# **Munich Cancer Registry**



- ▶ Survival
- ▶ Selection Matrix
- ▶ Homepage

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

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

# **Cancer statistics: Baseline statistics**

# **C62: Testicular cancer**

Year of diagnosis	1998-2011
Patients	2559
Diseases	2604
Creation date	04/02/2013
Export date	01/03/2013
Population (males)	2.2 m



http://www.tumorregister-muenchen.de/en/facts/base/base\_C62\_\_E.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<sup>#</sup>, with a total of 4.5 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\*\*\*\* 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. The time-delayed acquisition of data and the occasionally high DCO-rates indicate optimizing reserves, among others, because of current financial and legal conditions that hinder the analyses.

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 2013

- 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). Death certificates from 2011 are incorporated into these analyses.
- 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. A high proportion of DCO cases (≥5%) in particular cancer types indicate insufficient participation of specific cancer specializations.



## **INCIDENCE**

Table 1

Patient cohorts by year of diagnosis including DCO cases and multiple primaries, and with proportion of deaths and active follow-up

				Prop.		Prop.
		DCO	Prop.	mult.	Prop.	actively
Year of	Cases #	cases	DCO	primaries	deaths	followed
diagnosis	n	n	%	%	%	%
1998	131	/ 2 /	1.5	9.9	9.2	97.7
1999	117			11.1	4.3	95.7
2000	124	1	0.8	8.9	6.5	93.5
2001	131	1	0.8	5.3	5.3	91.6
2002	220	1	0.5	11.8	7.3	94.1
2003	201	1	0.5	9.5	7.5	97.0
2004	231	5	2.2	11.3	6.9	93.5
2005	216	6	2.8	10.2	7.9	93.5
2006	195	4	2.1	11.8	5.1	88.2
2007	266	1	0.4	13.2	7.1	65.4 ##
2008	192	2	1.0	8.9	5.7	41.7
2009	222	1	0.5	11.7	5.0	50.5
2010	202	2	1.0	6.9	3.0	92.6
2011	156			7.1		75.6 ###
1998-2011	2604	27	1.0	10.1	5.9	82.1

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

<sup>##</sup> Since 2007 the percentage of actively followed patients sharply declined compared to the previous years. This is a consequence of ambiguous data protection rules that currently forbid cancer registries in Bavaria to obtain the essential life status informations from competent registration offices.

<sup>###</sup> Please be aware that data of recent annual patient cohorts may not yet be fully processed. Therefore, the presented figures and tables are potentially related to different time periods as pointed out in the respective headlines or legends.

subsequent malignancy.

Table 2

Incidence measures by year of diagnosis and gender including DCO cases (with respect to registry area expansion from 2.51 to 3.96 m as of 2002, and from 3.96 to 4.52 m as of 2007, respectively)

Year of	Cases	Incidence	Incidence	Incidence	Incidence
diagnosis	n	raw	WS	ES	BRD-S
1998	131	11/.8	9.7	10.4	10.7
1999	117	10.5	8.4	9.0	9.4
2000	124	10.9	9.4	9.8	10.3
2001	131	11.3	9.5	10.0	10.6
2002	220	11.8	9.6	10.5	11.1
2003	201	10.7	9.2	9.8	10.3
2004	231	12.3	10.4	11.2	11.8
2005	216	11.4	9.6	10.4	10.8
2006	195	10.2	8.7	9.4	10.0
2007	266	12.0	10.7	11.4	11.9
2008	192	8.6	7.5	8.1	8.5
2009	222	9.9	8.5	9.3	9.8
2010	202	9.0	8.1	8.7	9.0
2011	156	6.9	6.1	6.6	7.0
1998-2011	2604	10.4	8.9	9.5	10.0



Table 3

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

Year of	Cases		Std.					Median		
diagnosis	n	Mean	dev.	Min.	Max.	10%	25%	50%	75%	90%
1998	131	36.7	10.3	1.3	59.4	24.2	30.6	36.4	43.2	51.7
1999	117	37.0	11.3	18.8	74.7	25.1	30.3	34.9	40.6	55.3
2000	124	35.8	11.1	14.4	85.1	23.5	28.2	34.4	41.2	49.6
2001	131	36.7	11,5	15.1	79.0	23.9	29.6	35.2	41.0	49.9
2002	220	38.6	11.4	19.1	93.5	25.3	31.4	37.0	43.8	49.8
2003	201	37.4	11.6	4.2	75.2	25.0	29.2	35.6	42.2	52.4
2004	231	38.8	12.4	0.5	84.6	25.8	30.5	37.7	44.7	55.2
2005	216	39.2	12.2	2.8	88.6	26.2	31.5	37.9	44.7	54.6
2006	195	38.2	11.9	18.6	86.7	23.2	30.3	37.3	43.8	53.3
2007	266	37.8	12.4	0.1	95.0	24.6	29.7	36.1	43.8	52.9
2008	192	39.0	12.2	15.9	83.8	24.4	29.6	38.3	44.3	55.5
2009	222	39.7	12.6	16.8	82.0	24.5	31.1	38.5	46.5	55.6
2010	202	37.7	11.3	16.4	74.6	24.3	29.5	36.1	43.8	51.2
2011	156	38.5	11.5	20.0	75.7	25.3	29.4	37.2	46.1	52.2
1998-2011	2604	38.1	11.8	0.1	95.0	24.6	30.2	36.9	43.9	52.9

Table 4  $\label{eq:Age_distribution} \mbox{Age distribution by 5-year age group for period 1998-2011} \mbox{ (incl. DCO)}$ 

Age at			
diagnosis	Cases		
Years	n	%	Cum.%
0-4	6	0.2	0.2
5-9	/ 1	0.0	0.3
10-14	/ 3	0.1	0.4
15-19	63	2.4	2.8
20-24	207	7.9	10.8
25-29	352	13.5	24.3
30-34	471	18.1	42.4
35-39	544	20.9	63.2
40-44	386	14.8	78.1
45-49	230	8.8	86.9
50-54	114	4.4	91.3
55-59	81	3.1	94.4
60-64	61	2.3	96.7
65-69	36	1.4	98.1
70-74	22	0.8	99.0
75-79	9	0.3	99.3
80-84	12	0.5	99.8
85+	6	0.2	100.0
All ages	2604	100.0	

Included in the statistics are 9.4% multiple primaries.

Table 5

Age-specific incidence, DCO rate and proportion of all cancers for period 1998-2011

Age at			DCO rate	Prop. all cancers	
diagnosis	Cases	Age-spec.	n=27	n=132509	
Years	n	incidence	8	%	
0- 4	6	0.5		2.1	
5- 9	1/	0.1		0.6	
10-14	3	0.2		2.3	
15-19	63	4.8		21.6	
20-24	205	13.8		40.4	
25-29	349	20.6		43.4	
30-34	467	24.0		35.8	
35-39	539	24.7	0.2	27.3	
40-44	386	17.3	0.8	14.0	
45-49	229	11.8	1.3	5.1	
50-54	114	6.8	2.6	1.6	
55-59	81	5.2		0.6	
60-64	61	4.0	6.6	0.3	
65-69	36	2.6	8.3	0.2	
70-74	22	2.1	9.1	0.1	
75-79	9	1.3	11.1	0.1	
80-84	12	3.0	50.0	0.1	
85+	6	2.2	16.7	0.1	
All ages	2589		1.0	2.0	
Incidence					
Raw		10.3			
WS		8.8			
ES		9.5			
BRD-S		10.0			
DRD D		10.0			

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).

Table 6

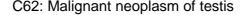
Standardized incidence ratio (SIR, with 95% confidence limits), excess absolute risk (EAR) and DCO rate of second primaries for period 1998-2011

	Observed Ex	xpected	LCL UCL		DCO
Diagnosis	n	n SI	IR 95% 95%	EAR	%
C09-C10 Oropharynx	2	0.5 4.	1 0.5 14.8	1.6	
C19-C20 Rectum	3 /	1.2 2.	4 0.5 7.1	1.9	
C22 Liver	/ 2 /	0.5 4.	1 0.5 14.9	1.6	
C25 Pancreas	2 /	0.6 3.	2 0.4 11.7	1.5	
C32 Larynx	/ 2/	0.3 6	6 0.8 24.0	1.8	50.0
C33-C34 Lung	4	2.3 1.	7 0.5 4.5	1.8	
C43 Malign. melanoma		1.7 3.	6 1.3 7.9 #	4.7	
C61 Prostate	7	4.1 /1.	7 0.7 3.5	3.2	
C62 Testis	42	1.7 25.	3 /18.3 34.2 #	43.4	
C64 Kidney	5	0.9 5.	1.7 12.4 #	4.4	
C70-C72 CNS cancer	2	0.7 3.	0.4 10.9	1.4	
C73 Thyroid	2	0.5 3.	9 0.5 14.2	1.6	
C82-C85 NHL	2	1.1 1.	9 0.2 6.9	1.0	
C91-C96 Leukaemia	5	0.4 11.	5 3.7 26.8 #	4.9	20.0
Other primaries	8	4.1 2.	0 0.8 3.9	4.2	
Not observed	0	2.2 0.	0.0 1.7	-2.4	
All mult. primaries	94	22.7 4.	1 3.4 5.1 #	76.8	2.1

Patients	1924
Mean age at second malignancy (years)	47.1
Person-years	9291
Mean observation time (years)	4.8
Median observation time (years)	4.3

# The occurrence of second malignancy is statistically significant.

Observed second primaries with count 1 are pooled in category "Other primaries".



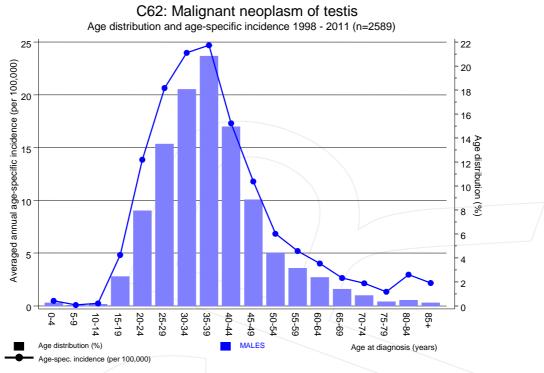
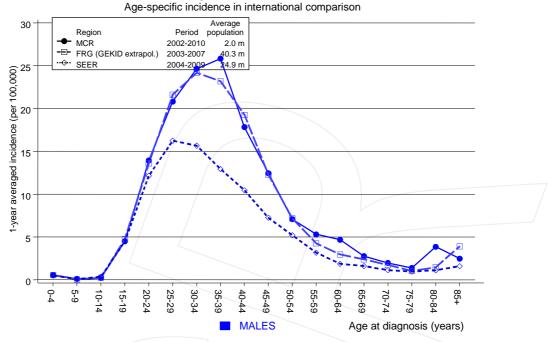


Figure 7. Age distribution and age-specific incidence



# C62: Malignant neoplasm of testis



**Figure 7a.** 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, 2011. http://www.gekid.de. Last access: 05/12/2011

Surveillance, Epidemiology, and End Results (SEER) Program SEER\*Stat Database: Incidence - SEER 18 Regs Research Data, released April 2012, based on the November 2011 submission. http://www.seer.cancer.gov.

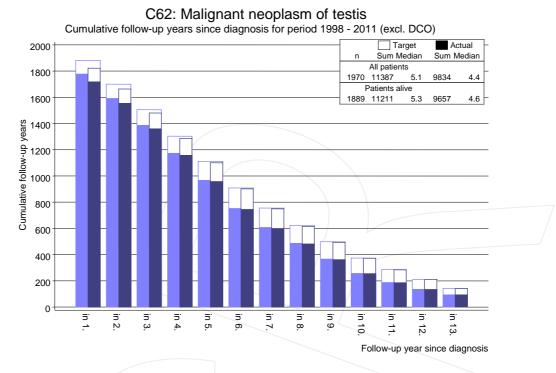


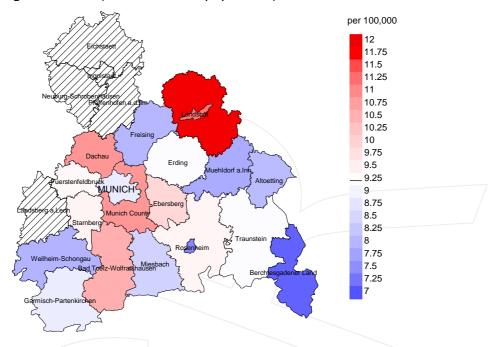
Figure 8. Cumulative follow-up years depending on time since diagnosis

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



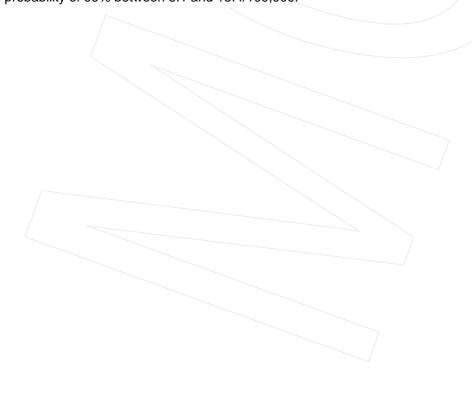
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### Average incidence (world standard population) 2003 - 2008

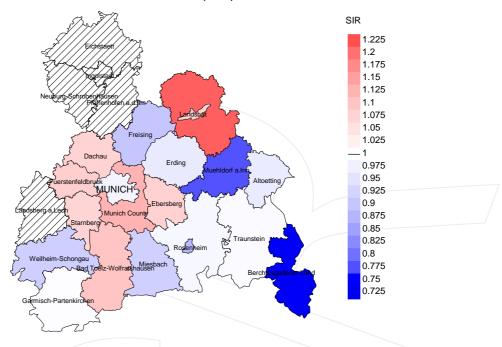


**Figure 9a.** Map of cancer incidence (world standard population, incl. DCO cases) by county averaged for period 2003 to 2008. According to their individual incidence rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (9.2/100,000 WS N=1,232). Since cancer data are not available in some counties until 2007, the local incidence rates were not calculated, and the map tiles show as shaded.

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 61,449 male residents (averaged) in the period from 2003 to 2008 a total of 41 men were identified with newly diagnosed testicular cancer. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 9.9/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 6.1 and 15.4/100,000.

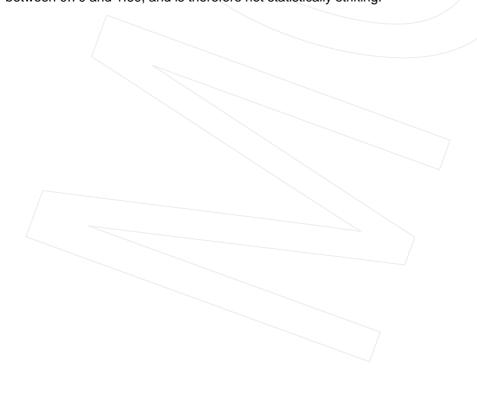


### Standardized incidence ratio (SIR) 2003 - 2008



**Figure 9b.** Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2003 to 2008. 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=1,232). Since cancer data are not available in some counties until 2007, the local SIR values were not calculated, and the map tiles show as shaded.

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 61,449 male residents (averaged) in the period from 2003 to 2008 a total of 41 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 1.08. Though, the value of this parameter may vary with an underlying probability of 99% between 0.70 and 1.60, 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 4.52 m as of 2007, respectively)

		Prop.				Prop. deaths
	Incident	actively	Prop.		Prop.	with death
Year of	cases	followed	DCO	Deaths	deaths	certific.
diagnosis	n	%	%	/ n /	%	%
1998	131	97.7	1.5	12	9.2	100.0
1999	117	95.7		5	4.3	100.0
2000	124	93.5	0.8	8	6.5	100.0
2001	131	91.6	0.8	7	5.3	100.0
2002	220	94.1	0.5	16	7.3	100.0
2003	201	97.0	0.5	15	7.5	100.0
2004	231	93.5	2.2	16	6.9	93.8
2005	216	93.5	2.8	17/	7.9	88.2
2006	195	88.2	2.1	10	5.1	100.0
2007	266	65.4	0.4	19	7.1	100.0
2008	192	41.7	1.0	11	5.7	100.0
2009	222	50.5	0.5	11	5.0	100.0
2010	202	92.6	1.0	6	3.0	100.0
2011	156	75.6				
1998-2011	2604	82.1	1.0	153	5.9	98.0

Table 10b

Annual cohorts of incident cancers and deaths, proportion of death certificates and cases deceased the same year of cancer diagnosis (incl. DCO)

			Prop.		
			deaths		Prop.
Year of	Incident		with death	Deaths in	deaths in
diagnosis/	cases	Deaths	certific.	same year	same year
death	n	n	%	n	8
1998	131	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	220	24	100.0	4	1.8
2003	201	22	100.0	6	3.0
2004	231	19	84.2	5	2.2
2005	216	33	93.9	9	4.2
2006	195	25	92.0	4	2.1
2007	266	29	96.6	5	1.9
2008	192	29	100.0	5	2.6
2009	222	35	97.1	_ 3	1.4
2010	202	32	93.8	4	2.0
2011	156	35	100.0		
1998-2011	2604	330	95.8	55	2.1

Table 10c

Annual cohorts of deaths, proportion of cancer-related and not 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 4.52 m as of 2007, respectively)

		Prop.	Prop.	Prop. cancer recorded on death	
Year of	Deaths	related	related	certificate	
death	n	%	96	%	
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	29	58.6	41.4	85.7	
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	35	74.3	25.7	80.0	
1998-2011	330	71.5	28.5	79.7	

Table 11

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

					Age at
		Age at	Age at	Age at	death
		death	death	death	(according
		(all	(cancer-	(not cancer-	to death
Year of	Deaths	causes)	related)	related)	certificate)
death	n	Years	Years	Years	Years
1998	9	51,9	56.0	43.5	51.9
1999	17	48.0	48.5	46.1	48.5
2000	6	48.8	34.8	62.9	41.4
2001	15	55.5	52.4	67.9	53.6
2002	24	64.2	63.3	74.7	63.3
2003	22	61.4	61.4	61.6	60.6
2004	19	57.7	55.4	66.5	57.7
2005	33	56.3	53.9	62.8	55.8
2006	25	59.3	55.1	63.1	55.9
2007	29	57.0	56.1	58.3	55.3
2008	29	60.5	57.9	67.6	59.0
2009	35	57.5	56.6	59.8	58.6
2010	32	60.4	60.5	60.4	58.6
2011	35	59.5	59.9	58.1	60.2
1998-2011	330	58.1	56.9	61.0	57.3



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

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 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011	6 14 3 12 22 18 15 24 12 17 21 26 20 26	0.5 1.3 0.3 1.0 1.2 1.0 0.8 1.3 0.6 0.8 0.9 1.2	0.05 0.12 0.02 0.09 0.10 0.09 0.07 0.11 0.06 0.06 0.11 0.12 0.10 0.17	0.4 0.9 0.3 0.8 0.7 0.6 0.6 0.9 0.5 0.5 0.7	0.04 0.10 0.03 0.09 0.08 0.07 0.05 0.09 0.05 0.05 0.09 0.05	0.5 1.1 0.3 1.0 1.1 0.8 0.7 1.1 0.6 0.7 0.8 1.0	0.10 0.10 0.09 0.06 0.10 0.06 0.10 0.10	0.5 1.2 0.2 1.3 1.0 0.8 1.2 0.7 0.7 0.9 1.1 0.8 1.1	0.05 0.13 0.02 0.11 0.12 0.09 0.07 0.11 0.07 0.06 0.11 0.09 0.16
1998-2011	236	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 1998-2011 (incl. multiple primaries)

Age at				
death	Cases			
Years	n	%	Cum.%	
5-9	1	0.4	0.4	
10-14	0	0.0	0.4	
15-19	/ 1	0.4	0.8	
20-24	9	3.8	4.6	
25-29	5	2.1	6.7	
30-34	7	2.9	9.7	
35-39	21	8.8	18.5	
40-44	16	6.7	25.2	
45-49	22	9.2	34.5	
50-54	21	8.8	43.3	
55-59	17	7.1	50.4	
60-64	35	14.7	65.1	
65-69	30	12.6	77.7	
70-74	19	8.0	85.7	
75-79	15	6.3	92.0	
80-84	11	4.6	96.6	
85+	8	3.4	100.0	
All ages	238	100.0		

Included in the statistics are 9.4% multiple primaries.

Table 14

Age-specific mortality (cancer-related) and proportion of all cancers for period 1998-2011

(incl. multiple primaries)

Age at				Prop. all	
death		Age-spec.		cancers	
Years	n / ı	mortality	MI-index	%	
0- 4		0.0			
5- 9	1/ /	0.1	1.00	3.2	
10-14		0.0			
15-19	/1 /	0.1	0.02	2.6	
20-24	9 /	0.6	0.04	11.3	
25-29	5 /	0.3	0.01	5.7	
30-34	7	0.4	0.01	4.2	
35-39	21	1.0	0.04	5.8	
40-44	16	0.7	0.04	2.1	
45-49	22	1.1	0.10	1.4	
50-54	21	1.3	0.18	0.7	
55-59	17	1.1	0.21	0.3	
60-64	35	2.3	0.57	0.5	
65-69	30	2.2	0.83	0.3	
70-74	19	1.8	0.86	0.3	
75-79	15	2.2	1.67	0.1	
80-84	11	2.7	0.92	0.1	
85+	8	2.9	1.33	0.1	
85+	ŏ	2.9	1.33	0.1	
All ages	238			0.4	
Mortality					
Raw		0.9	0.09		
WS		0.6	0.07		
ES		0.8	0.08		
BRD-S		0.9	0.09		
PYLL-70					
per 100,000		15.6			
ES		14.3			
AYLL-70		19.2			
		17.2			

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

Table 15

Multiple primaries in deaths in period 1998-2011

Diagnosis	Total n	Total %↓	Pre n	Pre ←%	Syn- chron ±30d n	Syn- chron ±30d ←%	Post n	Post ←%
C03-C06 Oral cavity	4	2.4					4	100.0
C07-C08 Salivary gland	1	0.6					1	100.0
C09-C10 Oropharynx	/3	1.8	1	33.3	\ 1	33.3	1	33.3
C15 Oesophagus	3	1.8	_	33.3	1	33.3	2	66.7
C16 Stomach	8	4.8	2	25.0		33.3	6	75.0
C17 Small intestine	2	1.2	2	23.0			2	100.0
C18 Colon	9 /	5.4	2	22.2			7	77.8
C19-C20 Rectum	8	4.8		22.2			8	100.0
C22 Liver	5	3.0					5	100.0
C23-C24 Bile	5	3.0					5	100.0
C25 Pancreas	7	4.2					7	100.0
C32 Larynx	3	1.8					3	100.0
C33-C34 Lung	31	18.7	2	6.5	1	3.2	28	90.3
C40-C41 Bone	1	0.6			1	100.0		
C43 Malign. melanoma	3	1.8	1	33.3			2	66.7
C44 Skin others	4	2.4					4	100.0
C46,C49 Soft tissue	6	3.6	2	33.3			4	66.7
C48 Peritoneal	1	0.6					1	100.0
C61 Prostate	19	11.4	4	21.1			15	78.9
C62 Testis	2	1.2					2	100.0
C64 Kidney	3	1.8					3	100.0
C65 Renal pelvis	1	0.6					1	100.0
C66 Ureter	1	0.6					1	100.0
C67 Bladder	6	3.6					6	100.0
C70-C72 CNS cancer	4	2.4	1	25.0			3	75.0
C73 Thyroid	2	1.2					2	100.0
C76-C79 CUP	6	3.6					6	100.0
C82-C85 NHL	7	4.2			1	14.3	6	85.7
C90 Mult. myeloma	3	1.8			1	33.3	2	66.7
C91-C96 Leukaemia	8	4.8	1_	12.5			7	87.5
All mult. primaries	166	100.0	16	9.6	6	3.6	144	86.7

Multiple primaries with number of cases n<1 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 1998-2011

(Singular primaries only \*)

Age at death	Cases	Age-spec.		Prop. all cancers	
Years	n	mortality	MI-index	%	
10012				v	
0 - 4		0.0			
5- 9		0.0			
10-14		0.0			
15-19	/1 /	0.1	0.02	2.9	
20-24	9 /	0.6	0.05	12.0	
25-29	5 /	0.3	0.02	6.2	
30-34	7 <	0.4	0.02	4.3	
35-39	20	0.9	0.04	5.9	
40-44	15	0.7	0.04	2.1	
45-49	20	1.0	0.09	1.4	
50-54	19	1.1	0.19	0.8	
55-59	14	0.9	0.19	0.3	
60-64	33	2.2	0.60	0.5	
65-69	27	2.0	1.00	0.3	
70-74	17	1.6	1.42	0.2	
75-79	14	2.1	4.67	0.2	
80-84	8	2.0	1.33	0.1	
85+	7	2.5	1.40	0.1	
All ages	216			0.4	
Mortality					
Raw		0.9	0.09		
WS		0.6	0.07		
ES		0.7	0.08		
BRD-S		0.8	0.09		
PYLL-70					
per 100,000		14.5			
ES		13.1			
AYLL-70		19.4			

<sup>\*</sup> See corresponding tables with multiple primaries.

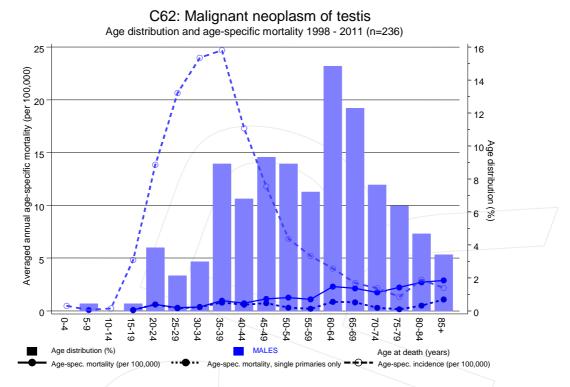
Table 17

Age-specific mortality (cancer-related) and proportion of all cancers for period 1998-2011

(Single primaries only \*)

Age at death	Cogog	Nac anca		Prop. all cancers	
		Age-spec.	МТ		
Years	n / r	mortality	MI-index	%	
0- 4		0.0			
5- 9		0.0			
10-14		0.0			
15-19	/1 /	0.1	0.02	2.9	
20-24	9	0.6	0.05	12.9	
25-29	4	0.2	0.01	5.3	
30-34	7	0.4	0.02	4.4	
35-39	17	0.8	0.03	5.2	
40-44	13	0.6	0.04	2.0	
45-49	14	0.7	0.07	1.1	
50-54	5	0.3	0.05	0.2	
55-59	3	0.2	0.04	0.1	
60-64	13	0.9	0.28	0.2	
65-69	11	0.8	0.44	0.2	
70-74	3	0.3	0.27	0.0	
75-79	1	0.1	0.33	0.0	
80-84	2	0.5	0.40	0.0	
85+	3	1.1	0.75	0.1	
All ages	106			0.2	
Mortality					
Raw		0.4	0.05		
WS		0.3	0.04		
ES		0.4	0.04		
BRD-S		0.4	0.04		
PYLL-70					
per 100,000		10.5			
ES		9.6			
AYLL-70		24.6			

<sup>\*</sup> See corresponding tables with multiple primaries.

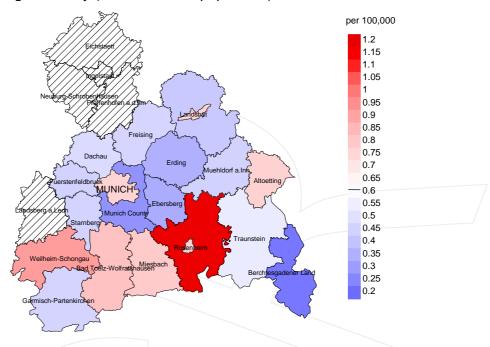


**Figure 18.** Distribution of age at death (bars) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

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) 2003 - 2008

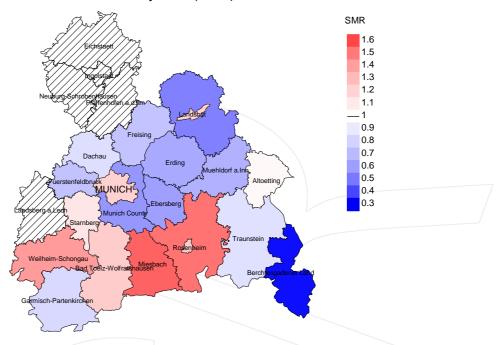


**Figure 19a.** Map of cancer mortality (world standard population) by county averaged for period 2003 to 2008. According to their individual mortality rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (0.6/100,000 WS N=104). Since cancer data are not available in some counties until 2007, the local mortality rates were not calculated, and the map tiles show as shaded.

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 61,449 male residents (averaged) in the period from 2003 to 2008 a total of 2 men died from testicular cancer. Therefore, the mean mortality rate for this cancer type in this area can be calculated at 0.3/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 0.0 and 1.6/100,000.



### Standardized mortality ratio (SMR) 2003 - 2008



**Figure 19b.** Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2003 to 2008. 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=104). Since cancer data are not available in some counties until 2007, the local SMR values were not calculated, and the map tiles show as shaded.

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 61,449 male residents (averaged) in the period from 2003 to 2008 a total of 2 men died from testicular cancer. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 0.60. Though, the value of this parameter may vary with an underlying probability of 99% between 0.03 and 2.80, 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. 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 tumor-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**

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) FRG Federal Republic of Germany

GEKID Association of Population-based Cancer Registries in Germany

(Gesellschaft der epidemiologischen Krebsregister in Deutschland e.V.)

LCL Lower confidence limit

MI-index Ratio between mortality and incidence

MCR Munich Cancer Registry (Tumorregister München)

PYLL-70 Potential years of life lost prior to age 70 given a person dies before that age

SEER Surveillance, Epidemiology, and End Results (USA)

SIR Standardized incidence ratio
SMR Standardized mortality ratio
UCL Upper confidence limit
WS World standard population

#### **Recommended Citation**

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