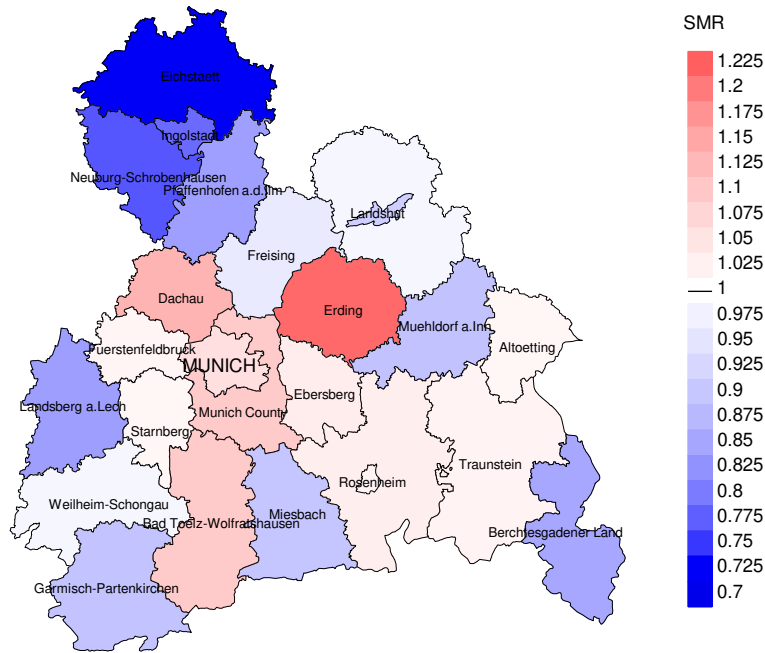
## Average mortality (world standard population) 2007 - 2016



**Figure 18a.** Map of cancer mortality (world standard population) by county averaged for period 2007 to 2016. 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 (16.2/100,000 WS N=9,859).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 65,063 male residents (averaged) in the period from 2007 to 2016 a total of 288 men died from prostate cancer. Therefore, the mean mortality rate for this cancer type in this area can be calculated at 16.3/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 13.8 and 19.2/100,000.

Standardized mortality ratio (SMR) 2007 - 2016



**Figure 18b.** Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2007 to 2016. 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=9,859).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 65,063 male residents (averaged) in the period from 2007 to 2016 a total of 288 men died from prostate cancer. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 1.03. Though, the value of this parameter may vary with an underlying probability of 99% between 0.88 and 1.20, 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 index from mortality and incidence (Mortality-Incidence ratio, **MI-index**) is a statistic 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 MI- index. 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 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 between mortality and incidence
FRG	Federal Republic of Germany

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