Munich Cancer Registry



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

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

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

Cancer statistics: Baseline statistics

D05: Breast cancer i.s. (women)

Year of diagnosis	1998-2013
Patients	4,524
Diseases	4,594
Creation date	05/19/2015
Export date	12/30/2014
Population (females)	2.36 m



http://www.tumorregister-muenchen.de/en/facts/base/base_D05f_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[#], 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. 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, May 2015

- 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 2014 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.
- 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.

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

Code	Description
D05	Carcinoma in situ of breast
D05.0	Lobular carcinoma in situ
D05.1	Intraductal carcinoma in situ
D05.7	Other carcinoma in situ of breast
D05.9	Carcinoma in situ of breast, unspecified

Gender: Female

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	%	8	રુ	%
1998	109			47.7	21.1	92.7
1999	127			40.9	22.8	98.4
2000	139			41.0	22.3	97.1
2001	163			46.6	17.2	98.8
2002	216			38.4	15.3	94.0 #
2003	218			35.8	10.6	96.3
2004	269			34.6	13.0	95.2
2005	312			32.7	8.3	95.8
2006	314			37.3	8.3	90.4
2007	345			37.4	5.8	78.3 # ##
2008	407			27.0	3.2	45.9
2009	406			27.8	7.4	48.0
2010	427			25.1	2.1	47.5
2011	411			23.6	2.9	53.3
2012	387			28.9	2.3	67.4
2013	344			22.4	0.6	98.3 ###
1998-2013	4594			31.7	7.6	75.0

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

^{##} 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.

^{###} 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.

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 4.64 m as of 2007, respectively)

Year of	Cases	Incidence	Incidence	Incidence	Incidence
diagnosis	n	raw	WS	ES	BRD-S
1998	109	9.3	6.2	8.1	8.7
1999	127	10.7	7.0	9.3	10.0
2000	139	11.6	7.1	9.7	10.6
2001	163	13.4	8.7	11.6	12.5
2002	216	11.0	7.3	9.7	10.5
2003	218	11.1	7.1	9.5	10.2
2004	269	13.6	8.3	11.2	12.1
2005	312	15.7	9.5	12.7	13.8
2006	314	15.6	9.8	13.1	14.2
2007	345	14.9	9.2	12.3	13.3
2008	407	17.5	10.9	14.6	15.4
2009	406	17.5	10.8	14.4	15.4
2010	427	18.2	11.5	15.5	16.4
2011	411	17.4	10.6	14.3	15.3
2012	387	16.4	10.1	13.6	14.6
2013	344	14.6	9.1	12.2	13.0
1998-2013	4594	14.8	9.2	12.4	13.3

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	Cases		Std.					Median		
diagnosis	n	Mean	dev.	Min.	Max.	10%	25%	50%	75%	90%
1998	109	56.7	10.9	28.5	89.2	43.9	49.3	56.3	62.3	69.0
1999	127	58.4	10.3	40.9	88.2	45.9	50.5	57.7	63.3	72.4
2000	139	59.6	12.0	30.9	85.6	43.9	51.1	59.0	67.8	77.5
2001	163	57.9	11.8	26.0	93.0	42.6	49.8	58.1	65.5	72.6
2002	216	58.4	11.2	34.3	88.8	45.5	50.1	57.9	65.1	74.2
2003	218	59.1	11.3	33.3	91.7	44,1	50.2	58.8	67.6	73.6
2004	269	60.8	10.8	32.5	90.7	46.8	53.5	62.1	67.6	74.1
2005	312	60.0	11.6	30.0	91.4	43.2	52.5	61.5	66.8	73.6
2006	314	59.5	10.8	33.8	84.9	45.5	50.9	61.0	67.3	73.2
2007	345	60.0	11.7	26.3	90.8	43.8	51.5	61.0	67.8	73.9
2008	407	59.4	11.4	34.0	92.5	43.7	51.1	59.6	67.6	71.7
2009	406	59.9	11.2	26.2	89.6	44.7	51.9	60.9	67.4	73.1
2010	427	59.1	10.7	27.2	89.8	45.0	51.6	59.3	66.9	72.6
2011	411	60.1	11.1	30.8	92.5	45.4	51.0	60.6	68.5	73.8
2012	387	60.1	11.5	31.1	92.7	46.8	50.9	60.1	67.7	74.5
2013	344	58.8	11.8	28.7	88.6	44.7	50.5	57.3	68.2	73.9
1998-2013	4594	59.5	11.3	26.0	93.0	44.8	51.2	59.7	67.4	73.5

Table 4

Age distribution by 5-year age group for period 1998-2013 (incl. DCO)

Age at					
diagnosis	Cas	es			
Years	'n		%	Cum.%	
25-29		8	0.2	0.2	
30-34		42	0.9	1.1	
35-39	/ 1	20	2.6	3.7	
40-44	3	80	6.7	10.4	
45-49	4	75	10.3	20.7	
50-54	6	91	15.0	35.8	
55-59	6	94	15.1	50.9	
60-64	7	71	16.8	67.7	
65-69	7	42	16.2	83.8	
70-74	3	68	8.0	91.8	
75-79	2	01	4.4	96.2	
80-84	1	.05	2.3	98.5	
85+		69	1.5	100.0	
All ages	45	94	100.0		

Included in the statistics are 36.7% multiple primaries.

Table 5

Age-specific incidence, DCO rate and proportion of all cancers for period 1998-2013

				Prop. all	
Age at			DCO rate	cancers	
diagnosis	Cases	Age-spec.	n=0	n=153136	
Years	n /	incidence	%	%	
0- 4		0.0			
5- 9		0.0			
10-14		0.0			
15-19		0.0			
20-24		0.0			
25-29	8	0.4		0.7	
30-34	42	1.9		2.0	
35-39	120	5.1		3.2	
40-44	303	12.2		4.9	
45-49	471	20.4		5.4	
50-54	688	33.5		6.2	
55-59	687	35.7		5.0	
60-64	767	40.9		4.4	
65-69	736	42.7		3.9	
70-74	366	24.1		2.0	
75-79	198	16.7		1.1	
80-84	103	11.0		0.7	
85+	69	7.7		0.4	
All ages	4558		0.0	3.0	
Incidence					
Raw		14.7			
WS		9.2			
ES		12.3			
BRD-S		13.2			

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).

Table 6

Standardized incidence ratio (SIR, with 95% confidence limits), excess absolute risk (EAR) and DCO rate of second primaries for period 1998-2013

	Observed	Expected		LCL	UCL		DCO
Diagnosis	n	n	SIR	95%	95%	EAR	%
C15 Oesophagus	2 /	1.0	2.1	0.2	7.4	0.6	
C16 Stomach	/ 4 /	4.4	0.9	0.2	2.3	-0.3	
C17 Small intestine	/ 2 /	0.8	2.5	0.3	9.1	0.7	
C18 Colon	16/	12.7	1.3	0.7	2.0	2.0	
C19-C20 Rectum	12	6.1	2.0	1.0	3.4 #	3.6	
C22 Liver	4	1.6	2.5	0.7	6.5	1.5	50.0
C23-C24 Bile	3	1.8	1.7/	0.3	4.8	0.7	
C25 Pancreas	19	5.7	3.3	2.0	5.2 #	8.0	10.5
C33-C34 Lung	23	11.7	2.0	1.2	2.9 #	6.8	
C43 Malign. melanoma	11	6.2	1.8	0.9	3.2	2.9	
C50 Breast	371	53.5	6.9	6.3	7.7 #	190.6	
C51 Vulva	4	1.3	3.1	0.8	8.0	1.6	
C54 Corpus uteri	20	9.1	2.2	1.3	3.4 #	6.5	5.0
C56 Ovary	11	6.4	1.7	0.9	3.1	2.7	9.1
C64 Kidney	4	3.6	1.1/	0.3	2.8	0.2	
C70-C72 CNS cancer	5	2.2	2.3	0.8	5.4	1.7	20.0
C73 Thyroid	3	3.6	0.8	0.2	2.4	-0.4	
C76-C79 CUP	2	2.2	0.9	0.1	3.3	-0.1	50.0
C82-C85 NHL	12	5.5	2.2	1.1	3.8 #	3.9	
C90 Mult. myeloma	3	1.7	1.8	0.4	5.2	0.8	
C91-C96 Leukaemia	5	2.1	2.3	0.8	5.4	1.7	
Other primaries	11	6.6	1.7	0.8	3.0	2.7	
Not observed	0	6.3	0.0	0.0	0.6 #	-3.8	
All mult. primaries	547	156.0	3.5	3.2	3.8 #	234.7	1.5

Patients	2970
Median age at second malignancy (years)	65.6
Person-years	16659
Mean observation time (years)	5.6
Median observation time (years)	5.0

The occurrence of second malignancy is statistically significant.

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

D05: Malignant neoplasm of breast in situ (women) Age distribution and age-specific incidence 1998 - 2013 (n=4558)

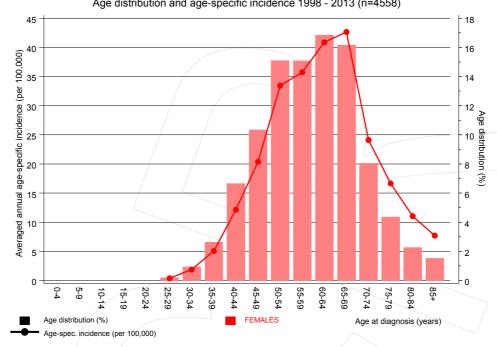
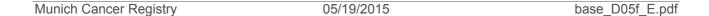


Figure 7. Age distribution and age-specific incidence



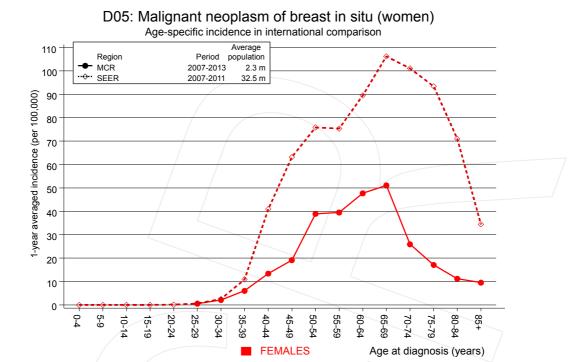


Figure 7a. Age-specific incidence in MCR registry areas compared to SEER (Surveillance, Epidemiology, and End Results, USA).



Reference:

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.

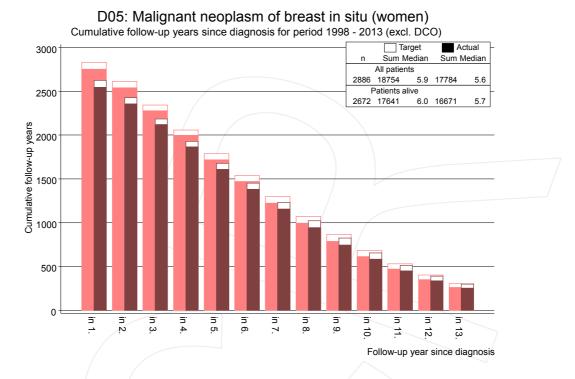


Figure 8. Cumulative follow-up years depending on time since diagnosis

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



Average incidence (world standard population) 2007 - 2013

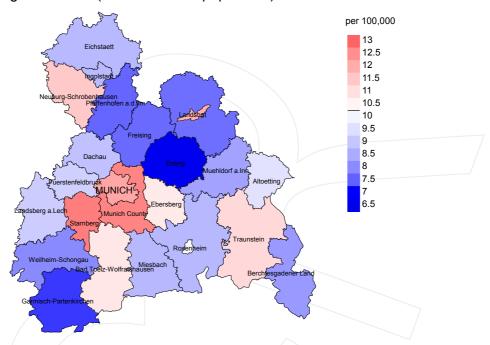


Figure 9a. Map of cancer incidence (world standard population, incl. DCO cases) by county averaged for period 2007 to 2013. According to their individual incidence rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (10.3/100,000 WS N=2,706).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 64,928 female residents (averaged) in the period from 2007 to 2013 a total of 79 women were identified with newly diagnosed breast cancer i.s. (women). Therefore, the mean incidence rate for this cancer type in this area can be calculated at 10.8/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 7.8 and 14.5/100,000.



Standardized incidence ratio (SIR) 2007 - 2013

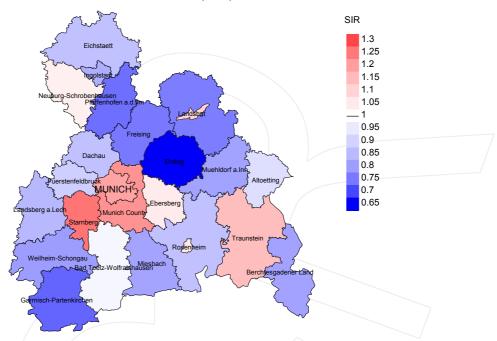
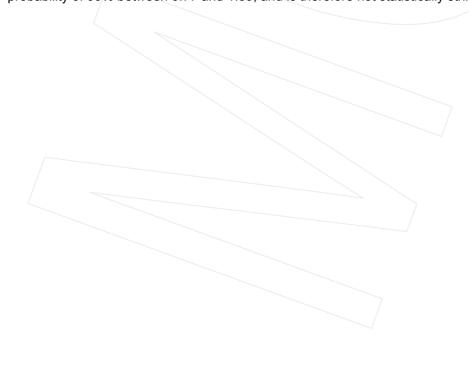


Figure 9b. Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2007 to 2013. According to their individual SIR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (N=2,706).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 64,642 female residents (averaged) in the period from 2007 to 2013 a total of 79 women were identified with newly diagnosed breast cancer i.s. (women). Therefore, the mean standardized incidence ratio (SIR) for this cancer type in this area can be calculated at 1.05. Though, the value of this parameter may vary with an underlying probability of 99% between 0.77 and 1.39, 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)

		Prop.				Prop. deaths
_	Incident	actively	Prop.	_/	Prop.	with death
Year of	cases	followed	DCO	Deaths	deaths	certific.
diagnosis	n	%	%	n	%	%
1998	109	92.7		23	21.1	91.3
1999	127	98.4		29	22.8	93.1
2000	139	97.1		31	22.3	96.8
2001	163	98.8		28	17.2	96.4
2002	216	94.0		33/	15.3	97.0
2003	218	96.3		23	10.6	95.7
2004	269	95.2		35	13.0	94.3
2005	312	95.8		26	8.3	88.5
2006	314	90.4		26	8.3	96.2
2007	345	78.3		20	5.8	90.0
2008	407	45.9		13	3.2	84.6
2009	406	48.0		30	7.4	90.0
2010	427	47.5		9	2.1	100.0
2011	411	53.3		12	2.9	83.3
2012	387	67.4		9	2.3	88.9
2013	344	98.3		2	0.6	50.0
1998-2013	4594	75.0		349	7.6	92.8

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	ଚ	n	%
1998	109	17	94.1		
1999	127	21	85.7		
2000	139	19	78.9	/ 1	0.7
2001	163	15	73.3		
2002	216	25	96.0		
2003	218	38	92.1		
2004	269	42	97.6		
2005	312	40	95.0	2	0.6
2006	314	44	90.9	_ 1	0.3
2007	345	33	97.0		
2008	407	43	95.3		
2009	406	56	100.0	2	0.5
2010	427	62	96.8	1	0.2
2011	411	66	100.0	2	0.5
2012	387	55	96.4	4	1.0
2013	344	92	96.7		
1998-2013	4594	668	95.1	13	0.3

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)

				Prop.
				cancer
		Prop.	Prop.	recorded
		cancer-	non-cancer-	on death
Year of	Deaths	related	related	certificate
death	n	%	8	%
1998	17	58.8	41.2	50.0
1999	21	61.9	38.1	77.8
2000	19	47.4	52.6	60.0
2001	15	40.0	60.0	54.5
2002	25	44.0	56.0	66.7
2003	38	73.7	26.3	74.3
2004	42	57.1	42.9	65.9
2005	40	57.5	42.5	71.1
2006	44	68.2	31.8	85.0
2007	33	63.6	36.4	75.0
2008	43	51.2	48.8	65.9
2009	56	39.3	60.7	50.0
2010	62	53.2	46.8	73.3
2011	66	43.9	56.1	59.1
2012	55	54.5	45.5	75.5
2013	92	50.0	50.0	60.7
1998-2013	668	53.4	46.6	66.6

Table 11

Medians 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-	(non-cancer-	to death
Year of	Deaths	causes)	related)	related)	certificate)
death	n	Years	Years	Years	Years
1998	17	77.3	68.1	87.1	68.1
1999	21	72.5	66.7	73.2	73.7
2000	19	78.7	64.6	83.0	76.4
2001	15	75.8	63.1	82.2	63.1
2002	25	75.6	74.8	84.7	73.2
2003	38	69.5	64.4	84.7	64.4
2004	42	73.0	65.6	82.4	66.2
2005	40	79.4	74.2	82.5	78.6
2006	44	75.8	72.2	80.0	73.8
2007	33	72.9	72.9	75.2	71.8
2008	43	79.1	69.6	84.4	71.1
2009	56	79.3	64.8	85.2	70.4
2010	62	75.8	72.4	83.3	73.3
2011	66	76.7	71.7	83.0	72.9
2012	55	79.8	72.4	82.8	78.4
2013	92	76.8	71.0	83.1	71.0
1998-2013	668	76.5	69.7	83.3	71.7

By 2010, life expectancy for a newborn male in Germany is 77.5 years compared with 82.6 years for his female counterpart.

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	Deaths	Mort.	MI-Index	Mort.	MI-Index	Mort.	MI-Index	Mort.	${\tt MI-Index}$
death	n	raw	raw	WS	WS	ES	ES	BRD-S	BRD-S
1998	10	0.9	0.09	0.4	0.07	0.6	0.08	0.7	0.08
1999	13	1.1	0.10	0.5	0.07	0.7	0.08	0.9	0.09
2000	9	0.7	0.06	0.4	0.05	0.5	0.06	0.7	0.06
2001	6	0.5	0.04	0.3	0.03	0.4	0.03	0.4	0.03
2002	11	0.6	0.05	0.3	0.04	0.4	0.04	0.5	0.05
2003	28	1.4	0.13	0.7	0.10	1.0	0.11	1.2	0.12
2004	24	1.2	0.09	0.6	0.08	0.9	0.08	1.0	0.08
2005	23	1.2	0.07	0.5	0.05	0.7	0.06	0.9	0.07
2006	30	1.5	0.10	0.7	0.07	1/. 0	0.08	1.3	0.09
2007	21	0.9	0.06	0.4	0.05	0.6	0.05	0.8	0.06
2008	22	0.9	0.05	0.4	0.04	0.6	0.04	0.7	0.05
2009	22	0.9	0.05	0.5	0.05	0.7	0.05	0.8	0.05
2010	33	1.4	0.08	0.6	0.06	0.9	0.06	1.1	0.07
2011	29	1.2	0.07	0.5	0.05	0.8	0.05	0.9	0.06
2012	30	1.3	0.08	0.5	0.05	0.8	0.06	1.0	0.07
2013	46	1.9	0.13	0.8	0.09	1.2	0.10	1.5	0.11
1998-2013	357	1.1	0.08	0.5	0.06	0.8	0.06	0.9	0.07

Table 13

Age distribution of age at death (cancer-related) for period 1998-2013

(incl. multiple primaries)

Age at				
death	Cases			
Years	'n	96	Cum.%	
35-39	/ 2	0.5	0.5	
40-44	/ 6	1.6	2.2	
45-49	/ 15	4.1	6.3	
50-54	22	6.0	12.3	
55-59	31	8.5	20.8	
60-64	58	15.9	36.7	
65-69	51	14.0	50.7	
70-74	48	13.2	63.8	
75-79	51	14.0	77.8	
80-84	27	7.4	85.2	
85+	54	14.8	100.0	
All ages	365	100.0		
3				

Included in the statistics are 36.7% multiple primaries.

Table 14

Age-specific mortality (cancer-related) and proportion of all cancers for period 1998-2013 (incl. multiple primaries)

Age at				Prop. all	
death	Cases	Age-spec.		cancers	
Years	n	mortality	MI-index	%	
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	2	0.1	0.02	0.4	
40-44	6	0.2	0.02	0.5	
45-49	15	0.6	0.03	0.7	
50-54	22	1.1	0.03	0.7	
55-59	31	1.6	0.04	0.7	
60-64	58	3.1	0.08	0.9	
65-69	51	3.0	0.07	0.6	
70-74	48	3.2	0.13	0.5	
75-79	51	4.3	0.25	0.5	
80-84	27	2.9	0.26	0.2	
85+	54	6.0	0.78	0.4	
All ages	365			0.5	
Mortality					
Raw		1.2	0.08		
WS		0.5	0.06		
ES		0.8	0.06		
BRD-S		1.0	0.07		
BKD 5		1.0	0.07		
PYLL-70					
per 100,000		7.2			
ES		6.1			
AYLL-70		10.3			

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

Table 15

Multiple primaries in deaths in period 1998-2013

					Syn- chron	Syn- chron		
	Total	Total	Pre	Pre	±30d	±30d	Post	Post
Diagnosis	n	% ↓	n	←%	n	← %	n	←%
C18 Colon	15	3.5	2	13.3	1	6.7	12	80.0
C19-C20 Rectum	/13	3.1	3	23.1			10	76.9
C25 Pancreas	19	4.5					19	100.0
C33-C34 Lung	33 /	7.8	1	3.0	3	9.1	29	87.9
C43 Malign. melanoma	10	2.4	4	40.0			6	60.0
C44 Skin others	12	2.8	2	16.7	2	16.7	8	66.7
C50 Breast	205	48.5			75	36.6	130	63.4
C54 Corpus uteri	10	2.4	7	70.0			3	30.0
C56 Ovary	22	5.2	7	31.8	1	4.5	14	63.6
C70-C72 CNS cancer	5	1.2	1	20.0			4	80.0
C82-C85 NHL	11	2.6	3	27.3			8	72.7
C90 Mult. myeloma	10	2.4	1	10.0	1	10.0	8	80.0
C91-C96 Leukaemia	8	1.9					8	100.0
Other primaries	50	11.8	12	24.0	1	2.0	37	74.0
All mult. primaries	423	100.0	43	10.2	84	19.9	296	70.0

Multiple primaries with number of cases 1 to 4 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 1998-2013

(Singular primaries only *)

Age at				Prop. all
death	Cases	Age-spec.		cancers
Years	n	mortality	MI-index	%
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	4	0.2	0.02	0.4
45-49	7	0.3	0.02	0.4
50-54	9	0.4	0.02	0.3
55-59	16	0.8	0.03	0.4
60-64	28	1.5	0.05	0.5
65-69	23	1.3	0.04	0.3
70-74	26	1.7	0.10	0.3
75-79	32	2.7	0.28	0.4
80-84	18	1.9	0.25	0.2
85+	33	3.7	0.65	0.3
	\			\ \
All ages	196			0.3
Mortality				
Raw		0.6	0.05	
WS		0.3	0.04	
ES		0.4	0.04	
BRD-S		0.5	0.05	
PYLL-70				
per 100,000		3.4		
ES		2.8		
AYLL-70		10.3		
/ 0		10.5		

^{*} See corresponding tables with multiple primaries.

Table 17

Age-specific mortality (cancer-related) and proportion of all cancers for period 1998-2013

(Single primaries only *)

				D 11	
Age at death	Cases	700 000		Prop. all cancers	
death Years		Age-spec.	MI-index	cancers %	
ieals	n	mortality	MI-Index	6	
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	3	0.1	0.01	0.3	
45-49	2	0.1	0.01	0.1	
50-54	1	0.0	0.00	0.0	
55-59	3	0.2	0.01	0.1	
60-64	8	0.4	0.02	0.2	
65-69	8	0.5	0.02	0.1	
70-74	4	0.3	0.02	0.1	
75-79	5	0.4	0.05	0.1	
80-84	2	0.2	0.03	0.0	
85+	13	1.5	0.27	0.1	
All ages	49			0.1	
AII ages	49			0.1	
Mortality					
Raw		0.2	0.02		
WS		0.1	0.01		
ES		0.1	0.01		
BRD-S		0.1	0.01		
PYLL-70					
per 100,000		1.0			
ES		0.8			
AYLL-70		10.5			

^{*} See corresponding tables with multiple primaries.

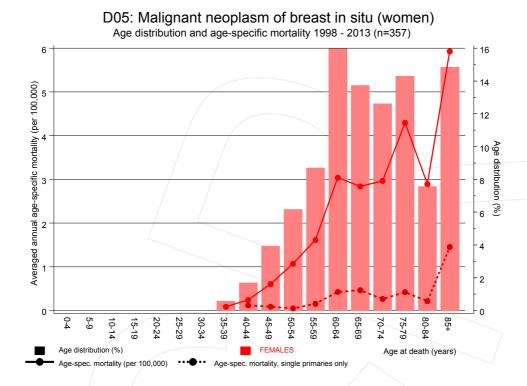


Figure 18. Distribution of age at death (bars) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). "

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



Average mortality (world standard population) 2007 - 2013

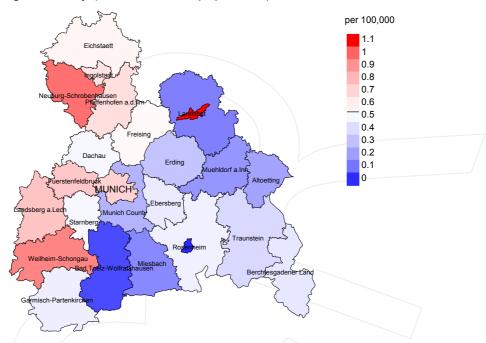


Figure 19a. Map of cancer mortality (world standard population) by county averaged for period 2007 to 2013. According to their individual mortality rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (0.5/100,000 WS N=198).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 64,928 female residents (averaged) in the period from 2007 to 2013 a total of 3 women died from breast cancer i.s. (women). Therefore, the mean mortality rate for this cancer type in this area can be calculated at 0.5/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 0.1 and 1.7/100,000.



Standardized mortality ratio (SMR) 2007 - 2013

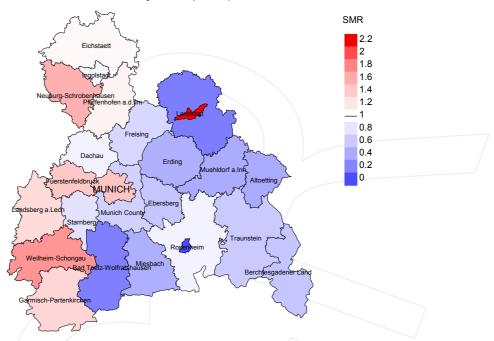


Figure 19b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2007 to 2013. According to their individual SMR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (N=198).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 64,642 female residents (averaged) in the period from 2007 to 2013 a total of 3 women died from breast cancer i.s. (women). Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 0.57. Though, the value of this parameter may vary with an underlying probability of 99% between 0.06 and 2.09, 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 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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Index of figures and tables

Fig./Tbl		Page
1	Pts cohorts, DCO, mult. prim., follow-up / yr	3
2	Incidence by year of diagnosis	4
3	Age distribution parameters by year of diagnosis	5
4	Age distribution by 5-year age group	6
5	Age-specific incidence and DCO rate	7
6	Standardized incidence ratio of second primaries	8
7	Age distribution and age-specific incidence (chart)	9
7a	Age-specific incidence internationally (chart)	10
8	Cumulative follow-up years (chart)	11
9a	Map of cancer incidence (WS) by county (chart)	12
9b	Standardized incidence ratio (SIR) by county (chart)	13
10a	Pts incident cohorts and mortality / yr	14
10b	Incidence and mortality by year of diagnosis	15
10c	Cancer-related deaths, death certification available / yr	16
11	Medians of age at death / yr	17
12	Mortality by year of death	18
13	Distribution of age at death	19
14	Age-specific mortality	20
15	Multiple primaries in deaths	21
16	Age-specific mortality (first primaries)	22
17	Age-specific mortality (single primaries)	23
18	Age distribution and age-specific mortality (chart)	24
19a	Map of cancer mortality (WS) by county (chart)	25
19b	Standardized mortality ratio (SMR) by county (chart)	26