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

C51-C58: Fem. genitale cancer

Year of diagnosis	1998-2013
Patients	19,509
Diseases	19,912
Creation date	05/19/2015
Export date	12/30/2014
Population (females)	2.36 m

http://www.tumorregister-muenchen.de/en/facts/base/base_C5158E.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
C51.-	Malignant neoplasm of vulva
C52	Malignant neoplasm of vagina
C53.-	Malignant neoplasm of cervix uteri
C54.-	Malignant neoplasm of corpus uteri
C55	Malignant neoplasm of uterus, part unspecified
C56	Malignant neoplasm of ovary
C57.-	Malignant neoplasm of other and unspecified female genital organs
C58	Malignant neoplasm of placenta

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	834	62	7.4	23.1	63.7	96.5	
1999	820	51	6.2	22.4	60.4	97.3	
2000	805	62	7.7	24.2	57.3	98.0	
2001	802	67	8.4	23.7	58.6	96.0	
2002	1333	156	11.7	24.2	60.1	97.6	#
2003	1333	134	10.1	24.2	58.1	95.9	
2004	1277	124	9.7	23.5	57.9	96.5	
2005	1294	101	7.8	22.4	52.6	95.1	
2006	1294	76	5.9	20.6	49.8	93.7	
2007	1543	128	8.3	23.1	50.9	84.0	# ##
2008	1549	106	6.8	21.6	46.7	67.1	
2009	1434	85	5.9	21.3	42.1	64.4	
2010	1482	108	7.3	23.3	40.9	66.3	
2011	1456	90	6.2	21.4	35.8	65.2	
2012	1431	91	6.4	23.0	29.5	66.3	
2013	1225	87	7.1	19.7	19.4	98.3	###
1998-2013	19912	1528	7.7	22.5	47.7	84.2	

\# 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 diagnosis	Cases n	Incidence raw	Incidence WS	Incidence ES	Incidence BRD-S
1998	834	70.9	38.4	53.1	62.9
1999	820	69.1	36.3	50.3	60.0
2000	805	67.0	35.4	49.3	58.9
2001	802	65.9	35.0	48.3	57.3
2002	1333	68.1	34.7	48.4	58.1
2003	1333	67.7	34.3	48.2	57.5
2004	1277	64.6	33.1	46.2	54.8
2005	1294	65.0	32.8	45.6	54.3
2006	1294	64.4	32.4	45.1	53.7
2007	1543	66.8	33.5	47.0	55.9
2008	1549	66.8	33.7	46.9	55.6
2009	1434	61.7	31.3	43.5	51.5
2010	1482	63.3	30.9	43.4	52.0
2011	1456	61.7	30.6	42.7	50.8
2012	1431	60.6	29.7	41.4	49.5
2013	1225	51.9	26.4	36.5	43.4
1998-2013	19912	64.1	32.5	45.2	53.9

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	834	64.6	15.3	14.6	97.0	43.5	54.6	65.6	76.3	84.5
1999	820	65.0	15.7	0.7	99.9	42.4	55.8	65.6	77.0	84.7
2000	805	64.8	14.9	19.9	98.0	42.6	55.1	65.3	76.6	83.0
2001	802	64.9	15.3	14.7	98.8	42.3	55.3	65.3	76.2	83.8
2002	1333	66.2	15.0	13.2	99.4	44.5	57.9	67.1	77.7	83.9
2003	1333	66.4	14.9	7.6	99.4	46.1	56.9	66.9	78.4	84.2
2004	1277	66.1	15.1	1.2	99.8	44.7	56.3	66.7	77.7	84.3
2005	1294	66.3	15.2	1.7	103	43.6	57.2	67.4	77.6	84.9
2006	1294	66.3	15.1	22.9	99.4	44.4	56.2	67.4	77.8	85.2
2007	1543	66.3	14.9	18.3	100	44.4	56.8	67.8	77.3	85.0
2008	1549	66.0	14.8	11.1	102	44.8	56.6	67.8	77.2	84.8
2009	1434	65.9	15.1	11.2	102	44.2	55.5	67.7	77.2	84.6
2010	1482	66.8	14.8	17.0	98.7	46.0	57.0	68.6	77.4	85.5
2011	1456	66.2	14.8	4.1	98.5	45.5	56.2	68.8	76.9	84.3
2012	1431	66.8	15.0	0.3	101	45.9	57.5	69.1	77.4	84.9
2013	1225	65.8	15.2	0.7	105	45.2	55.8	67.5	76.9	84.5
1998-2013	19912	66.0	15.0	0.3	105	44.6	56.4	67.5	77.3	84.6

Table 4

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

Age at diagnosis Years	Cases n	%	Cum.%
0-4	8	0.0	0.0
5-9	2	0.0	0.1
10-14	11	0.1	0.1
15-19	24	0.1	0.2
20-24	37	0.2	0.4
25-29	151	0.8	1.2
30-34	343	1.7	2.9
35-39	604	3.0	5.9
40-44	890	4.5	10.4
45-49	1059	5.3	15.7
50-54	1423	7.1	22.9
55-59	1822	9.2	32.0
60-64	2316	11.6	43.6
65-69	2581	13.0	56.6
70-74	2594	13.0	69.6
75-79	2261	11.4	81.0
80-84	1936	9.7	90.7
85+	1850	9.3	100.0
All ages	19912	100.0	

Included in the statistics are 25.2% multiple primaries.

Table 5

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

Age at diagnosis Years	Cases n	Age-spec. incidence	DCO rate n=1513 %	Prop. all cancers n=153136 %
0- 4	8	0.6	25.0	3.3
5- 9	2	0.1		1.6
10-14	11	0.8		6.5
15-19	24	1.6		8.2
20-24	37	2.1		7.0
25-29	148	7.3	0.7	13.3
30-34	342	15.4		16.6
35-39	596	25.2	0.5	15.9
40-44	879	35.3	1.3	14.1
45-49	1033	44.7	2.2	11.8
50-54	1393	67.7	1.3	12.6
55-59	1790	93.1	2.3	13.1
60-64	2279	121.5	1.8	13.2
65-69	2544	147.5	2.9	13.4
70-74	2559	168.6	5.3	13.9
75-79	2228	187.6	9.8	12.7
80-84	1910	204.8	16.8	12.1
85+	1836	205.4	33.9	10.7
All ages	19619		7.7	12.8
Incidence				
Raw		63.2		
WS		32.0		
ES		44.5		
BRD-S		53.0		

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 1998-2013

Diagnosis		Observed n	Expected n	SIR	LCL 95%	UCL 95%		EAR	DCO %
C03-C06	Oral cavity	8	3.3	2.4	1.0	4.8	#	0.9	
C09-C10	Oropharynx	4	2.3	1.8	0.5	4.5		0.3	
C15	Oesophagus	3	3.1	1.0	0.2	2.8		-0.0	
C16	Stomach	30	20.1	1.5	1.0	2.1	#	1.9	13.3
C17	Small intestine	12	2.5	4.7	2.4	8.3	#	1.8	8.3
C18	Colon	141	55.1	2.6	2.2	3.0	#	16.4	15.6
C19-C20	Rectum	53	24.1	2.2	1.6	2.9	#	5.5	13.2
C21	Anus/canal	15	2.9	5.2	2.9	8.5	#	2.3	6.7
C22	Liver	10	6.2	1.6	0.8	2.9		0.7	20.0
C23-C24	Bile	16	8.0	2.0	1.1	3.3	#	1.5	18.8
C25	Pancreas	45	23.5	1.9	1.4	2.6	#	4.1	33.3
C26	GI cancer	5	1.0	5.1	1.7	12.0	#	0.8	40.0
C33-C34	Lung	112	38.5	2.9	2.4	3.5	#	14.0	13.4
C38,C45	Mesothelioma	4	1.0	4.0	1.1	10.3	#	0.6	
C43	Malign. melanoma	28	19.9	1.4	0.9	2.0		1.5	7.1
C46,C49	Soft tissue	14	3.1	4.5	2.4	7.5	#	2.1	
C48	Peritoneal	10	1.9	5.1	2.5	9.5	#	1.5	
C50	Breast	376	169.9	2.2	2.0	2.4	#	39.3	5.1
C51	Vulva	21	5.2	4.0	2.5	6.1	#	3.0	9.5
C52	Vagina	10	1.0	9.7	4.6	17.8	#	1.7	
C53	Cervix uteri	20	8.0	2.5	1.5	3.9	#	2.3	35.0
C54	Corpus uteri	94	31.0	3.0	2.5	3.7	#	12.0	11.7
C55,C57	Fem. genitals un	2	1.3	1.6	0.2	5.6		0.1	100.0
C56	Ovary	137	23.1	5.9	5.0	7.0	#	21.7	16.8
C64	Kidney	24	13.8	1.7	1.1	2.6	#	1.9	4.2
C65	Renal pelvis	10	1.6	6.1	2.9	11.2	#	1.6	10.0
C67	Bladder	28	10.1	2.8	1.8	4.0	#	3.4	10.7
C68	Urethra	3	0.2	17.6	3.6	51.5	#	0.5	
C70-C72	CNS cancer	14	7.7	1.8	1.0	3.0		1.2	21.4
C73	Thyroid	24	10.4	2.3	1.5	3.4	#	2.6	
C76-C79	CUP	19	9.6	2.0	1.2	3.1	#	1.8	15.8
C81	Hodgkin lymphoma	4	1.1	3.7	1.0	9.4	#	0.6	
C82-C85	NHL	43	21.1	2.0	1.5	2.7	#	4.2	2.3
C90	Mult. myeloma	8	6.8	1.2	0.5	2.3		0.2	25.0
C91-C96	Leukaemia	20	8.7	2.3	1.4	3.6	#	2.2	35.0
Other primaries		9	6.4	1.4	0.6	2.7		0.5	11.1
Not observed		0	2.7	0.0	0.0	1.4		-0.5	
All mult. primaries		1376	556.4	2.5	2.3	2.6	#	156.2	11.6

Patients	12811
Median age at second malignancy (years)	70.9
Person-years	52489
Mean observation time (years)	4.1
Median observation time (years)	2.9

The occurrence of second malignancy is statistically significant.

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

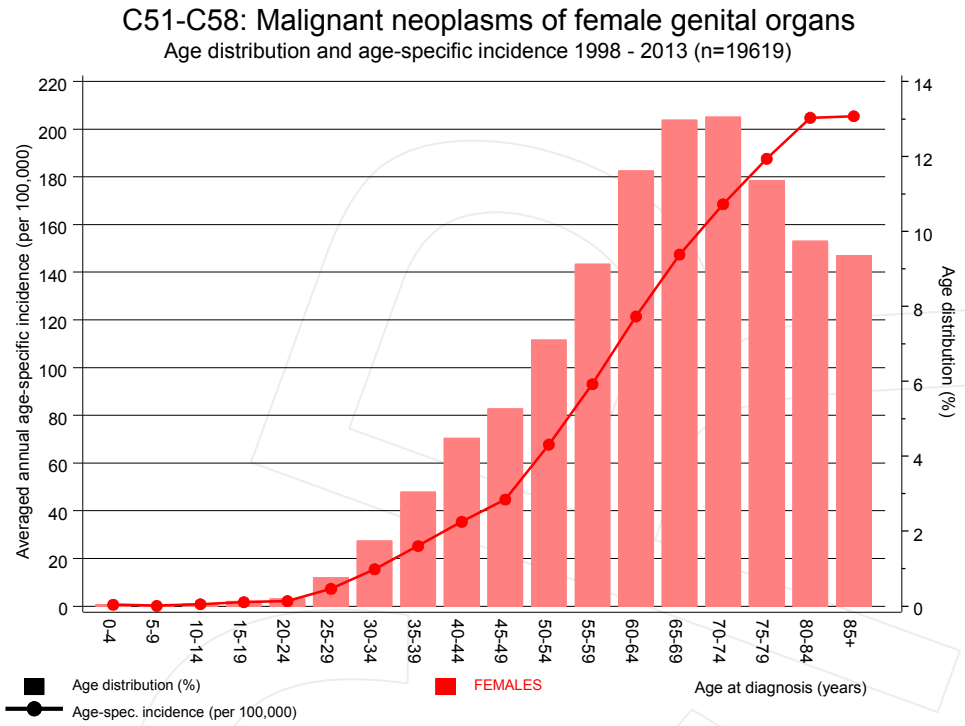

Figure 7. Age distribution and age-specific incidence

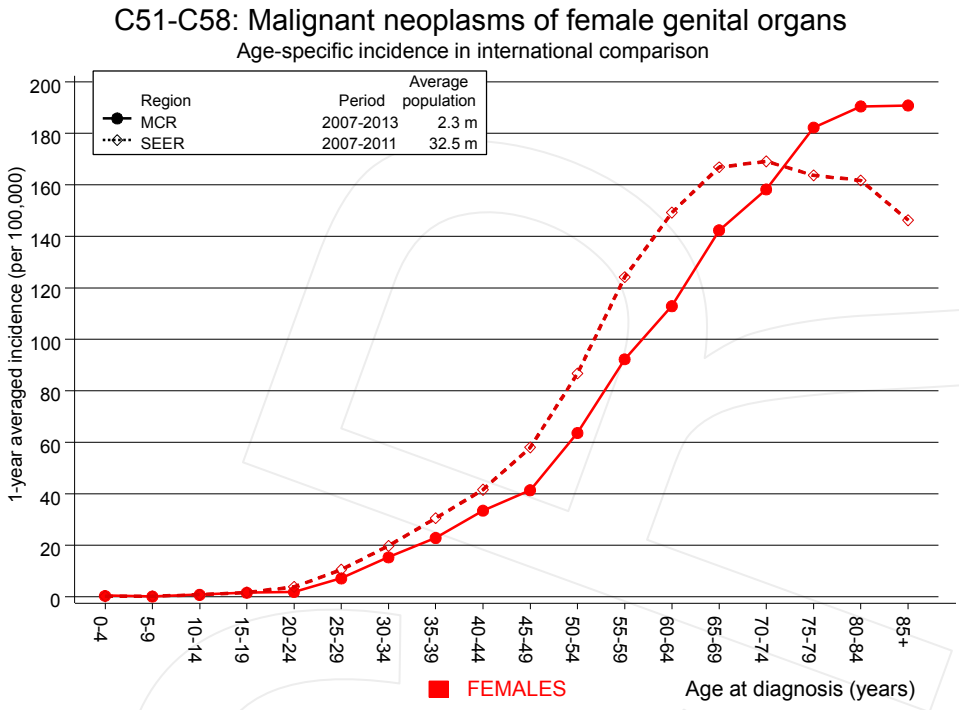

Figure 7a. Age-specific incidence in MCR registry areas compared to SEER (Surveillance, Epidemiology, and End Results, USA).

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.

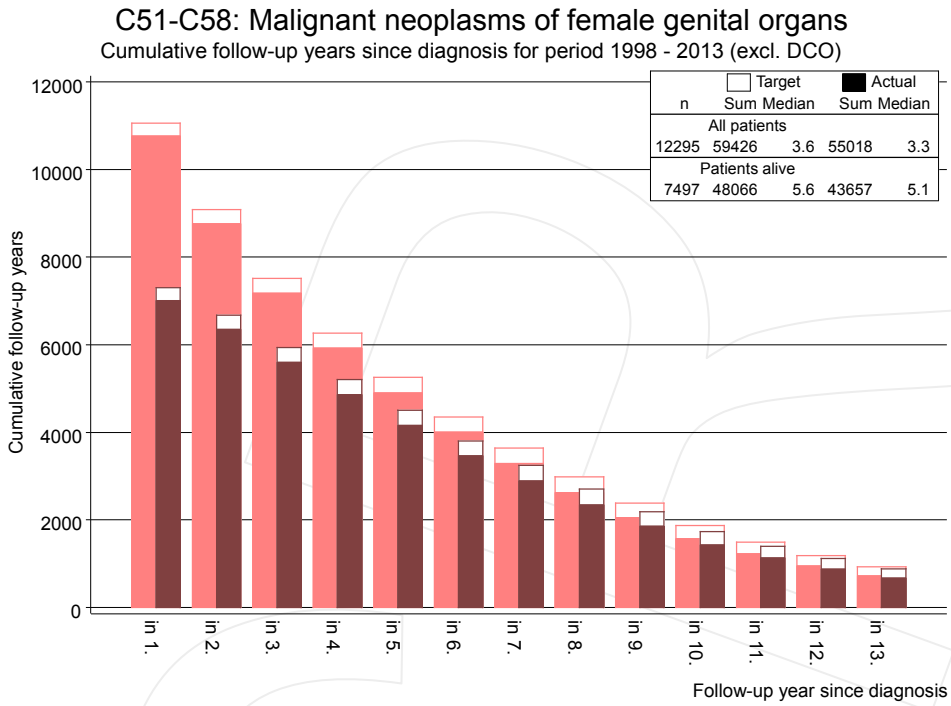

Figure 8. Cumulative follow-up years depending on time since diagnosis

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

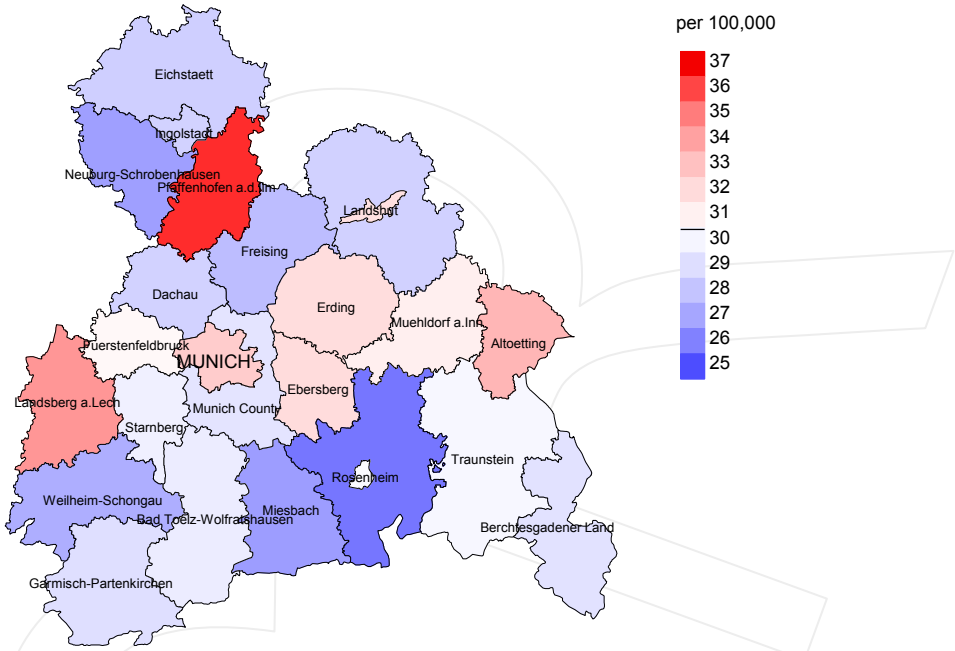

Figure 9a. Map of cancer incidence (world standard population, incl. DCO cases) by county averaged for period 2007 to 2013. According to their individual incidence rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (30.4/100,000 WS N=9,965).

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 290 women were identified with newly diagnosed fem. genitale cancer. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 32.0/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 26.9 and 37.7/100,000.

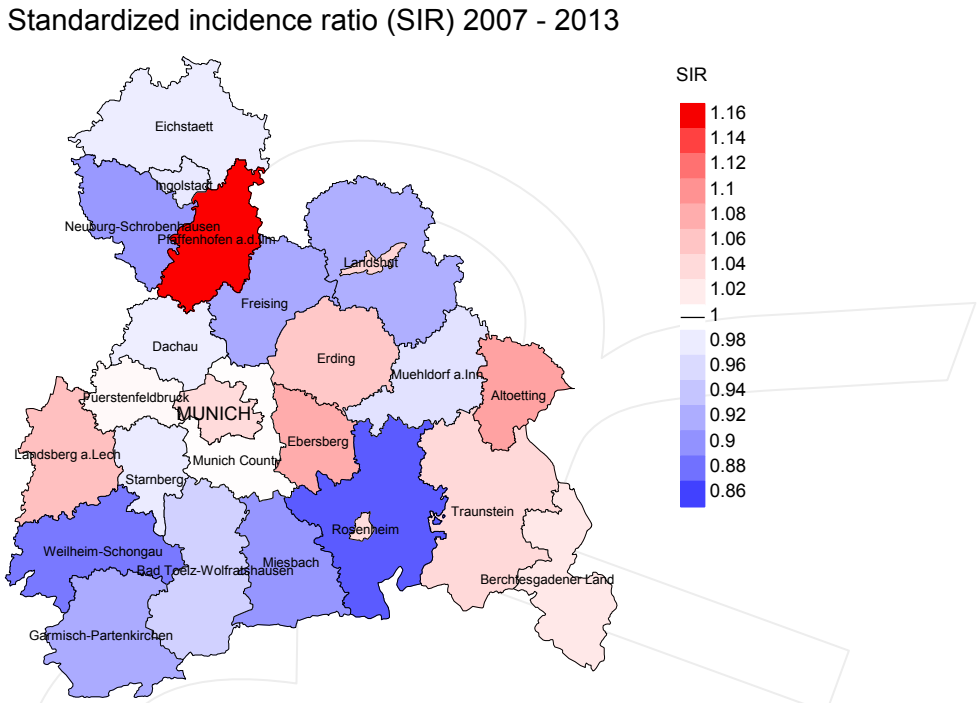

Figure 9b. Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2007 to 2013. According to their individual SIR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (N=9,965).

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 290 women were identified with newly diagnosed fem. genitale 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 0.92 and 1.26, and is therefore not statistically striking.

MORTALITY

Table 10a

Patient cohorts of incident cancers by year of diagnosis, follow-up status, proportion of DCO, deaths among the annual cohorts, and proportion of available death certificates (with respect to registry area expansion from 2.51 to 3.96 m as of 2002, and from 3.96 to 4.64 m as of 2007, respectively)

Year of diagnosis	Incident cases n	Prop. actively followed %	Prop. DCO %	Deaths n	Prop. deaths %	Prop. deaths with death certific. %
1998	834	96.5	7.4	531	63.7	89.8
1999	820	97.3	6.2	495	60.4	93.1
2000	805	98.0	7.7	461	57.3	94.6
2001	802	96.0	8.4	470	58.6	96.2
2002	1333	97.6	11.7	801	60.1	96.3
2003	1333	95.9	10.1	775	58.1	97.4
2004	1277	96.5	9.7	740	57.9	97.6
2005	1294	95.1	7.8	680	52.6	97.2
2006	1294	93.7	5.9	645	49.8	98.3
2007	1543	84.0	8.3	786	50.9	97.2
2008	1549	67.1	6.8	723	46.7	97.8
2009	1434	64.4	5.9	604	42.1	98.2
2010	1482	66.3	7.3	606	40.9	96.9
2011	1456	65.2	6.2	521	35.8	96.5
2012	1431	66.3	6.4	422	29.5	97.2
2013	1225	98.3	7.1	238	19.4	89.5
1998-2013	19912	84.2	7.7	9498	47.7	96.3

Table 10b

Annual cohorts of incident cancers and deaths, proportion of death certificates and cases deceased the same year of cancer diagnosis
(incl. DCO)
(with respect to registry area expansion from 2.51 to 3.96 m as of 2002, and from 3.96 to 4.64 m as of 2007, respectively)

Year of diagnosis/ death	Incident cases n	Deaths n	Prop. deaths with death certific. %	Deaths in same year n	Prop. deaths in same year %
1998	834	463	88.6	122	14.6
1999	820	495	88.9	117	14.3
2000	805	481	92.3	118	14.7
2001	802	481	92.5	112	14.0
2002	1333	779	95.6	269	20.2
2003	1333	805	97.3	228	17.1
2004	1277	793	97.6	217	17.0
2005	1294	820	96.6	190	14.7
2006	1294	775	96.6	180	13.9
2007	1543	913	97.7	251	16.3
2008	1549	926	99.4	218	14.1
2009	1434	936	99.1	181	12.6
2010	1482	956	98.8	229	15.5
2011	1456	1008	97.5	212	14.6
2012	1431	932	97.7	215	15.0
2013	1225	1021	98.2	179	14.6
1998-2013	19912	12584	96.7	3038	15.3

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)

Year of death	Deaths n	Prop. cancer-related %	Prop. non-cancer-related %	Prop. cancer recorded on death certificate %
1998	463	67.4	32.6	84.6
1999	495	69.9	30.1	83.9
2000	481	70.7	29.3	80.9
2001	481	68.0	32.0	82.9
2002	779	73.4	26.6	84.4
2003	805	73.7	26.3	82.9
2004	793	74.9	25.1	82.8
2005	820	75.1	24.9	82.8
2006	775	70.2	29.8	80.8
2007	913	73.3	26.7	80.5
2008	926	74.6	25.4	80.0
2009	936	70.7	29.3	78.0
2010	956	75.1	24.9	81.3
2011	1008	70.4	29.6	78.2
2012	932	69.0	31.0	77.8
2013	1021	69.4	30.6	76.7
1998-2013	12584	71.9	28.1	80.7

Table 11

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

Year of death	Deaths n	Age at death (all causes) Years	Age at death (cancer-related) Years	Age at death (non-cancer-related) Years	Age at death (according to death certificate) Years
1998	463	76.5	73.0	81.8	75.9
1999	495	78.2	74.5	84.0	77.8
2000	481	78.1	75.8	82.9	77.3
2001	481	77.9	72.9	82.5	76.0
2002	779	77.5	73.9	84.8	75.4
2003	805	77.2	74.2	84.3	75.1
2004	793	77.5	74.1	84.2	75.2
2005	820	78.2	73.8	84.6	75.4
2006	775	78.2	74.5	85.0	75.8
2007	913	79.1	75.2	85.8	77.0
2008	926	77.8	73.7	85.9	74.6
2009	936	77.5	72.9	85.1	74.5
2010	956	78.2	74.9	85.5	75.7
2011	1008	77.6	73.5	85.5	74.9
2012	932	79.5	76.3	87.0	76.7
2013	1021	78.3	74.2	86.9	75.6
1998-2013	12584	78.0	74.3	85.0	75.7

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 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	312	26.5	0.38	11.7	0.31	17.4	0.34	22.2	0.36
1999	346	29.2	0.43	12.1	0.34	18.5	0.37	24.5	0.41
2000	341	28.4	0.43	11.4	0.33	17.5	0.36	23.3	0.40
2001	327	26.9	0.41	11.6	0.34	17.2	0.36	22.2	0.39
2002	572	29.2	0.44	12.4	0.36	18.5	0.39	24.0	0.42
2003	593	30.1	0.45	12.6	0.37	18.9	0.40	24.6	0.44
2004	594	30.0	0.47	12.3	0.38	18.4	0.40	23.9	0.44
2005	616	31.0	0.48	12.5	0.39	18.8	0.42	24.2	0.45
2006	544	27.1	0.43	10.8	0.34	16.2	0.37	21.4	0.40
2007	669	29.0	0.44	11.2	0.34	16.9	0.37	22.2	0.41
2008	691	29.8	0.45	11.9	0.36	17.7	0.38	22.9	0.42
2009	662	28.5	0.47	11.6	0.37	17.2	0.40	22.0	0.43
2010	718	30.7	0.49	11.7	0.38	17.7	0.41	23.1	0.45
2011	711	30.1	0.50	11.8	0.39	17.8	0.42	22.8	0.46
2012	643	27.2	0.46	9.9	0.34	15.3	0.38	20.4	0.42
2013	711	30.1	0.59	11.7	0.45	17.6	0.49	22.8	0.54
1998-2013	9050	29.1	0.46	11.7	0.37	17.5	0.39	22.8	0.43

Table 13

Age distribution of age at death (cancer-related) for period 1998-2013
(**incl. multiple primaries**)

Age at death Years	Cases n	%	Cum.%
0-4	1	0.0	0.0
5-9	1	0.0	0.0
10-14	0	0.0	0.0
15-19	2	0.0	0.0
20-24	4	0.0	0.1
25-29	12	0.1	0.2
30-34	37	0.4	0.6
35-39	81	0.9	1.5
40-44	177	1.9	3.4
45-49	283	3.0	6.4
50-54	385	4.1	10.5
55-59	591	6.3	16.9
60-64	794	8.5	25.4
65-69	1147	12.3	37.6
70-74	1341	14.4	52.0
75-79	1379	14.8	66.7
80-84	1485	15.9	82.6
85+	1621	17.4	100.0
All ages	9341	100.0	

Included in the statistics are 25.2% multiple primaries.

Table 14

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

Age at death Years	Cases n	Age-spec. mortality	MI-index	Prop. all cancers %
0- 4	1	0.1	0.13	3.8
5- 9	1	0.1	0.50	2.5
10-14		0.0		
15-19	2	0.1	0.08	5.4
20-24	4	0.2	0.11	7.8
25-29	12	0.6	0.08	10.4
30-34	37	1.7	0.11	16.3
35-39	81	3.4	0.13	15.7
40-44	177	7.1	0.20	15.6
45-49	283	12.2	0.27	14.0
50-54	385	18.7	0.27	12.4
55-59	591	30.7	0.32	12.4
60-64	794	42.3	0.34	12.2
65-69	1147	66.5	0.44	13.8
70-74	1341	88.3	0.52	13.6
75-79	1379	116.1	0.61	12.9
80-84	1485	159.2	0.77	13.2
85+	1621	181.4	0.88	11.9
All ages	9341			12.9
Mortality				
Raw		30.1	0.47	
WS		12.0	0.37	
ES		18.1	0.40	
BRD-S		23.6	0.44	
PYLL-70				
per 100,000		147.5		
ES		126.2		
AYLL-70		11.1		

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

Table 15

Multiple primaries in deaths in period 1998-2013

Diagnosis		Total n	Total %↓	Pre n	Pre ←%	Syn-chron ±30d n	Syn-chron ±30d ←%	Post n	Post ←%
C16	Stomach	115	3.3	19	16.5	11	9.6	85	73.9
C18	Colon	362	10.3	117	32.3	51	14.1	194	53.6
C19-C20	Rectum	191	5.4	65	34.0	17	8.9	109	57.1
C22	Liver	31	0.9	3	9.7	1	3.2	27	87.1
C23-C24	Bile	43	1.2	10	23.3	2	4.7	31	72.1
C25	Pancreas	114	3.2	8	7.0	8	7.0	98	86.0
C33-C34	Lung	272	7.7	27	9.9	21	7.7	224	82.4
C43	Malign. melanoma	101	2.9	55	54.5	2	2.0	44	43.6
C44	Skin others	101	2.9	42	41.6	13	12.9	46	45.5
C48	Peritoneal	49	1.4	18	36.7	13	26.5	18	36.7
C50	Breast	939	26.7	537	57.2	85	9.1	317	33.8
C51	Vulva	51	1.4			4	7.8	47	92.2
C52	Vagina	35	1.0			7	20.0	28	80.0
C53	Cervix uteri	42	1.2			6	14.3	36	85.7
C54	Corpus uteri	62	1.8			18	29.0	44	71.0
C56	Ovary	199	5.7			93	46.7	106	53.3
C64	Kidney	68	1.9	25	36.8	6	8.8	37	54.4
C67	Bladder	152	4.3	40	26.3	13	8.6	99	65.1
C70-C72	CNS cancer	61	1.7	17	27.9	5	8.2	39	63.9
C73	Thyroid	36	1.0	22	61.1	1	2.8	13	36.1
C76-C79	CUP	71	2.0	19	26.8	7	9.9	45	63.4
C82-C85	NHL	84	2.4	29	34.5	7	8.3	48	57.1
C91-C96	Leukaemia	75	2.1	8	10.7	5	6.7	62	82.7
Other primaries		265	7.5	73	27.5	20	7.5	172	64.9
All mult. primaries		3519	100.0	1134	32.2	416	11.8	1969	56.0

Multiple primaries with number of cases 1 to 29 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 death Years	Cases n	Age-spec. mortality	MI-index	Prop. all cancers %
0- 4	1	0.1	0.13	4.2
5- 9	1	0.1	0.50	2.7
10-14		0.0		
15-19	2	0.1	0.08	6.1
20-24	4	0.2	0.11	8.5
25-29	10	0.5	0.07	9.2
30-34	31	1.4	0.09	15.4
35-39	77	3.3	0.13	16.5
40-44	156	6.3	0.19	15.7
45-49	238	10.3	0.26	13.7
50-54	312	15.2	0.26	12.0
55-59	500	26.0	0.32	12.5
60-64	667	35.6	0.34	12.5
65-69	913	52.9	0.42	13.6
70-74	1093	72.0	0.52	14.0
75-79	1118	94.1	0.61	13.0
80-84	1196	128.2	0.77	13.5
85+	1328	148.6	0.89	12.1
All ages	7647			13.0
Mortality				
Raw		24.6	0.46	
WS		9.9	0.36	
ES		14.9	0.39	
BRD-S		19.3	0.43	
PYLL-70				
per 100,000		125.0		
ES		107.0		
AYLL-70		11.4		

* 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** *)

Age at death Years	Cases n	Age-spec. mortality	MI-index	Prop. all cancers %
0- 4	1	0.1	0.13	4.2
5- 9	1	0.1	1.00	2.8
10-14		0.0		
15-19	2	0.1	0.08	7.1
20-24	4	0.2	0.11	9.1
25-29	10	0.5	0.07	9.7
30-34	29	1.3	0.09	15.9
35-39	70	3.0	0.13	16.4
40-44	146	5.9	0.19	16.0
45-49	214	9.3	0.25	13.8
50-54	263	12.8	0.23	11.3
55-59	430	22.4	0.30	12.1
60-64	573	30.5	0.32	12.4
65-69	742	43.0	0.38	13.0
70-74	874	57.6	0.46	13.3
75-79	862	72.6	0.52	12.0
80-84	914	98.0	0.63	12.3
85+	1056	118.2	0.74	11.2
All ages	6191			12.3
Mortality				
Raw		19.9	0.40	
WS		8.3	0.32	
ES		12.3	0.35	
BRD-S		15.7	0.38	
PYLL-70				
per 100,000		110.0		
ES		94.2		
AYLL-70		11.7		

* See corresponding tables with multiple primaries.

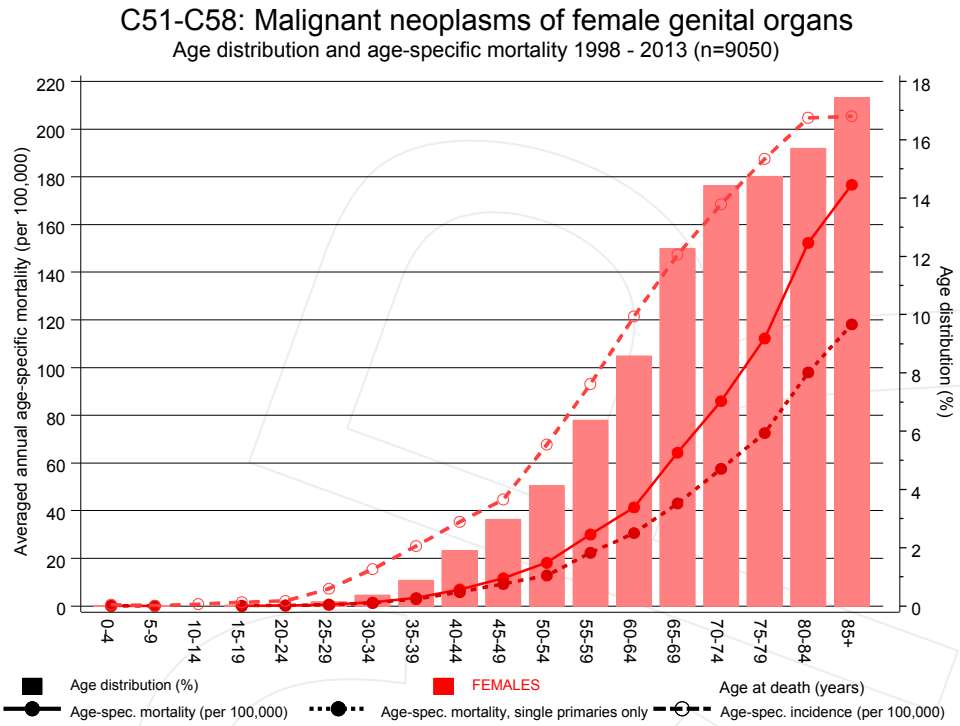

Figure 18. Distribution of age at death (bars) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

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

Average mortality (world standard population) 2007 - 2013

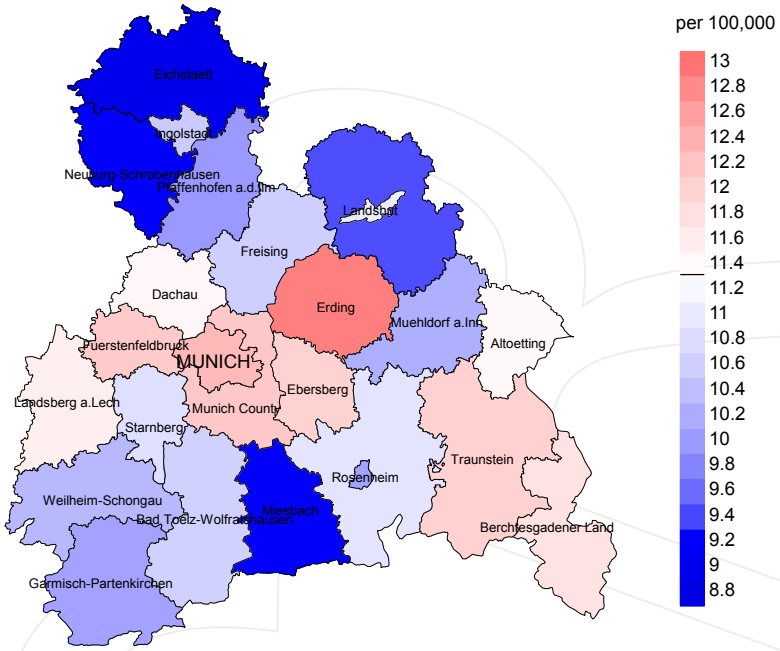

Figure 19a. Map of cancer mortality (world standard population) by county averaged for period 2007 to 2013. According to their individual mortality rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (11.3/100,000 WS N=4,765).

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 136 women died from fem. genitale cancer. Therefore, the mean mortality rate for this cancer type in this area can be calculated at 12.0/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 9.3 and 15.4/100,000.

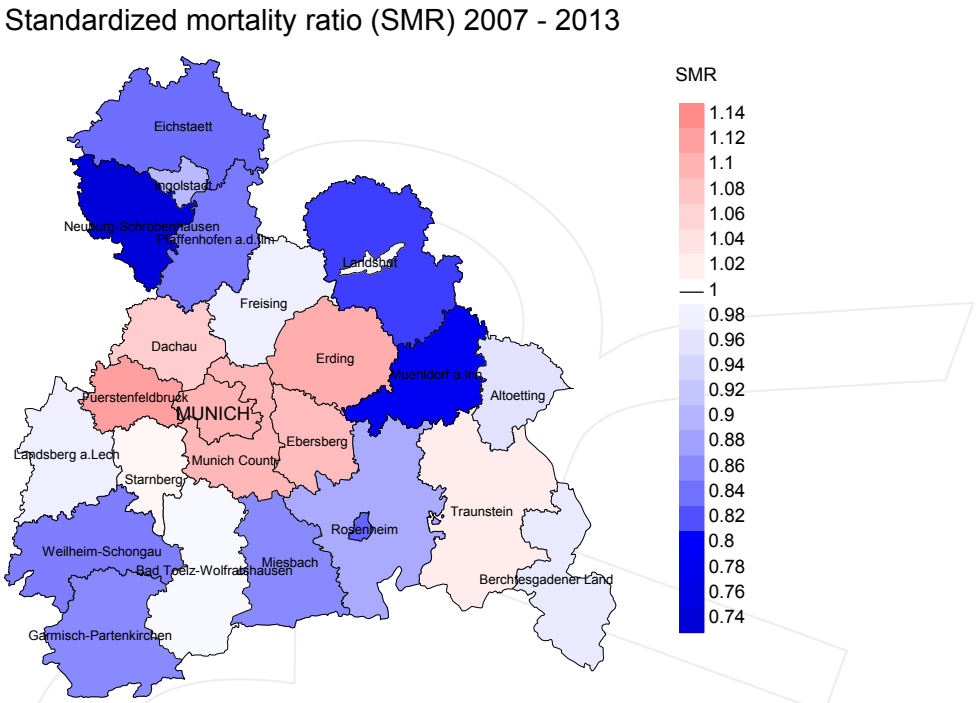

Figure 19b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2007 to 2013. According to their individual SMR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (N=4,765).

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 136 women died from fem. genitale cancer. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 1.09. Though, the value of this parameter may vary with an underlying probability of 99% between 0.86 and 1.35, 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