Munich Cancer Registry

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

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

Cancer statistics: Baseline statistics

C50: Breast cancer (women)

Year of diagnosis	1998-2012
Patients	45,935
Diseases	47,887
Creation date	03/20/2014
Export date	02/12/2014
Population (females)	2.3 m

http://www.tumorregister-muenchen.de/en/facts/base/base_C50f_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 4.5 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, March 2014

[#] 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 2013 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.

INCIDENCE

Table 1

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

Year of diagnosis	Cases n	DCO cases n	Prop. DCO %	Prop. mult. primaries %	Prop. deaths %	Prop. actively followed %	
1998	1907	110	5.8	30.2	52.8	97.4	
1999	1946	87	4.5	26.8	46.8	96.6	
2000	1960	80	4.1	27.1	46.3	97.9	
2001	1991	91	4.6	28.3	41.8	97.0	
2002	3365	264	7.8	25.3	44.3	97.3	#
2003	3167	240	7.6	24.6	42.1	96.6	#
2004	3267	193	5.9	24.8	36.5	96.4	#
2005	3377	190	5.6	24.5	34.0	96.3	#
2006	3352	132	3.9	24.3	29.1	94.2	#
2007	3685	187	5.1	22.6	28.5	82.6	# ##
2008	4055	166	4.1	22.3	24.1	58.7	
2009	4111	184	4.5	22.6	21.0	59.1	
2010	4045	165	4.1	22.2	16.9	58.1	
2011	3905	163	4.2	22.3	14.2	74.3	
2012	3754	133	3.5	21.2	8.6	96.0	###
1998-2012	47887	2385	5.0	24.0	29.7	83.9	

\# 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 4.52 m as of 2007, respectively)

Year of diagnosis	Cases n	Incidence raw	Incidence WS	Incidence ES	Incidence BRD-S
1998	1907	162.1	92.5	127.3	144.5
1999	1946	164.0	93.8	128.5	145.8
2000	1960	163.2	91.6	126.5	144.1
2001	1991	163.7	93.8	128.8	146.6
2002	3365	171.9	95.1	131.1	150.9
2003	3167	160.8	87.2	120.4	139.1
2004	3267	165.3	91.2	124.7	143.1
2005	3377	169.7	92.5	127.2	145.7
2006	3352	166.9	91.8	125.0	142.4
2007	3685	159.6	86.8	119.2	136.0
2008	4055	174.7	95.0	130.0	149.1
2009	4111	176.8	96.4	132.1	150.4
2010	4045	172.8	92.6	127.2	144.9
2011	3905	165.5	88.3	121.1	138.5
2012	3754	159.1	85.2	116.9	134.5
1998-2012	47887	166.9	91.5	125.6	143.6

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	1907	62.5	13.8	28.4	97.5	45.5	52.9	60.9	72.8	82.7
1999	1946	62.2	14.1	23.9	99.3	43.9	52.5	61.3	73.0	81.4
2000	1960	63.0	14.0	20.4	100	44.7	53.3	62.0	74.0	81.8
2001	1991	62.5	13.9	24.3	97.7	44.5	52.8	61.6	72.9	81.2
2002	3365	64.0	14.3	21.5	99.4	45.2	53.8	63.4	75.0	82.6
2003	3167	64.2	14.5	24.4	105	44.1	53.9	63.9	75.5	82.9
2004	3267	63.7	14.5	18.8	98.9	44.6	53.5	63.8	74.3	83.2
2005	3377	64.2	14.1	21.7	102	45.2	54.7	64.1	74.0	83.1
2006	3352	63.5	14.3	23.3	102	43.8	53.3	64.4	72.7	82.6
2007	3685	64.0	14.4	20.7	103	44.6	53.1	64.7	73.7	83.8
2008	4055	63.8	14.1	21.6	109	44.7	53.3	64.7	73.3	82.4
2009	4111	63.7	14.0	25.0	109	45.0	53.3	64.3	73.3	82.6
2010	4045	64.1	14.2	23.9	105	45.2	52.8	64.7	74.0	83.6
2011	3905	64.0	14.4	21.7	102	45.3	52.4	64.5	74.3	83.8
2012	3754	63.8	14.1	23.9	101	45.2	52.3	64.4	74.4	82.1
1998-2012	47887	63.7	14.2	18.8	109	44.8	53.1	63.8	73.9	82.8

Table 4

Age distribution by 5-year age group for period 1998-2012
(incl. DCO)

Age at diagnosis Years	Cases n	%	Cum.%
15-19	1	0.0	0.0
20-24	20	0.0	0.0
25-29	183	0.4	0.4
30-34	534	1.1	1.5
35-39	1416	3.0	4.5
40-44	2790	5.8	10.3
45-49	4054	8.5	18.8
50-54	4692	9.8	28.6
55-59	5352	11.2	39.8
60-64	6478	13.5	53.3
65-69	6454	13.5	66.8
70-74	4944	10.3	77.1
75-79	4201	8.8	85.9
80-84	3275	6.8	92.7
85+	3493	7.3	100.0
All ages	47887	100.0	

Included in the statistics are 24.2% multiple primaries.

Table 5

Age-specific incidence, DCO rate and proportion of all cancers
for period 1998-2012

Age at diagnosis Years	Cases n	Age-spec. incidence	DCO rate n=2385 %	Prop. all cancers n=142297 %
0- 4		0.0		
5- 9		0.0		
10-14		0.0		
15-19	1	0.1		0.4
20-24	20	1.2	5.0	4.1
25-29	182	9.7		17.8
30-34	528	25.7		28.0
35-39	1400	63.2	0.6	39.8
40-44	2761	119.9	0.8	47.6
45-49	3964	187.4	0.8	49.6
50-54	4581	242.5	0.9	45.0
55-59	5205	292.2	0.8	40.6
60-64	6321	363.3	1.2	39.2
65-69	6277	391.4	1.6	35.4
70-74	4807	348.6	3.3	28.4
75-79	4058	371.0	6.5	25.0
80-84	3155	365.3	14.5	21.3
85+	3409	416.2	34.8	21.3
All ages	46669		5.1	32.8
Incidence				
Raw		162.6		
WS		89.3		
ES		122.5		
BRD-S		140.0		

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 1998-2012

Diagnosis		Observed n	Expected n	SIR	LCL 95%	UCL 95%		EAR	DCO %
C03-C06	Oral cavity	19	9.9	1.9	1.2	3.0	#	0.6	
C07-C08	Salivary gland	7	2.5	2.8	1.1	5.7	#	0.3	14.3
C09-C10	Oropharynx	12	7.4	1.6	0.8	2.8		0.3	
C12-C13	Hypopharynx	4	2.0	2.0	0.5	5.1		0.1	
C15	Oesophagus	25	9.1	2.8	1.8	4.1	#	1.0	12.0
C16	Stomach	114	54.4	2.1	1.7	2.5	#	3.8	9.6
C17	Small intestine	19	7.4	2.6	1.5	4.0	#	0.7	
C18	Colon	235	151.5	1.6	1.4	1.8	#	5.4	6.4
C19-C20	Rectum	102	68.3	1.5	1.2	1.8	#	2.2	3.9
C21	Anus/canal	15	8.6	1.8	1.0	2.9		0.4	6.7
C22	Liver	26	16.9	1.5	1.0	2.3	#	0.6	30.8
C23-C24	Bile	31	21.6	1.4	1.0	2.0		0.6	12.9
C25	Pancreas	113	64.3	1.8	1.4	2.1	#	3.1	23.0
C26	GI cancer	7	2.5	2.8	1.1	5.7	#	0.3	42.9
C30-C31	Sinuses	4	1.9	2.1	0.6	5.3		0.1	
C33-C34	Lung	210	112.8	1.9	1.6	2.1	#	6.3	18.1
C43	Malign. melanoma	110	58.3	1.9	1.6	2.3	#	3.3	0.9
C46,C49	Soft tissue	30	8.8	3.4	2.3	4.9	#	1.4	6.7
C48	Peritoneal	9	5.4	1.7	0.8	3.2		0.2	
C50	Breast	1526	510.0	3.0	2.8	3.1	#	65.3	
C51	Vulva	26	14.4	1.8	1.2	2.6	#	0.7	3.8
C52	Vagina	7	2.9	2.4	1.0	4.9		0.3	14.3
C53	Cervix uteri	36	23.9	1.5	1.1	2.1	#	0.8	8.3
C54	Corpus uteri	192	90.0	2.1	1.8	2.5	#	6.6	1.6
C56	Ovary	128	66.8	1.9	1.6	2.3	#	3.9	7.0
C64	Kidney	76	38.4	2.0	1.6	2.5	#	2.4	5.3
C65	Renal pelvis	6	4.5	1.3	0.5	2.9		0.1	
C66	Ureter	4	2.2	1.9	0.5	4.8		0.1	
C67	Bladder	34	27.2	1.2	0.9	1.7		0.4	11.8
C69	Eye melanoma	4	2.1	1.9	0.5	4.8		0.1	
C70-C72	CNS cancer	30	22.6	1.3	0.9	1.9		0.5	16.7
C73	Thyroid	50	33.0	1.5	1.1	2.0	#	1.1	4.0
C76-C79	CUP	17	26.2	0.6	0.4	1.0		-0.6	
C81	Hodgkin lymphoma	6	3.1	2.0	0.7	4.3		0.2	16.7
C82-C85	NHL	103	59.1	1.7	1.4	2.1	#	2.8	3.9
C90	Mult. myeloma	28	18.7	1.5	1.0	2.2		0.6	21.4
C91-C96	Leukaemia	71	23.8	3.0	2.3	3.8	#	3.0	9.9
Other primaries		22	19.4	1.1	0.7	1.7		0.2	4.5
Not observed		0	2.1	0.0	0.0	1.8		-0.1	
All mult. primaries		3458	1603.9	2.2	2.1	2.2	#	119.2	4.9

Patients	31284
Mean age at second malignancy (years)	68.1
Person-years	155512
Mean observation time (years)	5.0
Median observation time (years)	4.3

The occurrence of second malignancy is statistically significant.

Observed second malignancies with count 1 to 3 are pooled in category "Other primaries".

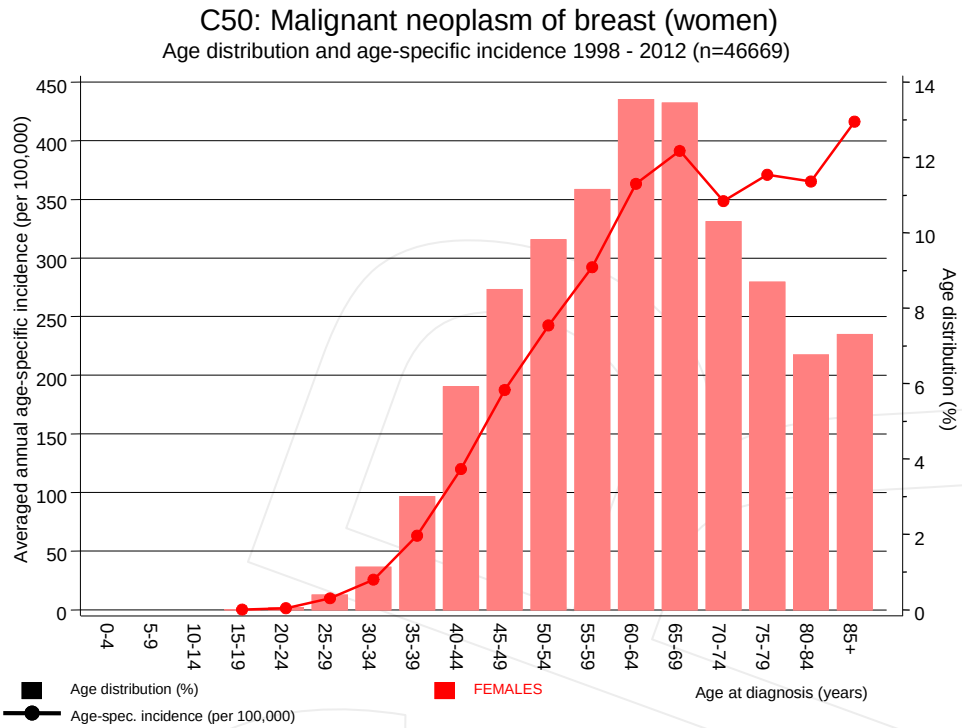

Figure 7. Age distribution and age-specific incidence

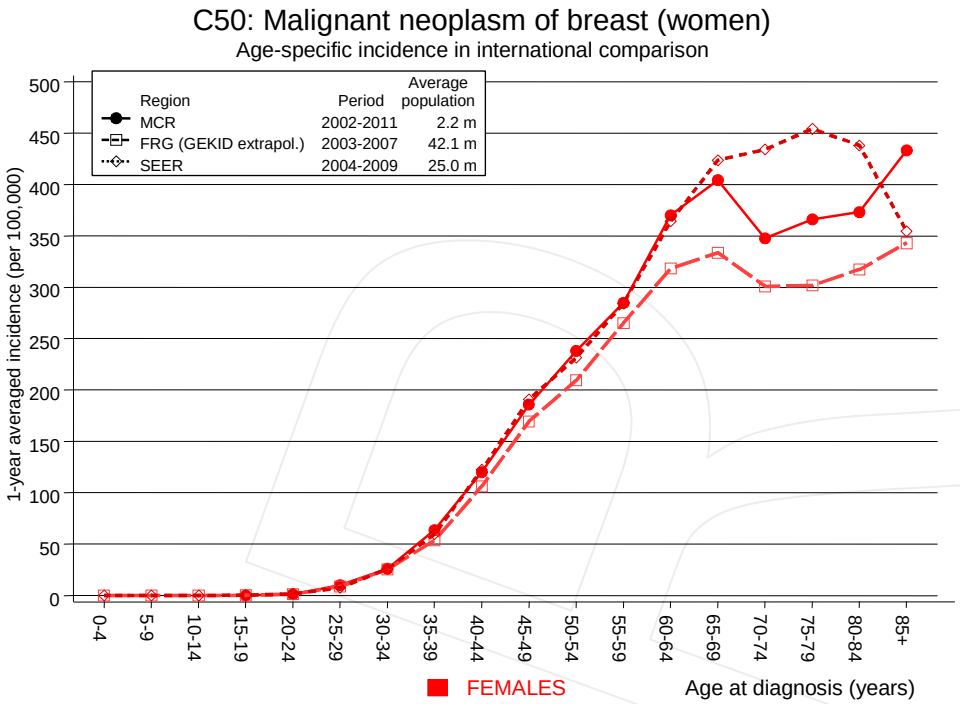

Figure 7a. Age-specific incidence in MCR registry areas compared to Germany (FRG, GEKID extrapolation) and SEER (Surveillance, Epidemiology, and End Results, USA).

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.

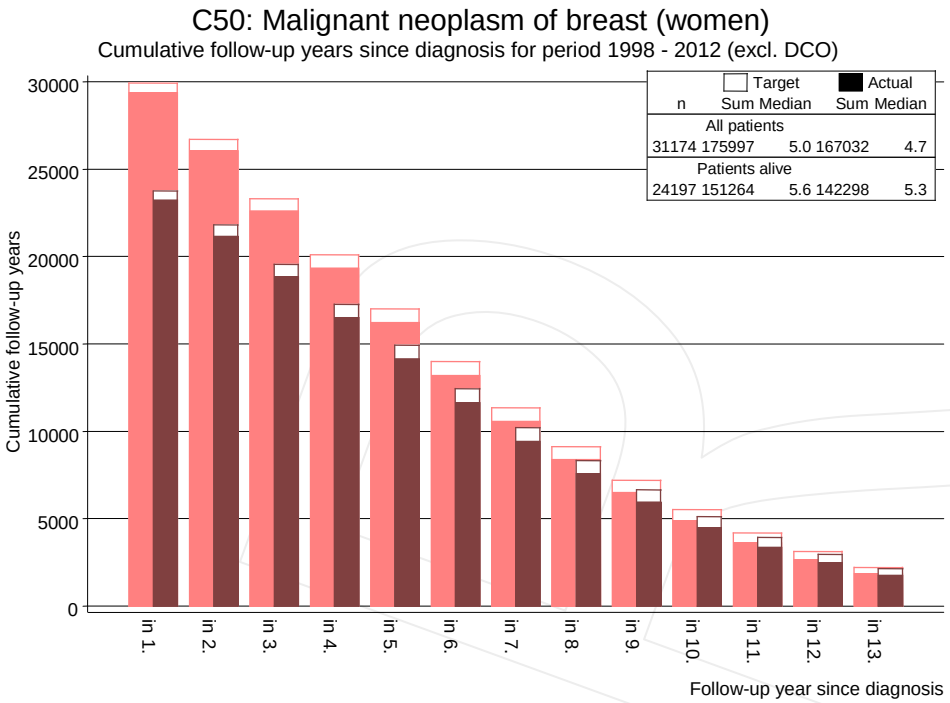

Figure 8. Cumulative follow-up years depending on time since diagnosis

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

Average incidence (world standard population) 2003 - 2008

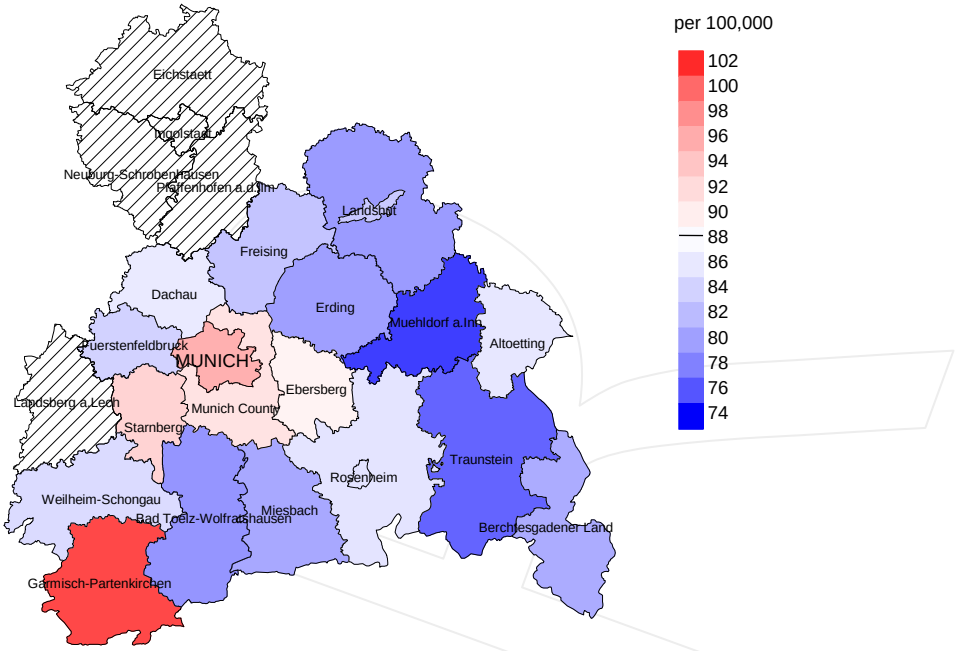

Figure 9a. Map of cancer incidence (world standard population, incl. DCO cases) by county averaged for period 2003 to 2008. According to their individual incidence rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (88.4/100,000 WS N=19,499). 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 63,131 female residents (averaged) in the period from 2003 to 2008 a total of 592 women were identified with newly diagnosed breast cancer (women). Therefore, the mean incidence rate for this cancer type in this area can be calculated at 89.6/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 79.9 and 100.4/100,000.

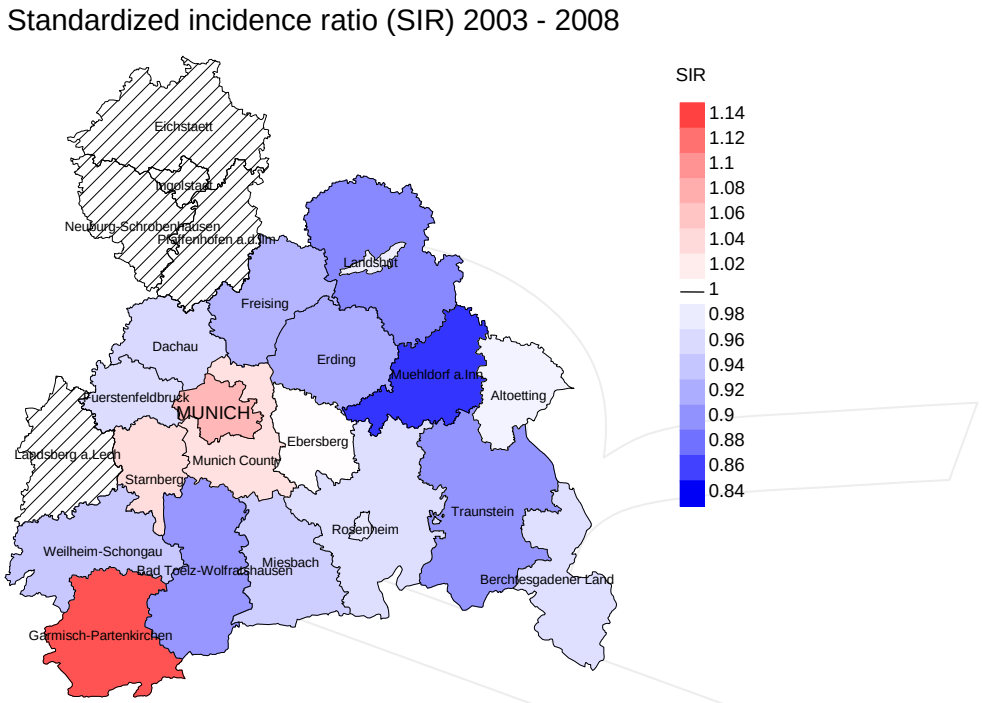

Figure 9b. Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2003 to 2008. According to their individual SIR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (N=19,499). 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 63,131 female residents (averaged) in the period from 2003 to 2008 a total of 592 women were identified with newly diagnosed breast cancer (women). Therefore, the mean standardized incidence ratio (SIR) for this cancer type in this area can be calculated at 1.00. Though, the value of this parameter may vary with an underlying probability of 99% between 0.90 and 1.11, 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)

Year of diagnosis	Incident cases n	Prop. actively followed %	Prop. DCO %	Deaths n	Prop. deaths %	Prop. deaths with death certific. %
1998	1907	97.4	5.8	1006	52.8	93.8
1999	1946	96.6	4.5	910	46.8	94.9
2000	1960	97.9	4.1	908	46.3	96.4
2001	1991	97.0	4.6	833	41.8	96.3
2002	3365	97.3	7.8	1491	44.3	97.7
2003	3167	96.6	7.6	1333	42.1	96.8
2004	3267	96.4	5.9	1191	36.5	97.8
2005	3377	96.3	5.6	1148	34.0	98.3
2006	3352	94.2	3.9	975	29.1	98.6
2007	3685	82.6	5.1	1051	28.5	98.1
2008	4055	58.7	4.1	978	24.1	98.4
2009	4111	59.1	4.5	862	21.0	97.6
2010	4045	58.1	4.1	684	16.9	95.8
2011	3905	74.3	4.2	553	14.2	96.7
2012	3754	96.0	3.5	321	8.6	93.8
1998-2012	47887	83.9	5.0	14244	29.7	97.0

Table 10b

Annual cohorts of incident cancers and deaths, proportion of death certificates and cases deceased the same year of cancer diagnosis
(incl. DCO)
(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 diagnosis/ death	Incident cases n	Deaths n	Prop. deaths with death certific. %	Deaths in same year n	Prop. deaths in same year %
1998	1907	818	87.2	155	8.1
1999	1946	812	87.9	117	6.0
2000	1960	839	90.5	123	6.3
2001	1991	828	90.8	119	6.0
2002	3365	1247	96.9	334	9.9
2003	3167	1376	97.2	304	9.6
2004	3267	1411	97.7	265	8.1
2005	3377	1452	97.0	275	8.1
2006	3352	1418	97.3	227	6.8
2007	3685	1581	98.0	266	7.2
2008	4055	1662	98.5	301	7.4
2009	4111	1655	98.5	250	6.1
2010	4045	1740	98.6	265	6.6
2011	3905	1834	99.1	273	7.0
2012	3754	1794	98.8	226	6.0
1998-2012	47887	20467	96.6	3500	7.3

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)

Year of death	Deaths n	Prop. cancer-related %	Prop. not cancer-related %	Prop. cancer recorded on death certificate %
1998	818	68.9	31.1	84.4
1999	812	71.1	28.9	86.7
2000	839	70.8	29.2	83.1
2001	828	67.0	33.0	83.2
2002	1247	71.9	28.1	86.4
2003	1376	70.0	30.0	84.6
2004	1411	75.8	24.2	85.8
2005	1452	69.4	30.6	81.5
2006	1418	72.1	27.9	83.7
2007	1581	69.6	30.4	81.5
2008	1662	69.0	31.0	80.4
2009	1655	67.8	32.2	79.2
2010	1740	68.7	31.3	80.2
2011	1834	67.8	32.2	80.4
2012	1794	66.6	33.4	78.9
1998-2012	20467	69.6	30.4	82.2

Table 11

Means 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 (not cancer-related) Years	Age at death (according to death certificate) Years
1998	818	73.5	70.5	80.2	73.7
1999	812	72.6	69.1	81.3	72.2
2000	839	73.2	69.4	82.2	72.1
2001	828	73.0	68.9	81.3	71.8
2002	1247	73.9	70.2	83.3	72.5
2003	1376	73.6	69.3	83.5	71.7
2004	1411	73.7	70.5	83.7	72.1
2005	1452	74.3	70.0	84.1	72.0
2006	1418	74.4	70.6	84.2	72.4
2007	1581	74.7	70.8	83.5	72.7
2008	1662	75.7	71.8	84.6	73.6
2009	1655	75.6	71.3	84.8	73.3
2010	1740	75.9	72.0	84.5	73.6
2011	1834	76.4	72.6	84.5	74.3
2012	1794	76.3	72.0	84.9	73.9
1998-2012	20467	74.7	70.8	83.7	72.9

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 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	565	48.0	0.30	21.8	0.24	32.1	0.26	40.3	0.29
1999	577	48.6	0.30	22.8	0.25	33.3	0.27	41.1	0.29
2000	594	49.5	0.31	22.9	0.26	33.5	0.27	41.5	0.30
2001	555	45.6	0.28	21.6	0.24	31.4	0.25	38.6	0.27
2002	897	45.8	0.27	20.7	0.22	30.3	0.24	37.6	0.26
2003	965	49.0	0.31	23.0	0.27	33.4	0.28	40.8	0.30
2004	1069	54.1	0.34	23.9	0.27	35.2	0.29	44.0	0.32
2005	1008	50.7	0.31	23.0	0.26	33.4	0.27	41.3	0.29
2006	1023	50.9	0.31	22.3	0.25	32.7	0.27	41.1	0.30
2007	1104	47.8	0.31	20.9	0.25	30.7	0.26	38.2	0.29
2008	1149	49.5	0.29	20.6	0.22	30.4	0.24	38.5	0.26
2009	1124	48.3	0.28	20.5	0.22	30.2	0.23	37.7	0.26
2010	1196	51.1	0.30	20.7	0.23	30.8	0.25	39.2	0.28
2011	1244	52.7	0.33	21.1	0.25	31.3	0.27	39.5	0.29
2012	1196	50.7	0.33	20.5	0.25	30.5	0.27	38.4	0.29
1998-2012	14266	49.7	0.31	21.6	0.24	31.8	0.26	39.7	0.28

Table 13

Age distribution of age at death (cancer-related) for period 1998-2012
(**incl. multiple primaries**)

Age at death Years	Cases n	%	Cum.%
20-24	2	0.0	0.0
25-29	15	0.1	0.1
30-34	67	0.4	0.5
35-39	164	1.0	1.6
40-44	427	2.7	4.3
45-49	655	4.2	8.5
50-54	948	6.0	14.5
55-59	1328	8.5	23.0
60-64	1656	10.6	33.6
65-69	1853	11.8	45.4
70-74	1932	12.3	57.7
75-79	2013	12.8	70.6
80-84	2023	12.9	83.5
85+	2592	16.5	100.0
All ages	15675	100.0	

Included in the statistics are 24.2% multiple primaries.

Table 14

Age-specific mortality (cancer-related) and proportion of all cancers
for period 1998-2012
(**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		0.0		
20-24	2	0.1	0.10	4.3
25-29	15	0.8	0.08	13.8
30-34	67	3.3	0.13	31.5
35-39	164	7.4	0.12	33.0
40-44	427	18.5	0.15	39.9
45-49	655	31.0	0.16	34.9
50-54	948	50.2	0.20	33.0
55-59	1328	74.5	0.25	29.9
60-64	1656	95.2	0.26	27.4
65-69	1853	115.5	0.29	24.1
70-74	1932	140.1	0.39	21.5
75-79	2013	184.0	0.48	20.4
80-84	2023	234.2	0.62	19.4
85+	2592	316.5	0.74	20.6
All ages	15675			23.4
Mortality				
Raw		54.6	0.33	
WS		23.8	0.26	
ES		35.0	0.28	
BRD-S		43.7	0.30	
PYLL-70				
per 100,000		347.5		
ES		298.2		
AYLL-70		12.0		

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

Table 15

Multiple primaries in deaths in period 1998-2012

Diagnosis		Total n	Total %↓	Pre n	Pre ←%	Syn-chron ±30d n	Syn-chron ±30d ←%	Post n	Post ←%
C15	Oesophagus	55	0.9	4	7.3	3	5.5	48	87.3
C16	Stomach	249	4.3	47	18.9	19	7.6	183	73.5
C18	Colon	469	8.1	128	27.3	33	7.0	308	65.7
C19-C20	Rectum	177	3.1	53	29.9	15	8.5	109	61.6
C22	Liver	51	0.9	2	3.9	3	5.9	46	90.2
C23-C24	Bile	51	0.9	2	3.9	2	3.9	47	92.2
C25	Pancreas	234	4.0	12	5.1	10	4.3	212	90.6
C33-C34	Lung	453	7.8	40	8.8	34	7.5	379	83.7
C43	Malign. melanoma	152	2.6	72	47.4	10	6.6	70	46.1
C44	Skin others	168	2.9	50	29.8	19	11.3	99	58.9
C46,C49	Soft tissue	56	1.0	10	17.9			46	82.1
C50	Breast	1667	28.8			565	33.9	1102	66.1
C53	Cervix uteri	132	2.3	74	56.1	14	10.6	44	33.3
C54	Corpus uteri	293	5.1	113	38.6	24	8.2	156	53.2
C56	Ovary	337	5.8	74	22.0	34	10.1	229	68.0
C64	Kidney	110	1.9	45	40.9	13	11.8	52	47.3
C67	Bladder	142	2.5	41	28.9	7	4.9	94	66.2
C70-C72	CNS cancer	130	2.2	27	20.8	15	11.5	88	67.7
C73	Thyroid	72	1.2	37	51.4			35	48.6
C76-C79	CUP	81	1.4	24	29.6	7	8.6	50	61.7
C82-C85	NHL	173	3.0	50	28.9	21	12.1	102	59.0
C90	Mult. myeloma	71	1.2	9	12.7	4	5.6	58	81.7
C91-C96	Leukaemia	154	2.7	20	13.0	7	4.5	127	82.5
Other primaries		313	5.4	84	26.8	26	8.3	203	64.9
All mult. primaries		5790	100.0	1018	17.6	885	15.3	3887	67.1

Multiple primaries with number of cases n<50 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 1998-2012
(**Singular primaries only** *)

Age at death Years	Cases n	Age-spec. mortality	MI-index	Prop. all cancers %
0- 4		0.0		
5- 9		0.0		
10-14		0.0		
15-19		0.0		
20-24	2	0.1	0.10	4.7
25-29	15	0.8	0.09	14.6
30-34	59	2.9	0.12	31.6
35-39	146	6.6	0.11	32.5
40-44	359	15.6	0.14	38.4
45-49	555	26.2	0.15	34.2
50-54	761	40.3	0.19	31.4
55-59	1069	60.0	0.24	28.4
60-64	1315	75.6	0.25	26.5
65-69	1467	91.5	0.28	23.5
70-74	1495	108.4	0.39	20.9
75-79	1610	147.2	0.50	20.3
80-84	1556	180.2	0.64	18.7
85+	2002	244.4	0.72	19.7
All ages	12411			22.8
Mortality				
Raw		43.2	0.32	
WS		19.1	0.25	
ES		28.0	0.27	
BRD-S		34.8	0.29	
PYLL-70				
per 100,000		286.3		
ES		245.7		
AYLL-70		12.2		

* See corresponding tables with multiple primaries.

Table 17

Age-specific mortality (cancer-related) and proportion of all cancers
for period 1998-2012
(**Single primaries only** *)

Age at death Years	Cases n	Age-spec. mortality	MI-index	Prop. all cancers %
0- 4		0.0		
5- 9		0.0		
10-14		0.0		
15-19		0.0		
20-24	2	0.1	0.11	5.0
25-29	15	0.8	0.10	15.5
30-34	51	2.5	0.11	30.2
35-39	135	6.1	0.11	32.8
40-44	318	13.8	0.13	37.1
45-49	479	22.6	0.14	32.9
50-54	637	33.7	0.17	29.3
55-59	905	50.8	0.22	27.0
60-64	1032	59.3	0.21	23.9
65-69	1103	68.8	0.23	20.8
70-74	1078	78.2	0.31	17.8
75-79	1152	105.3	0.40	17.3
80-84	1082	125.3	0.48	15.5
85+	1508	184.1	0.57	17.2
All ages	9497			20.3
Mortality				
Raw		33.1	0.26	
WS		15.1	0.21	
ES		21.9	0.23	
BRD-S		26.8	0.24	
PYLL-70				
per 100,000		242.5		
ES		208.5		
AYLL-70		12.7		

* See corresponding tables with multiple primaries.

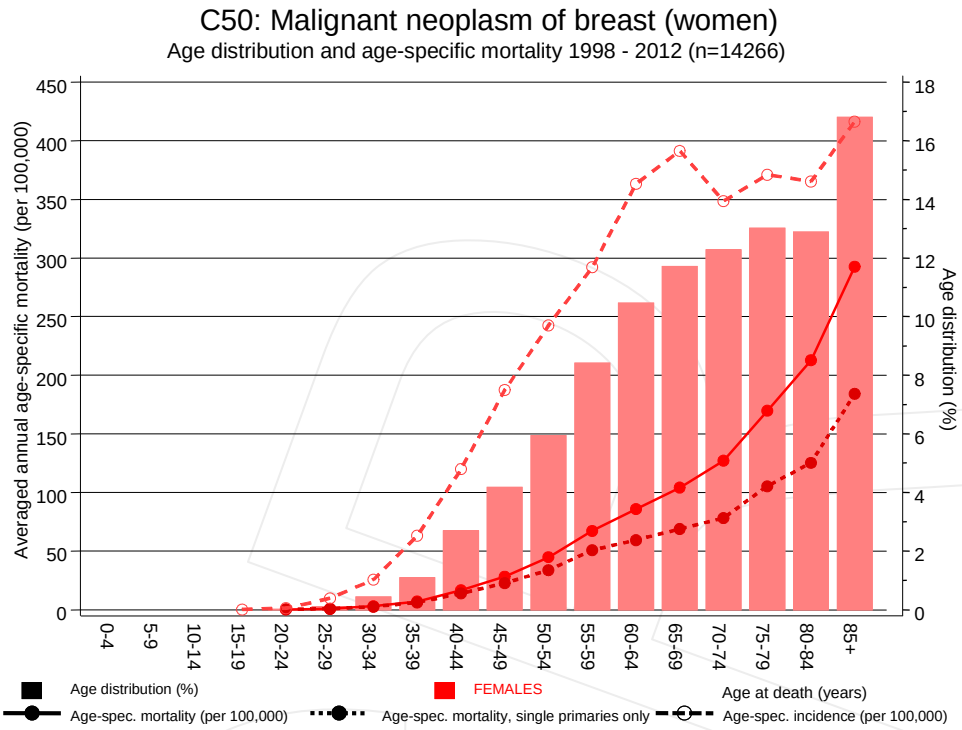

Figure 18. Distribution of age at death (bars) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

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

Average mortality (world standard population) 2003 - 2008

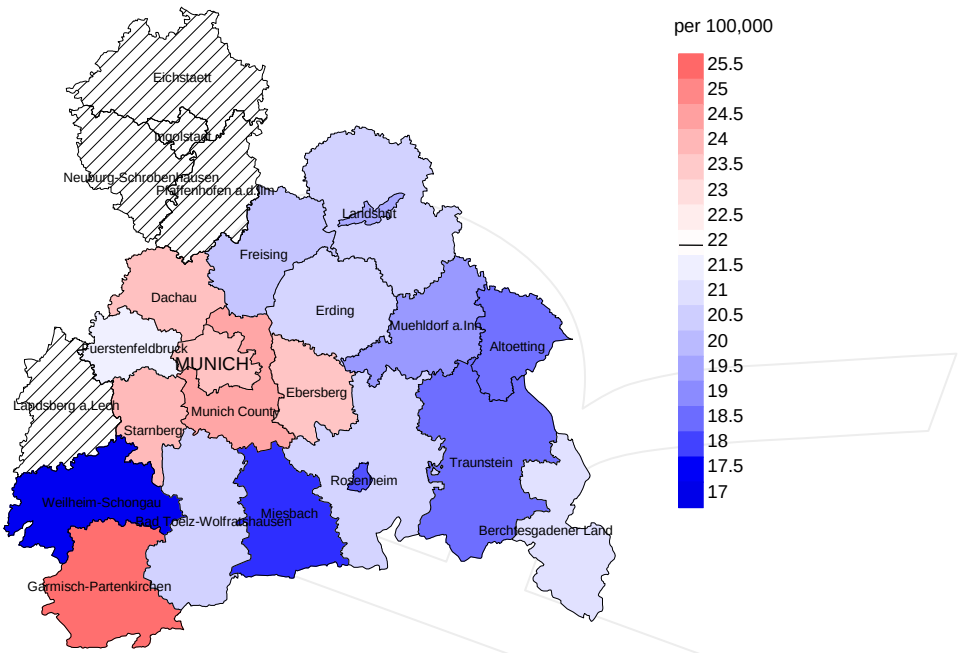

Figure 19a. Map of cancer mortality (world standard population) by county averaged for period 2003 to 2008. According to their individual mortality rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (22.0/100,000 WS N=6,042). 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 63,131 female residents (averaged) in the period from 2003 to 2008 a total of 195 women died from breast cancer (women). Therefore, the mean mortality rate for this cancer type in this area can be calculated at 23.6/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 19.1 and 29.2/100,000.

Standardized mortality ratio (SMR) 2003 - 2008

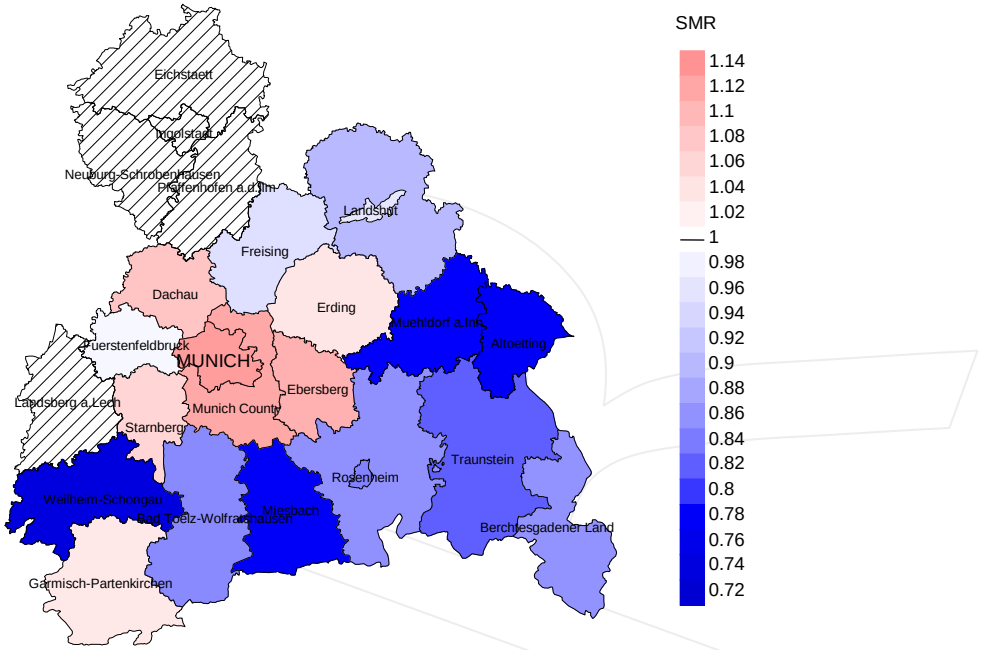

Figure 19b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2003 to 2008. According to their individual SMR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (N=6,042). 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 63,131 female residents (averaged) in the period from 2003 to 2008 a total of 195 women died from breast cancer (women). Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 1.11. Though, the value of this parameter may vary with an underlying probability of 99% between 0.91 and 1.33, 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

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