

Munich Cancer Registry



- ▶ Survival
- ▶ Selection Matrix
- ▶ Homepage
- ▶ *Deutsch*

ICD-10 C62: Testicular cancer

Incidence and Mortality

Year of diagnosis	1998-2016
Patients	3,621
Diseases	3,694
Creation date	08/21/2018
Export date	08/09/2018
Population (males)	2.38 m





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<https://www.tumorregister-muenchen.de/en>

https://www.tumorregister-muenchen.de/en/facts/base/bC62__E-ICD-10-C62-Testicular-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[#], 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, August 2018

[#] 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
C62.-	Malignant neoplasm of testis
C62.0	Undescended testis
C62.1	Descended testis
C62.9	Testis, unspecified

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	134	3	2.2	3.7	5.5	11.9	92.5
1999	120	1	0.8	3.9	5.4	10.0	93.3
2000	124	1	0.8	3.4	5.2	7.3	87.9
2001	131	1	0.8	3.1	5.1	6.9	89.3
2002	219	1	0.5	3.4	5.1	9.1	92.2 #
2003	202	1	0.5	3.8	4.7	8.9	97.0
2004	233	5	2.1	4.2	4.6	8.6	90.1
2005	221	6	2.7	4.6	4.3	10.4	91.4
2006	196	4	2.0	4.7	4.1	7.1	84.2
2007	263	1	0.4	5.0	3.8	8.7	57.0 #
2008	197	2	1.0	5.2	3.6	7.1	35.0
2009	235	1	0.4	5.5	3.6	7.2	42.1
2010	219	2	0.9	5.5	3.4	5.5	41.6
2011	210			5.7	3.0	1.0	37.6
2012	229	2	0.9	5.5	2.2	5.2	34.9
2013	248	1	0.4	5.4	1.8	3.2	37.9
2014	217	3	1.4	5.4	1.4	2.3	40.6
2015	168			5.4	2.1	0.6	99.4
2016	128	4	3.1	5.4	2.4	3.1	83.6 ##
1998-2016	3694	39	1.1	5.4	5.5	6.5	66.6

3,694 cases diagnosed 1998-2016 are related to a total of 3,621 patients. Currently, in 370 (10.2 %) of these 3,621 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 333 / 31 / 6 (9.2 % / 0.9 % / 0.2 %) 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 217 cases has been diagnosed, of which 5.4 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 1.4 % 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	134	12.1	9.9	10.6	11.0
1999	120	10.7	8.7	9.2	9.6
2000	124	10.9	9.5	9.8	10.3
2001	131	11.3	9.5	10.0	10.6
2002	219	11.8	9.6	10.5	11.1
2003	202	10.8	9.2	9.9	10.4
2004	233	12.4	10.4	11.2	11.9
2005	221	11.7	9.8	10.6	11.1
2006	196	10.2	8.7	9.5	10.0
2007	263	11.9	10.6	11.2	11.8
2008	197	8.9	7.7	8.3	8.7
2009	235	10.5	9.0	9.9	10.5
2010	219	9.7	8.7	9.3	9.8
2011	210	9.4	8.3	9.1	9.6
2012	229	10.1	9.1	9.8	10.2
2013	248	10.8	9.7	10.4	10.9
2014	217	9.3	8.3	9.0	9.5
2015	168	7.1	6.0	6.7	7.1
2016	128	5.3	4.7	5.2	5.4
1998-2016	3694	10.0	8.7	9.4	9.9

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	Std.		Min.	Max.	Median				
		Mean	dev.			10%	25%	50%	75%	90%
1998	134	36.9	10.2	1.3	59.4	24.2	31.2	36.4	43.7	51.7
1999	120	36.7	11.5	5.2	74.7	25.0	30.2	34.8	40.6	55.3
2000	124	35.4	10.7	14.4	85.1	23.0	28.0	34.4	40.8	46.4
2001	131	36.7	11.5	15.1	79.0	23.9	29.6	35.2	41.0	49.9
2002	219	38.4	11.2	19.1	93.5	25.2	31.2	36.9	43.7	49.5
2003	202	37.5	11.7	4.2	75.2	25.0	29.2	35.7	42.6	52.5
2004	233	38.7	12.4	0.5	84.6	25.8	30.5	37.7	44.3	55.2
2005	221	39.2	12.3	2.8	88.6	26.3	31.5	37.9	44.7	54.6
2006	196	38.3	11.8	18.6	86.7	24.1	30.3	37.3	43.8	53.3
2007	263	37.7	12.4	0.1	95.0	24.8	29.6	36.1	43.8	52.9
2008	197	39.1	12.1	15.9	83.8	24.4	30.0	38.5	44.4	55.5
2009	235	39.6	12.6	16.8	82.0	24.5	31.1	38.3	46.5	55.6
2010	219	38.1	11.5	16.4	80.2	24.8	29.9	37.0	44.5	51.9
2011	210	38.8	11.9	18.9	77.0	24.6	29.7	37.1	46.5	53.3
2012	229	38.2	11.9	2.6	78.8	23.9	30.0	37.4	45.4	52.4
2013	248	38.3	11.6	0.9	83.1	23.8	29.9	37.1	45.9	52.9
2014	217	39.4	13.0	15.5	88.4	24.5	29.4	37.8	48.1	55.2
2015	168	40.5	13.7	20.1	99.3	25.6	30.9	37.7	48.8	56.9
2016	128	39.6	12.8	16.3	88.2	24.9	31.5	37.8	45.7	55.9
1998-2016	3694	38.4	12.0	0.1	99.3	24.6	30.2	37.0	44.7	53.8

Table 4

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

Age at diagnosis Years	Cases n	%	Cum.%
0-4	4	0.2	0.2
5-9	0	0.0	0.2
10-14	1	0.0	0.2
15-19	51	2.4	2.6
20-24	179	8.5	11.1
25-29	291	13.8	24.9
30-34	357	16.9	41.8
35-39	350	16.6	58.3
40-44	311	14.7	73.0
45-49	229	10.8	83.9
50-54	141	6.7	90.5
55-59	75	3.5	94.1
60-64	50	2.4	96.5
65-69	30	1.4	97.9
70-74	20	0.9	98.8
75-79	11	0.5	99.3
80-84	8	0.4	99.7
85+	6	0.3	100.0
All ages	2114	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=16 %	Prop. all cancers n=113978 %
0- 4	4	0.4		2.0
5- 9		0.0		
10-14	1	0.1		0.9
15-19	51	4.2		20.2
20-24	177	12.6		38.5
25-29	288	18.4		42.1
30-34	350	22.0		36.7
35-39	349	21.4		25.3
40-44	310	16.6	0.3	14.3
45-49	228	11.5		5.8
50-54	140	8.1	1.4	2.3
55-59	75	5.3	2.7	0.8
60-64	50	4.1	2.0	0.4
65-69	30	2.5	6.7	0.2
70-74	20	1.8		0.1
75-79	11	1.4	9.1	0.1
80-84	8	1.7	37.5	0.1
85+	6	2.0	66.7	0.1
All ages	2098		0.8	1.8
Incidence				
Raw		9.2		
WS		8.1		
ES		8.8		
BRD-S		9.2		

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).

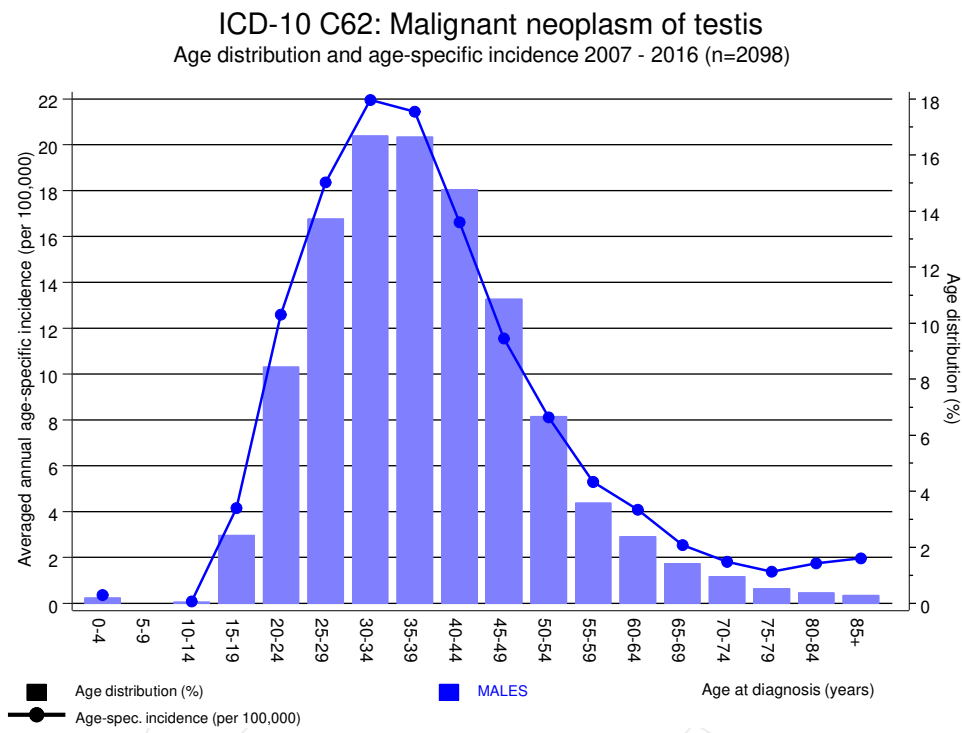


Figure 6. Age distribution (mean=38.9 yrs, median=37.5 yrs) and age-specific incidence.

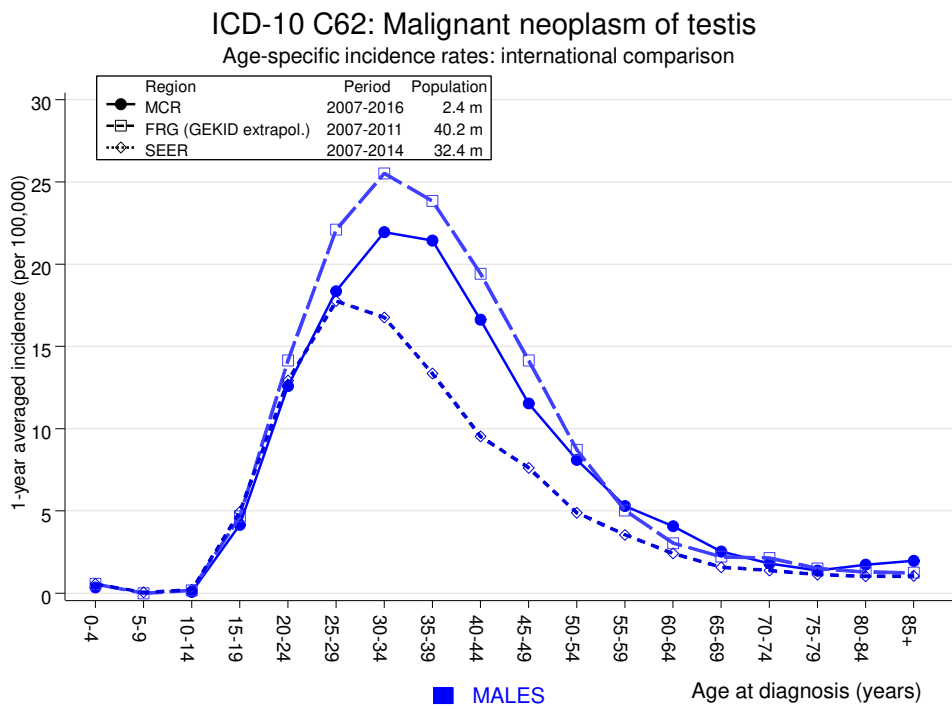


Figure 6a. Age-specific incidence in MCR registry areas compared to Germany (FRG, GEKID extrapolation) and SEER (Surveillance, Epidemiology, and End Results, USA).

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	2	0.7	3.0	0.4	10.7	1.0	
C09-C10 Oropharynx	2	0.8	2.6	0.3	9.3	0.9	
C12-C13 Hypopharynx	2	0.4	4.9	0.6	17.8	1.2	
C16 Stomach	2	1.2	1.6	0.2	5.8	0.6	
C17 Small intestine	3	0.3	11.8	2.4	34.4 #	2.0	
C18 Colon	4	2.7	1.5	0.4	3.9	1.0	
C19-C20 Rectum	4	2.0	2.0	0.5	5.1	1.4	
C22 Liver	6	0.9	6.8	2.5	14.8 #	3.7	
C25 Pancreas	4	1.1	3.7	1.0	9.4	2.1	
C32 Larynx	2	0.5	4.1	0.5	14.8	1.1	50.0
C33-C34 Lung	13	3.8	3.4	1.8	5.8 #	6.7	7.7
C43 Malign. melanoma	8	2.8	2.8	1.2	5.5 #	3.8	
C61 Prostate	23	7.1	3.2	2.1	4.9 #	11.6	4.3
C62 Testis	72	2.3	30.9	24.2	38.9 #	50.8	
C64 Kidney	10	1.6	6.4	3.1	11.7 #	6.1	
C67 Bladder	2	1.0	2.0	0.2	7.2	0.7	
C70-C72 CNS cancer	6	1.0	6.1	2.2	13.3 #	3.7	16.7
C73 Thyroid	4	0.9	4.7	1.3	12.0 #	2.3	
C76-C79 CUP	3	0.6	5.4	1.1	15.9 #	1.8	
C81 Hodgkin lymphoma	2	0.5	4.4	0.5	16.0	1.1	
C82-C85 NHL	4	1.7	2.3	0.6	5.9	1.6	
C91-C96 Leukaemia	5	0.7	7.3	2.4	17.1 #	3.1	20.0
Others, specified	11	2.3	4.8	2.4	8.7 #	6.4	
Not observed	0	0.9	0.0	0.0	4.2	-0.6	
All further malignancies	194	37.6	5.2	4.5	5.9 #	114.0	2.6
Patients		3426					
Median age at next malignancy (years)		47.9					
Person-years		13725					
Mean observation time (years)		4.0					
Median observation time (years)		2.5					

The occurrence of further malignancy listed is statistically significant.

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

Average incidence (world standard population) 2007 - 2016

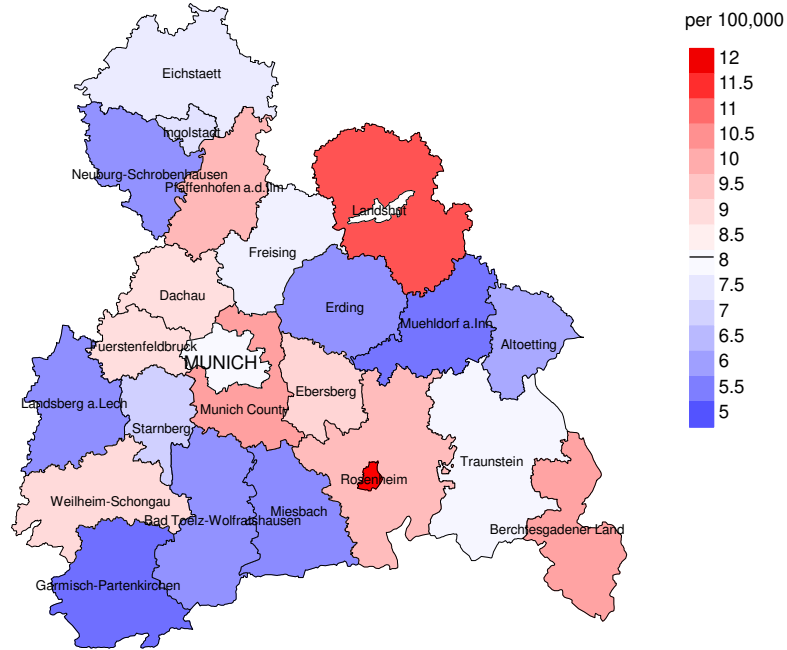


Figure 8a. Map of cancer incidence (world standard population, incl. DCO cases) by county averaged for period 2007 to 2016. According to their individual incidence rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (8.1/100,000 WS N=2,098).

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 58 men were identified with newly diagnosed testicular cancer. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 9.1/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 6.2 and 12.9/100,000.

Standardized incidence ratio (SIR) 2007 - 2016

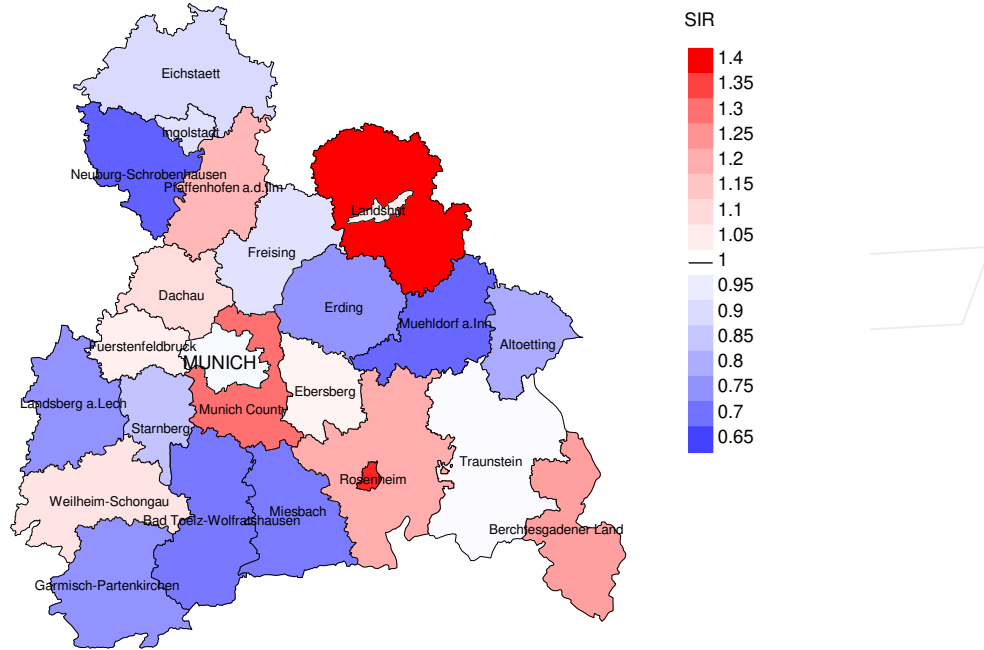


Figure 8b. Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2007 to 2016. According to their individual SIR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (N=2,098).

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 58 men were identified with newly diagnosed testicular cancer. Therefore, the mean standardized incidence ratio (SIR) 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 0.72 and 1.43, 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	134	92.5	2.2	16	11.9	100.0
1999	120	93.3	0.8	12	10.0	100.0
2000	124	87.9	0.8	9	7.3	100.0
2001	131	89.3	0.8	9	6.9	100.0
2002	219	92.2	0.5	20	9.1	100.0
2003	202	97.0	0.5	18	8.9	100.0
2004	233	90.1	2.1	20	8.6	100.0
2005	221	91.4	2.7	23	10.4	91.3
2006	196	84.2	2.0	14	7.1	100.0
2007	263	57.0	0.4	23	8.7	95.7
2008	197	35.0	1.0	14	7.1	100.0
2009	235	42.1	0.4	17	7.2	94.1
2010	219	41.6	0.9	12	5.5	100.0
2011	210	37.6		2	1.0	100.0
2012	229	34.9	0.9	12	5.2	100.0
2013	248	37.9	0.4	8	3.2	100.0
2014	217	40.6	1.4	5	2.3	100.0
2015	168	99.4		1	0.6	100.0
2016	128	83.6	3.1	4	3.1	100.0
1998-2016	3694	66.6	1.1	239	6.5	98.3

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	134	9	100.0	4	3.0
1999	120	17	82.4	2	1.7
2000	124	6	100.0	1	0.8
2001	131	15	100.0	5	3.8
2002	219	24	100.0	4	1.8
2003	202	22	100.0	6	3.0
2004	233	19	84.2	5	2.1
2005	221	33	93.9	9	4.1
2006	196	25	92.0	4	2.0
2007	263	28	96.4	4	1.5
2008	197	29	100.0	5	2.5
2009	235	34	97.1	3	1.3
2010	219	33	93.9	4	1.8
2011	210	37	100.0		
2012	229	29	100.0	4	1.7
2013	248	46	97.8	4	1.6
2014	217	32	100.0	3	1.4
2015	168	34	100.0	1	0.6
2016	128	31	96.8	4	3.1
1998-2016	3694	503	96.8	72	1.9

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	9	66.7	33.3	100.0
1999	17	82.4	17.6	85.7
2000	6	50.0	50.0	66.7
2001	15	80.0	20.0	73.3
2002	24	91.7	8.3	91.7
2003	22	81.8	18.2	86.4
2004	19	84.2	15.8	87.5
2005	33	72.7	27.3	87.1
2006	25	48.0	52.0	60.9
2007	28	57.1	42.9	85.2
2008	29	72.4	27.6	79.3
2009	34	73.5	26.5	72.7
2010	33	63.6	36.4	67.7
2011	37	75.7	24.3	81.1
2012	29	58.6	41.4	58.6
2013	46	65.2	34.8	62.2
2014	32	59.4	40.6	71.9
2015	34	52.9	47.1	64.7
2016	31	61.3	38.7	73.3
1998-2016	503	67.8	32.2	74.9

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	9	50.6	55.5	45.3	50.6
1999	17	40.9	42.9	40.5	42.9
2000	6	60.5	38.4	61.3	49.1
2001	15	58.1	48.9	66.1	58.1
2002	24	67.9	63.7	74.7	63.7
2003	22	63.7	63.7	56.0	63.3
2004	19	63.1	63.3	62.5	63.7
2005	33	58.9	55.7	70.8	56.9
2006	25	62.2	52.0	65.4	52.0
2007	28	60.5	58.6	63.7	59.0
2008	29	61.3	54.2	65.0	60.5
2009	34	59.4	59.4	65.8	61.7
2010	33	61.6	63.6	58.7	60.5
2011	37	61.8	62.8	53.4	62.8
2012	29	59.3	57.2	61.9	57.2
2013	46	56.5	56.2	63.1	55.1
2014	32	66.3	66.5	59.6	67.1
2015	34	67.3	67.9	57.4	67.9
2016	31	61.7	63.4	61.4	59.0
1998-2016	503	60.9	60.2	61.5	60.4

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	6	0.5	0.05	0.4	0.04	0.5	0.05	0.5	0.05
1999	14	1.3	0.12	0.9	0.10	1.1	0.12	1.2	0.13
2000	3	0.3	0.02	0.3	0.03	0.3	0.03	0.2	0.02
2001	12	1.0	0.09	0.8	0.09	1.0	0.10	1.2	0.11
2002	22	1.2	0.10	0.7	0.08	1.1	0.10	1.3	0.12
2003	18	1.0	0.09	0.6	0.07	0.8	0.09	1.0	0.09
2004	16	0.9	0.07	0.6	0.06	0.7	0.07	0.9	0.07
2005	24	1.3	0.11	0.9	0.09	1.1	0.10	1.2	0.11
2006	12	0.6	0.06	0.5	0.05	0.6	0.06	0.7	0.07
2007	16	0.7	0.06	0.5	0.05	0.6	0.06	0.7	0.06
2008	21	0.9	0.11	0.6	0.08	0.8	0.10	0.9	0.11
2009	25	1.1	0.11	0.7	0.08	0.9	0.09	1.1	0.10
2010	21	0.9	0.10	0.6	0.07	0.7	0.08	0.9	0.09
2011	28	1.3	0.13	0.8	0.10	1.0	0.12	1.2	0.13
2012	17	0.7	0.07	0.4	0.05	0.6	0.06	0.7	0.07
2013	30	1.3	0.12	0.9	0.09	1.1	0.11	1.2	0.11
2014	19	0.8	0.09	0.5	0.06	0.6	0.07	0.7	0.08
2015	18	0.8	0.11	0.4	0.07	0.6	0.09	0.7	0.10
2016	19	0.8	0.15	0.4	0.09	0.6	0.12	0.7	0.13
1998-2016	341	0.9	0.09	0.6	0.07	0.8	0.08	0.9	0.09

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	1	0.5	0.5
20-24	4	1.9	2.3
25-29	3	1.4	3.7
30-34	8	3.7	7.5
35-39	9	4.2	11.7
40-44	12	5.6	17.3
45-49	13	6.1	23.4
50-54	26	12.1	35.5
55-59	24	11.2	46.7
60-64	24	11.2	57.9
65-69	34	15.9	73.8
70-74	25	11.7	85.5
75-79	11	5.1	90.7
80-84	14	6.5	97.2
85+	6	2.8	100.0
All ages	214	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	1	0.1	0.02	2.3
20-24	4	0.3	0.02	7.0
25-29	3	0.2	0.01	4.1
30-34	8	0.5	0.02	7.7
35-39	9	0.6	0.03	4.5
40-44	12	0.6	0.04	2.4
45-49	13	0.7	0.06	1.1
50-54	26	1.5	0.19	1.3
55-59	24	1.7	0.32	0.7
60-64	24	2.0	0.48	0.5
65-69	34	2.9	1.13	0.5
70-74	25	2.3	1.25	0.3
75-79	11	1.4	1.00	0.1
80-84	14	3.0	1.75	0.2
85+	6	2.0	1.00	0.1
All ages	214			0.4
Mortality				
Raw		0.9	0.10	
WS		0.6	0.07	
ES		0.8	0.09	
BRD-S		0.9	0.09	
PYLL-70 per 100,000		12.9		
ES		11.6		
AYLL-70		16.5		

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 ←%
C03–C06 Oral cavity	4	1.5					4	100.0
C09–C10 Oropharynx	6	2.2	1	16.7			5	83.3
C15 Oesophagus	3	1.1			1	33.3	2	66.7
C16 Stomach	12	4.4	2	16.7			10	83.3
C18 Colon	18	6.6	2	11.1			16	88.9
C19–C20 Rectum	14	5.1	1	7.1			13	92.9
C22 Liver	9	3.3					9	100.0
C23–C24 Bile	5	1.8					5	100.0
C25 Pancreas	18	6.6					18	100.0
C32 Larynx	5	1.8					5	100.0
C33–C34 Lung	51	18.8	3	5.9	2	3.9	46	90.2
C40–C41 Bone	3	1.1			1	33.3	2	66.7
C43 Malign. melanoma	6	2.2	1	16.7			5	83.3
C44 Skin others	5	1.8					5	100.0
C46,C49 Soft tissue	5	1.8	2	40.0			3	60.0
C61 Prostate	32	11.8	7	21.9	1	3.1	24	75.0
C62 Testis	7	2.6			1	14.3	6	85.7
C64 Kidney	6	2.2					6	100.0
C67 Bladder	10	3.7					10	100.0
C70–C72 CNS cancer	10	3.7	1	10.0	2	20.0	7	70.0
C73 Thyroid	3	1.1					3	100.0
C76–C79 CUP	9	3.3					9	100.0
C82–C85 NHL	11	4.0	2	18.2	1	9.1	8	72.7
C91–C96 Leukaemia	7	2.6	1	14.3			6	85.7
Others, specified	13	4.8			1	7.7	12	92.3
All further malignancies	272	100.0	23	8.5	10	3.7	239	87.9

Further malignancies with number of cases 1 to 2 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	1	0.1	0.02	2.4
20-24	4	0.3	0.02	7.8
25-29	2	0.1	0.01	3.0
30-34	8	0.5	0.02	7.8
35-39	9	0.6	0.03	4.8
40-44	11	0.6	0.04	2.4
45-49	12	0.6	0.06	1.1
50-54	24	1.4	0.19	1.3
55-59	21	1.5	0.32	0.7
60-64	21	1.7	0.51	0.5
65-69	32	2.7	1.60	0.5
70-74	20	1.8	1.67	0.3
75-79	9	1.1	1.29	0.1
80-84	11	2.4	5.50	0.2
85+	5	1.6	2.50	0.1
All ages	190			0.5
Mortality				
Raw		0.8	0.10	
WS		0.5	0.07	
ES		0.7	0.08	
BRD-S		0.8	0.09	
PYLL-70				
per 100,000		12.0		
ES		10.8		
AYLL-70		16.6		

* 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	1	0.1	0.02	2.4
20-24	4	0.3	0.02	7.8
25-29	2	0.1	0.01	3.0
30-34	8	0.5	0.02	7.8
35-39	7	0.4	0.02	3.7
40-44	10	0.5	0.04	2.2
45-49	8	0.4	0.04	0.8
50-54	3	0.2	0.02	0.2
55-59	5	0.4	0.08	0.2
60-64	7	0.6	0.19	0.2
65-69	10	0.8	0.50	0.2
70-74	4	0.4	0.50	0.1
75-79	2	0.3	0.33	0.0
80-84	3	0.7	1.50	0.1
85+	1	0.3	0.50	0.0
All ages	75			0.2
Mortality				
Raw		0.3	0.04	
WS		0.2	0.03	
ES		0.3	0.04	
BRD-S		0.3	0.04	
PYLL-70 per 100,000		7.4		
ES		6.8		
AYLL-70		23.1		

* See corresponding tables with multiple malignancies.

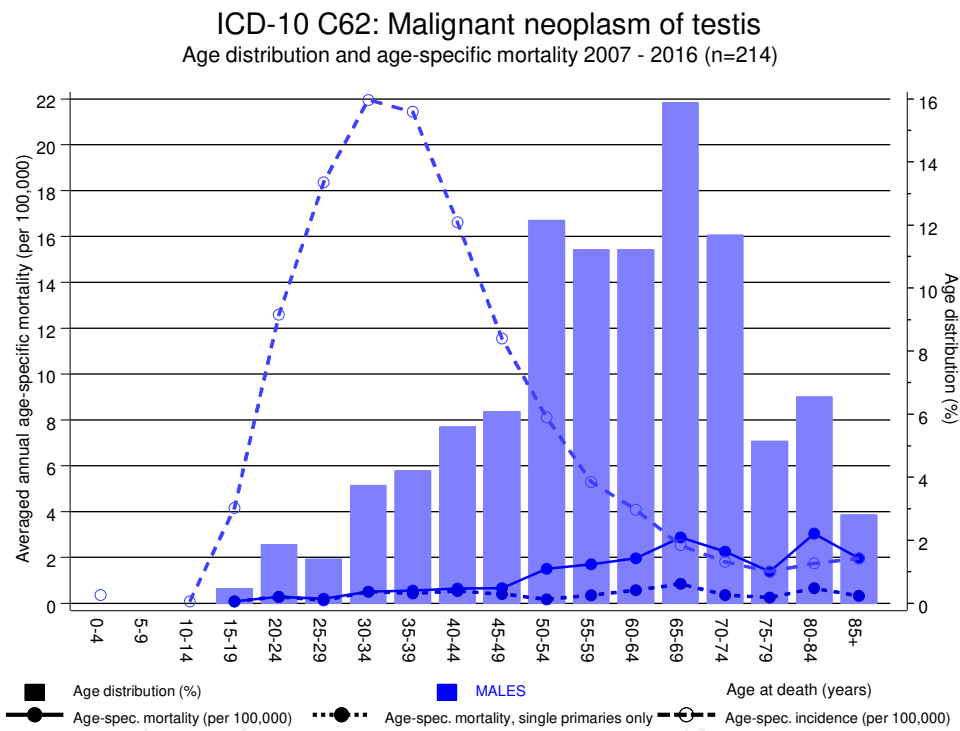


Figure 17. Distribution of age at death (bars; mean=44.0 yrs, median=41.9 yrs) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

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

Average mortality (world standard population) 2007 - 2016

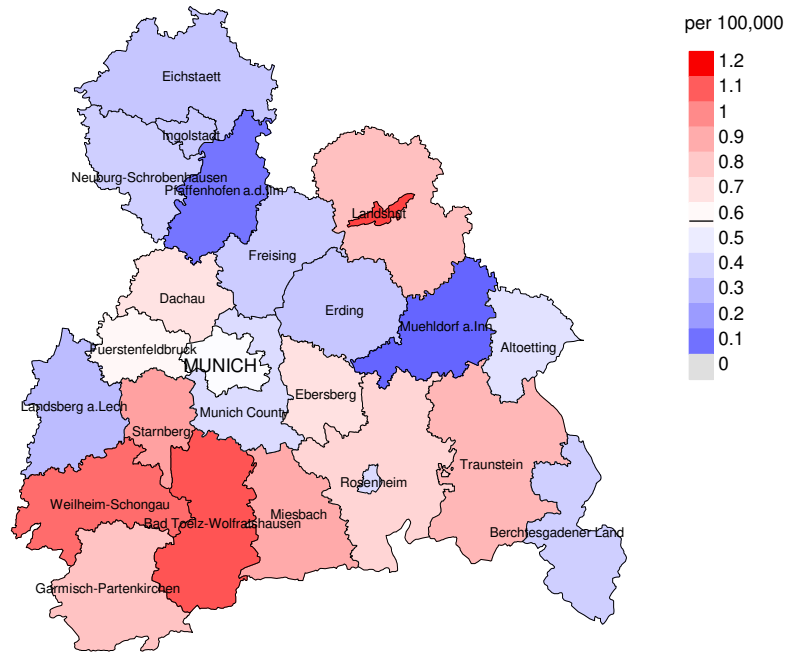


Figure 18a. Map of cancer mortality (world standard population) by county averaged for period 2007 to 2016. According to their individual mortality rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (0.6/100,000 WS N=214).

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 7 men died from testicular cancer. Therefore, the mean mortality rate for this cancer type in this area can be calculated at 0.7/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 0.2 and 2.0/100,000.

Standardized mortality ratio (SMR) 2007 - 2016

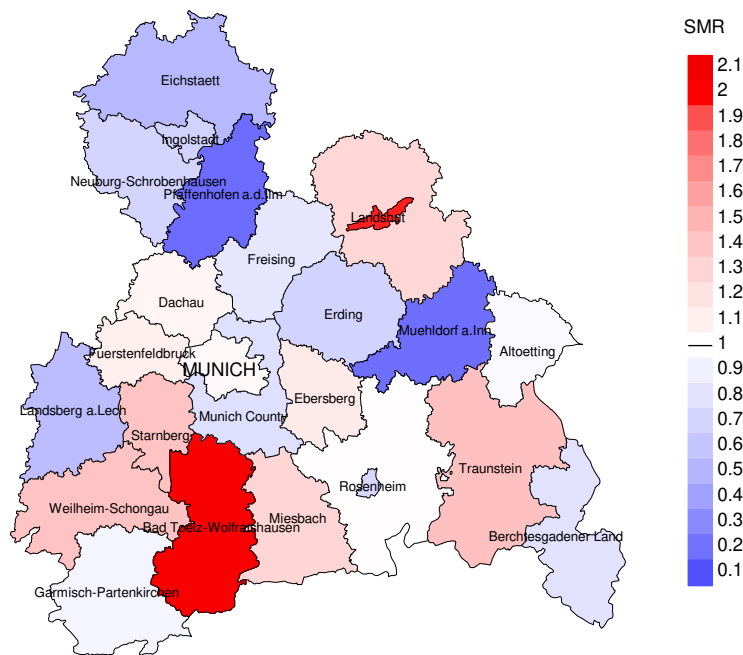


Figure 18b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2007 to 2016. According to their individual SMR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (N=214).

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 7 men died from testicular cancer. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 1.15. Though, the value of this parameter may vary with an underlying probability of 99% between 0.34 and 2.82, 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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