Munich Cancer Registry

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ICD-10 C62: Testicular cancer

Incidence and Mortality

Year of diagnosis	1998-2014
Patients	3,262
Diseases	3,330
Creation date	04/13/2016
Export date	12/23/2015
Population (males)	2.28 m

Munich Cancer Registry at Munich Cancer Center
Marchioninistr. 15
Munich, 81377
Germany

http://www.tumorregister-muenchen.de/en

http://www.tumorregister-muenchen.de/en/facts/base/bC62__E-ICD-10-C62-Testicular-cancer-incidence-and-mortality.pdf

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 4.64 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, April 2016

[#] 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 2.51 million to 3.96 in 2002, and to 4.52 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

All patients with invasive cancer by year of diagnosis, proportions of DCO, multiple primaries, deaths, and active follow-up (incl. DCO)

Year of diagnosis	Cases n	DCO cases n	Prop. DCO %	Prop. mult. primaries %	Prop. deaths %	Prop. actively followed %	
1998	132	2	1.5	10.6	10.6	96.2	
1999	117			11.1	6.8	94.0	
2000	124	1	0.8	12.1	7.3	91.9	
2001	131	1	0.8	6.1	6.1	90.8	
2002	219	1	0.5	14.2	8.2	93.6	#
2003	202	1	0.5	11.4	7.9	97.0	
2004	232	5	2.2	13.4	8.2	93.5	
2005	219	6	2.7	14.2	8.7	93.2	
2006	196	4	2.0	14.3	7.1	85.2	
2007	264	1	0.4	13.6	8.3	59.5	#
2008	195	2	1.0	10.3	7.2	40.0	
2009	234	1	0.4	13.2	6.4	43.2	
2010	213	2	0.9	9.4	4.7	43.2	
2011	206			13.6	1.0	40.8	
2012	223	2	0.9	7.6	4.0	40.8	
2013	237	1	0.4	10.5	2.5	99.6	
2014	186	2	1.1	7.0	1.1	97.8	##
1998-2014	3330	32	1.0	11.5	6.2	74.5	

\# 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 found in the respective headings.

Table 2

Incidence measures by year of diagnosis including DCO cases
(with respect to registry area expansion from 2.51 to 3.96 m as of 2002,
and from 3.96 to 4.64 m as of 2007, respectively)

Year of diagnosis	Cases n	Incidence raw	Incidence WS	Incidence ES	Incidence BRD-S
1998	132	11.9	9.7	10.4	10.8
1999	117	10.5	8.4	9.0	9.4
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	232	12.3	10.4	11.2	11.8
2005	219	11.6	9.7	10.5	11.0
2006	196	10.2	8.7	9.5	10.0
2007	264	11.9	10.6	11.3	11.8
2008	195	8.8	7.6	8.2	8.7
2009	234	10.5	9.0	9.8	10.4
2010	213	9.5	8.5	9.1	9.5
2011	206	9.0	7.9	8.6	9.1
2012	223	9.8	8.8	9.4	9.9
2013	237	10.4	9.4	10.0	10.6
2014	186	8.1	7.4	8.0	8.4
1998-2014	3330	10.4	9.0	9.7	10.2

The computation of the incidence measures includes all primaries, 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	132	36.8	10.3	1.3	59.4	24.2	30.9	36.4	43.5	51.7
1999	117	37.0	11.3	18.8	74.7	25.1	30.3	34.9	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	232	38.7	12.4	0.5	84.6	25.8	30.5	37.7	44.5	55.2
2005	219	39.2	12.3	2.8	88.6	26.2	31.4	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	264	37.7	12.4	0.1	95.0	24.8	29.6	36.1	43.5	52.9
2008	195	39.1	12.1	15.9	83.8	24.4	29.7	38.4	45.1	55.5
2009	234	39.7	12.6	16.8	82.0	24.5	31.1	38.4	46.5	55.6
2010	213	38.0	11.5	16.4	80.2	24.8	29.9	36.4	44.0	51.8
2011	206	38.6	11.8	18.9	77.0	24.4	29.7	37.0	46.3	52.2
2012	223	38.1	11.9	2.6	78.8	23.9	30.0	37.4	45.4	51.7
2013	237	38.0	11.6	0.9	83.1	23.8	29.9	36.8	45.8	52.9
2014	186	38.6	12.9	15.5	88.4	24.0	28.4	36.6	48.1	54.9
1998-2014	3330	38.2	11.9	0.1	95.0	24.5	30.0	36.9	44.5	53.3

Table 4

Age distribution by 5-year age group for period 2007-2014
(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	0.1	0.3
15-19	46	2.6	2.9
20-24	153	8.7	11.6
25-29	251	14.3	25.9
30-34	296	16.8	42.7
35-39	288	16.4	59.1
40-44	261	14.8	73.9
45-49	192	10.9	84.9
50-54	114	6.5	91.4
55-59	58	3.3	94.7
60-64	37	2.1	96.8
65-69	23	1.3	98.1
70-74	16	0.9	99.0
75-79	8	0.5	99.4
80-84	7	0.4	99.8
85+	3	0.2	100.0
All ages	1758	100.0	

Included in the statistics are 10.6% multiple primaries.

Table 5

Age-specific incidence, DCO rate and proportion of all cancers for period 2007-2014

Age at diagnosis Years	Cases n	Age-spec. incidence	DCO rate n=11 %	Prop. all cancers n=91183 %
0- 4	4	0.5		2.2
5- 9		0.0		
10-14	1	0.1		1.0
15-19	46	4.8		21.3
20-24	151	13.6		40.5
25-29	248	20.5		44.4
30-34	289	23.2		37.4
35-39	287	22.0		24.9
40-44	260	16.0	0.4	14.2
45-49	191	12.1		5.9
50-54	113	8.7	0.9	2.3
55-59	58	5.5		0.8
60-64	37	3.8	2.7	0.3
65-69	23	2.4	8.7	0.1
70-74	16	1.8		0.1
75-79	8	1.5	12.5	0.1
80-84	7	2.0	42.9	0.1
85+	3	1.3	66.7	0.0
All ages	1742		0.6	1.9
Incidence				
Raw		9.6		
WS		8.6		
ES		9.2		
BRD-S		9.7		

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).

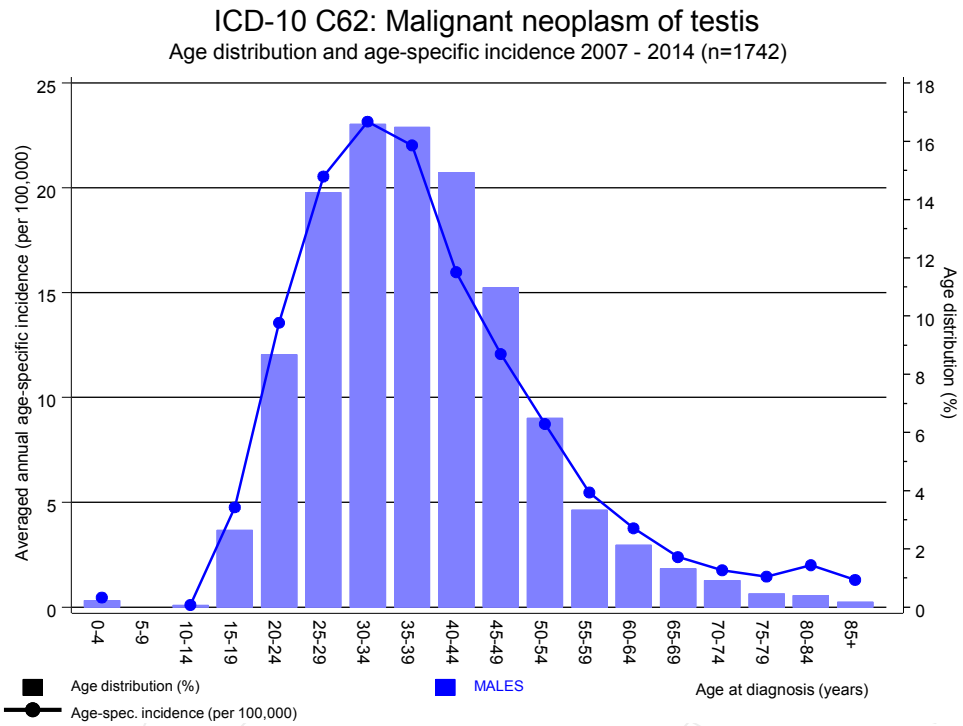

Figure 6. Age distribution and age-specific incidence

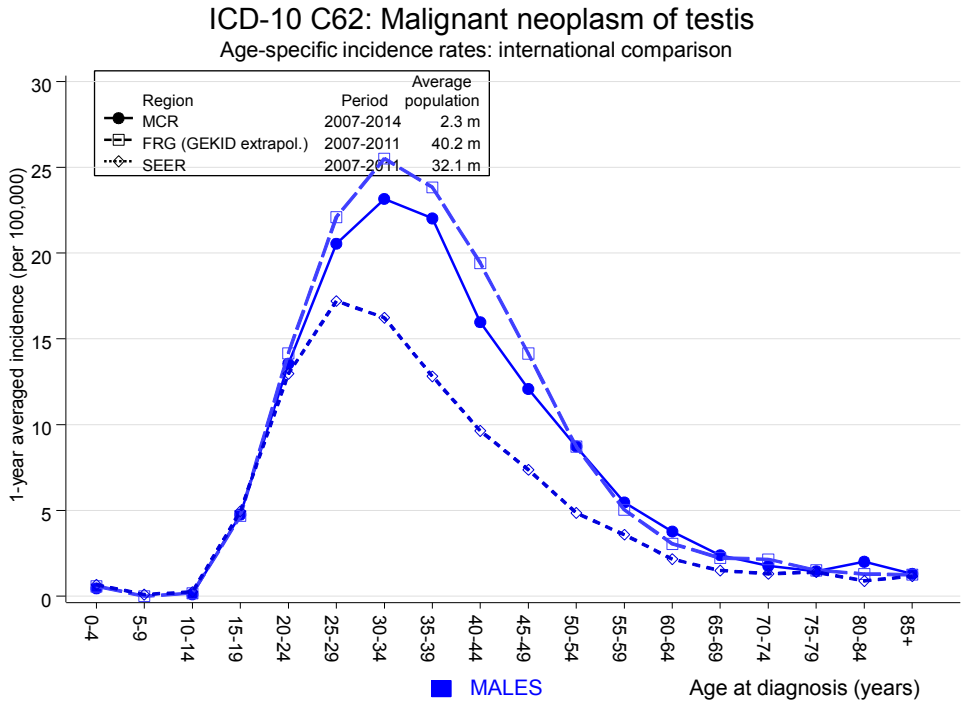

Figure 6a. Age-specific incidence in MCR registry areas compared to Germany (FRG, GEKID extrapolation) and SEER (Surveillance, Epidemiology, and End Results, USA).

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.

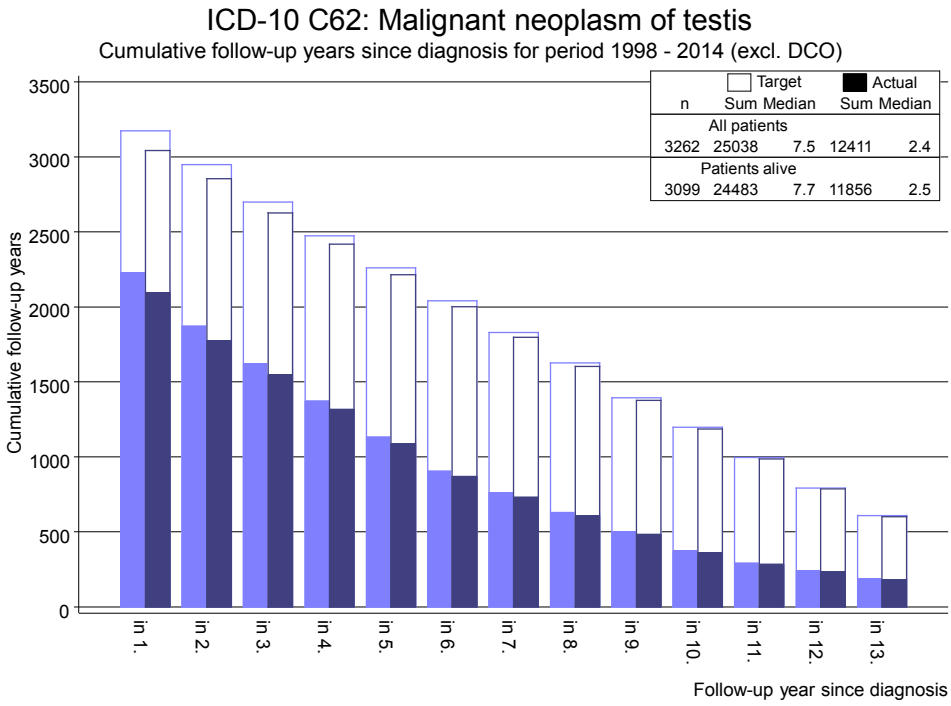

Figure 7. Cumulative follow-up years depending on time since diagnosis

The increase of the lost to follow-up rate can be interpreted as a consequence of a declining number of survivors over time.

Table 8

Standardized incidence ratio (SIR, with 95% confidence limits), excess absolute risk (EAR) and DCO rate of second primaries for period 1998-2014

Diagnosis	Observed n	Expected n	SIR	LCL 95%	UCL 95%		EAR	DCO %
C03-C06 Oral cavity	2	0.6	3.4	0.4	12.4		1.2	
C09-C10 Oropharynx	2	0.7	3.0	0.4	10.9		1.1	
C12-C13 Hypopharynx	2	0.4	5.7	0.7	20.4		1.3	
C16 Stomach	2	1.0	1.9	0.2	6.9		0.8	
C18 Colon	3	2.3	1.3	0.3	3.9		0.6	
C19-C20 Rectum	4	1.7	2.3	0.6	5.9		1.9	
C22 Liver	5	0.7	7.1	2.3	16.5	#	3.5	
C25 Pancreas	2	0.9	2.2	0.3	8.1		0.9	
C32 Larynx	2	0.4	4.9	0.6	17.6		1.3	50.0
C33-C34 Lung	8	3.2	2.5	1.1	4.9	#	3.9	
C43 Malign. melanoma	7	2.4	2.9	1.2	5.9	#	3.7	
C61 Prostate	18	6.1	2.9	1.7	4.7	#	9.7	
C62 Testis	67	2.1	31.6	24.5	40.1	#	53.1	
C64 Kidney	9	1.3	6.7	3.1	12.7	#	6.3	
C67 Bladder	2	0.9	2.3	0.3	8.5		0.9	
C70-C72 CNS cancer	6	0.9	6.9	2.5	14.9	#	4.2	33.3
C73 Thyroid	4	0.7	5.6	1.5	14.4	#	2.7	
C76-C79 CUP	3	0.5	6.5	1.3	18.9	#	2.1	
C81 Hodgkin lymphoma	2	0.4	5.0	0.6	18.2		1.3	
C82-C85 NHL	3	1.5	2.0	0.4	6.0		1.2	
C91-C96 Leukaemia	5	0.6	8.3	2.7	19.5	#	3.6	20.0
Other primaries	11	2.1	5.2	2.6	9.3	#	7.3	
Not observed	0	0.7	0.0	0.0	4.9		-0.6	
All mult. primaries	169	32.1	5.3	4.5	6.1	#	112.0	2.4

Patients	3167
Median age at second malignancy (years)	46.9
Person-years	12228
Mean observation time (years)	3.9
Median observation time (years)	2.5

The occurrence of second malignancy is statistically significant.

Observed second primaries with count 1 are pooled in category “Other primaries”

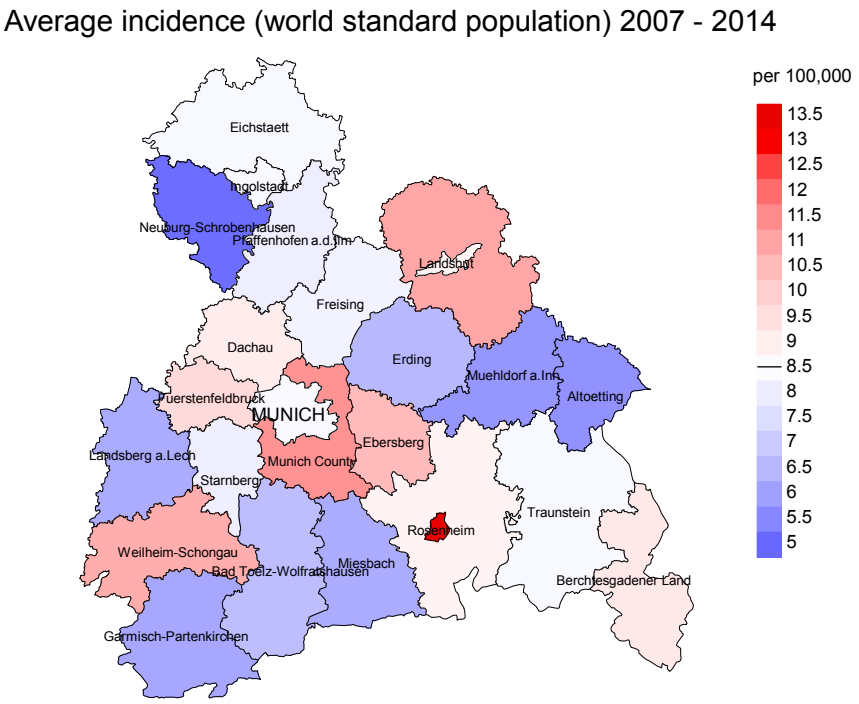

Figure 9a. Map of cancer incidence (world standard population, incl. DCO cases) by county averaged for period 2007 to 2014. According to their individual incidence rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (8.5/100,000 WS N=1,742).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 63,886 male residents (averaged) in the period from 2007 to 2014 a total of 52 men were identified with newly diagnosed testicular cancer. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 10.5/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 6.9 and 15.3/100,000.

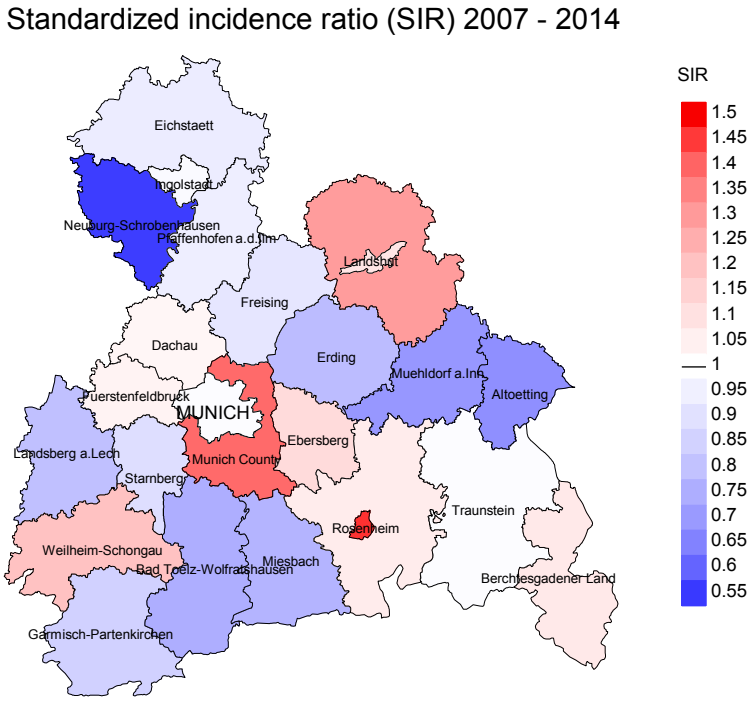

Figure 9b. Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2007 to 2014. According to their individual SIR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (N=1,742).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 63,358 male residents (averaged) in the period from 2007 to 2014 a total of 52 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 1.12. Though, the value of this parameter may vary with an underlying probability of 99% between 0.76 and 1.59, and is therefore not statistically striking.

MORTALITY

Table 10a

Patient cohorts of incident cancers by year of diagnosis, follow-up status, proportion of DCO, deaths among the annual cohorts and proportion of available death certificates (with respect to registry area expansion from 2.51 to 3.96 m as of 2002, and from 3.96 to 4.64 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	132	96.2	1.5	14	10.6	100.0
1999	117	94.0		8	6.8	100.0
2000	124	91.9	0.8	9	7.3	100.0
2001	131	90.8	0.8	8	6.1	100.0
2002	219	93.6	0.5	18	8.2	100.0
2003	202	97.0	0.5	16	7.9	100.0
2004	232	93.5	2.2	19	8.2	100.0
2005	219	93.2	2.7	19	8.7	89.5
2006	196	85.2	2.0	14	7.1	100.0
2007	264	59.5	0.4	22	8.3	100.0
2008	195	40.0	1.0	14	7.2	100.0
2009	234	43.2	0.4	15	6.4	93.3
2010	213	43.2	0.9	10	4.7	100.0
2011	206	40.8		2	1.0	100.0
2012	223	40.8	0.9	9	4.0	100.0
2013	237	99.6	0.4	6	2.5	100.0
2014	186	97.8	1.1	2	1.1	100.0
1998-2014	3330	74.5	1.0	205	6.2	98.5

Table 10b

Annual cohorts of incident cancers and deaths, proportion of death certificates and cases deceased the same year of cancer diagnosis
(incl. DCO)
(with respect to registry area expansion from 2.51 to 3.96 m as of 2002, and from 3.96 to 4.64 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	132	9	100.0	3	2.3
1999	117	17	82.4	1	0.9
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	232	19	84.2	5	2.2
2005	219	33	93.9	9	4.1
2006	196	25	92.0	4	2.0
2007	264	28	96.4	4	1.5
2008	195	29	100.0	5	2.6
2009	234	35	97.1	3	1.3
2010	213	32	93.8	4	1.9
2011	206	37	100.0		
2012	223	30	100.0	4	1.8
2013	237	46	97.8	4	1.7
2014	186	29	100.0	2	1.1
1998-2014	3330	436	96.6	64	1.9

Table 10c

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 2.51 to 3.96 m as of 2002, and from 3.96 to 4.64 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	78.9	21.1	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	35	74.3	25.7	73.5
2010	32	62.5	37.5	66.7
2011	37	75.7	24.3	81.1
2012	30	60.0	40.0	60.0
2013	46	65.2	34.8	62.2
2014	29	55.2	44.8	69.0
1998-2014	436	69.0	31.0	75.8

Table 11

Medians of age at death according to the grouping in Table 10

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	63.1	63.6	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	35	59.4	58.2	65.8	59.5
2010	32	62.4	63.8	58.7	61.0
2011	37	61.8	62.8	53.4	62.8
2012	30	60.4	59.3	61.9	58.3
2013	46	56.5	56.2	63.1	55.1
2014	29	63.7	64.9	59.6	66.3
1998-2014	436	60.2	59.4	62.0	59.9

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 12

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	15	0.8	0.06	0.6	0.05	0.7	0.06	0.8	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	0.04	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	26	1.2	0.11	0.7	0.08	1.0	0.10	1.1	0.11
2010	20	0.9	0.09	0.5	0.06	0.7	0.08	0.8	0.09
2011	28	1.2	0.14	0.8	0.10	1.0	0.12	1.2	0.13
2012	18	0.8	0.08	0.5	0.05	0.6	0.07	0.7	0.07
2013	30	1.3	0.13	0.9	0.10	1.2	0.12	1.3	0.12
2014	16	0.7	0.09	0.4	0.06	0.6	0.07	0.6	0.08
1998-2014	301	0.9	0.09	0.6	0.07	0.8	0.08	0.9	0.09

Table 13

Age distribution of age at death (cancer-related) for period 2007-2014
(**incl. multiple primaries**)

Age at death Years	Cases n	%	Cum.%
15-19	1	0.6	0.6
20-24	4	2.3	2.8
25-29	3	1.7	4.5
30-34	7	4.0	8.5
35-39	9	5.1	13.6
40-44	10	5.6	19.2
45-49	11	6.2	25.4
50-54	22	12.4	37.9
55-59	21	11.9	49.7
60-64	20	11.3	61.0
65-69	26	14.7	75.7
70-74	20	11.3	87.0
75-79	11	6.2	93.2
80-84	10	5.6	98.9
85+	2	1.1	100.0
All ages	177	100.0	

Included in the statistics are 10.6% multiple primaries.

Table 14

Age-specific mortality (cancer-related) and proportion of all cancers
for period 2007-2014
(**incl. multiple primaries**)

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	2.8
20-24	4	0.4	0.03	8.3
25-29	3	0.2	0.01	4.8
30-34	7	0.6	0.02	8.0
35-39	9	0.7	0.03	5.1
40-44	10	0.6	0.04	2.2
45-49	11	0.7	0.06	1.1
50-54	22	1.7	0.19	1.2
55-59	21	2.0	0.36	0.7
60-64	20	2.0	0.54	0.4
65-69	26	2.7	1.13	0.4
70-74	20	2.2	1.25	0.2
75-79	11	2.0	1.38	0.1
80-84	10	2.9	1.43	0.1
85+	2	0.9	0.67	0.0
All ages	177			0.4
Mortality				
Raw		1.0	0.10	
WS		0.6	0.07	
ES		0.8	0.09	
BRD-S		0.9	0.09	
PYLL-70				
per 100,000		14.4		
ES		13.2		
AYLL-70		17.2		

The rates underestimate the prognosis if other synchronous cancers are prognostic unfavorable.

Table 15

Multiple primaries in deaths in period 1998-2014

Diagnosis	Total n	Total %↓	Pre n	Pre ←%	Syn-chron ±30d n	Syn-chron ±30d ←%	Post n	Post ←%
C03-C06 Oral cavity	4	1.7					4	100.0
C09-C10 Oropharynx	6	2.6	1	16.7			5	83.3
C15 Oesophagus	3	1.3			1	33.3	2	66.7
C16 Stomach	10	4.3	2	20.0			8	80.0
C18 Colon	11	4.7	2	18.2			9	81.8
C19-C20 Rectum	11	4.7	1	9.1			10	90.9
C22 Liver	8	3.4					8	100.0
C23-C24 Bile	5	2.1					5	100.0
C25 Pancreas	14	6.0					14	100.0
C32 Larynx	5	2.1					5	100.0
C33-C34 Lung	40	17.1	2	5.0	1	2.5	37	92.5
C43 Malign. melanoma	5	2.1	2	40.0			3	60.0
C44 Skin others	4	1.7					4	100.0
C46,C49 Soft tissue	6	2.6	2	33.3			4	66.7
C61 Prostate	26	11.1	7	26.9	1	3.8	18	69.2
C62 Testis	4	1.7					4	100.0
C64 Kidney	3	1.3					3	100.0
C67 Bladder	11	4.7					11	100.0
C70-C72 CNS cancer	10	4.3	2	20.0	2	20.0	6	60.0
C76-C79 CUP	8	3.4					8	100.0
C82-C85 NHL	11	4.7	2	18.2	1	9.1	8	72.7
C90 Mult. myeloma	3	1.3			1	33.3	2	66.7
C91-C96 Leukaemia	12	5.1	1	8.3			11	91.7
Other primaries	14	6.0			1	7.1	13	92.9
All mult. primaries	234	100.0	24	10.3	8	3.4	202	86.3

Multiple primaries with number of cases 1 to 2 are pooled in category “Other primaries”

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 multiple malignancy.

Table 16

Age-specific mortality (cancer-related) and proportion of all cancers
for period 2007-2014
(**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	3.0
20-24	4	0.4	0.03	9.3
25-29	2	0.2	0.01	3.6
30-34	7	0.6	0.03	8.1
35-39	9	0.7	0.03	5.5
40-44	10	0.6	0.04	2.4
45-49	10	0.6	0.06	1.1
50-54	21	1.6	0.20	1.3
55-59	18	1.7	0.34	0.7
60-64	18	1.8	0.60	0.5
65-69	24	2.5	1.60	0.4
70-74	16	1.8	1.60	0.2
75-79	8	1.5	2.00	0.1
80-84	7	2.0	7.00	0.1
85+	2	0.9	2.00	0.0
All ages	157			0.4
Mortality				
Raw		0.9	0.10	
WS		0.6	0.07	
ES		0.7	0.09	
BRD-S		0.8	0.09	
PYLL-70				
per 100,000		13.5		
ES		12.3		
AYLL-70		17.5		

* See corresponding tables with multiple primaries.

Table 17

Age-specific mortality (cancer-related) and proportion of all cancers
for period 2007-2014
(**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	3.0
20-24	4	0.4	0.03	10.3
25-29	2	0.2	0.01	3.9
30-34	7	0.6	0.03	8.2
35-39	7	0.5	0.03	4.4
40-44	9	0.6	0.04	2.3
45-49	8	0.5	0.05	0.9
50-54	3	0.2	0.03	0.2
55-59	4	0.4	0.08	0.2
60-64	6	0.6	0.21	0.2
65-69	10	1.0	0.67	0.2
70-74	3	0.3	0.43	0.1
75-79	2	0.4	0.50	0.0
80-84	2	0.6	2.00	0.0
85+	1	0.4	1.00	0.0
All ages	69			0.2
Mortality				
Raw		0.4	0.04	
WS		0.3	0.04	
ES		0.3	0.04	
BRD-S		0.4	0.04	
PYLL-70				
per 100,000		8.8		
ES		8.1		
AYLL-70		23.2		

* See corresponding tables with multiple primaries.

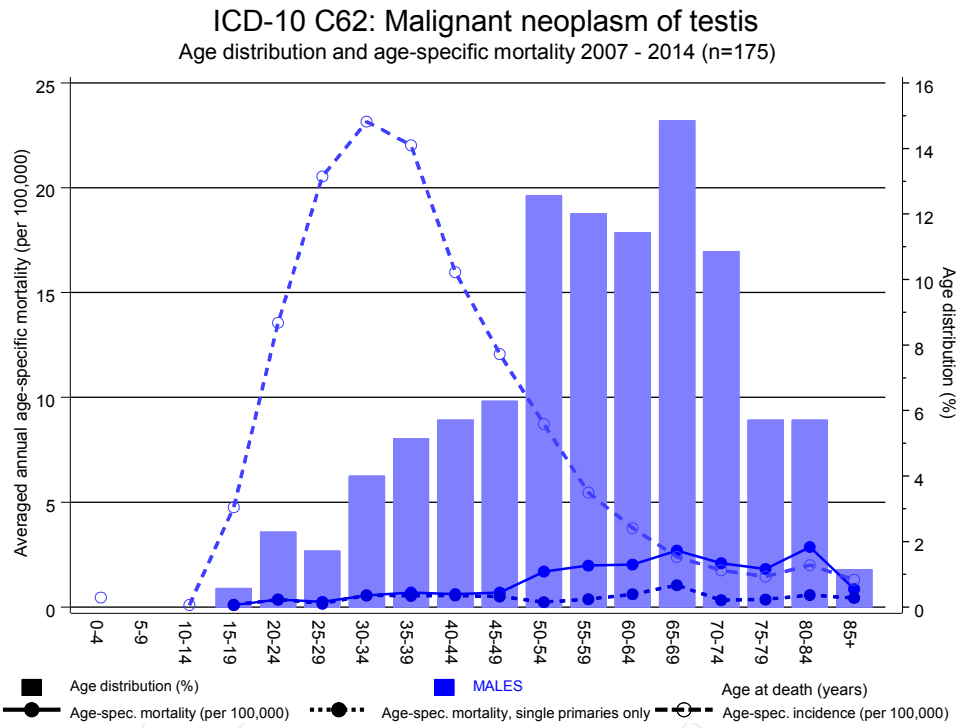

Figure 18. Distribution of age at death (bars) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

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 - 2014

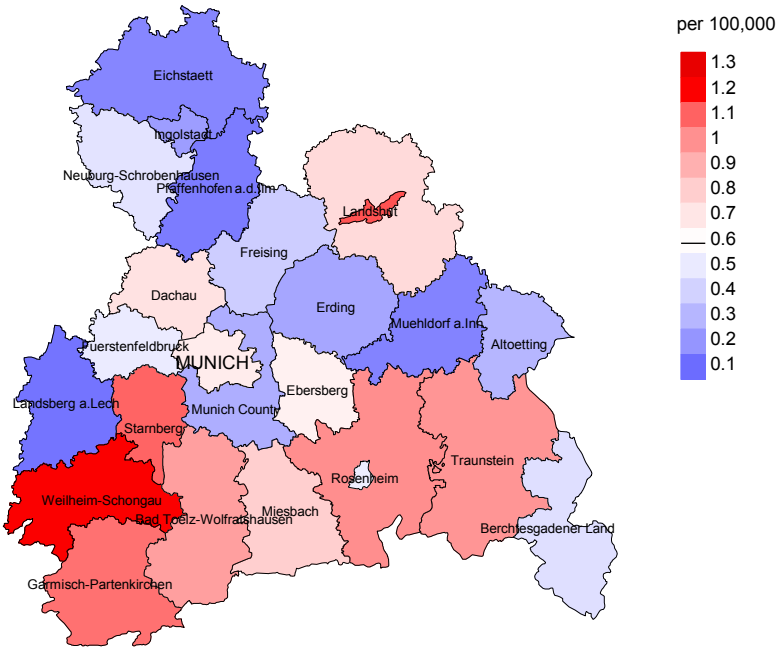

Figure 19a. Map of cancer mortality (world standard population) by county averaged for period 2007 to 2014. According to their individual mortality rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (0.6/100,000 WS N=169).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 63,886 male residents (averaged) in the period from 2007 to 2014 a total of 5 men died from testicular cancer. Therefore, the mean mortality rate for this cancer type in this area can be calculated at 0.6/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 0.1 and 2.6/100,000.

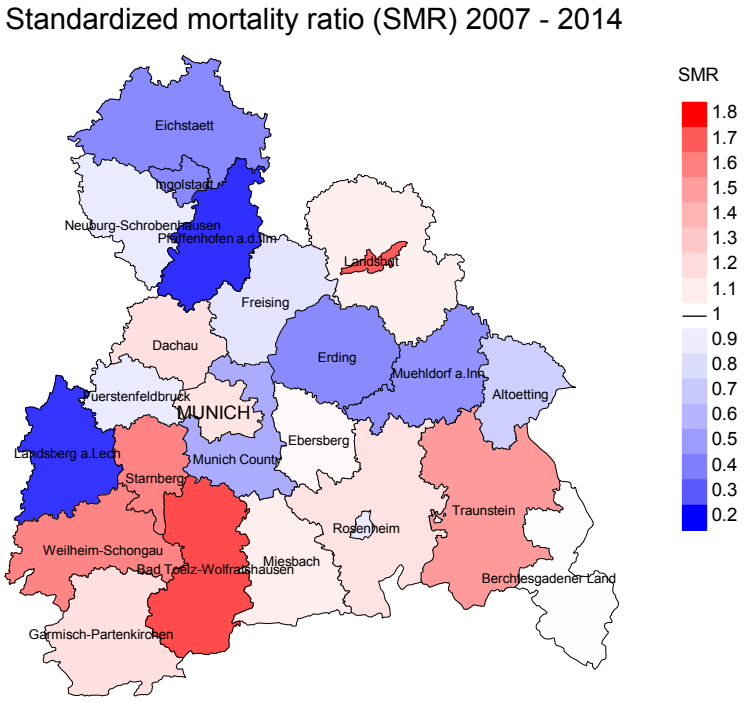

Figure 19b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2007 to 2014. According to their individual SMR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (N=169).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 63,358 male residents (averaged) in the period from 2007 to 2014 a total of 5 men died from testicular cancer. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 1.04. Though, the value of this parameter may vary with an underlying probability of 99% between 0.22 and 2.95, 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

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

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