Munich Cancer Registry

- Survival
- Selection Matrix
- Homepage
- *Deutsch*

ICD-10 C51-C58: Fem. genitale cancer

Incidence and Mortality

Year of diagnosis	1998-2014
Patients	20,904
Diseases	21,336
Creation date	04/13/2016
Export date	12/23/2015
Population (females)	2.36 m

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

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

http://www.tumorregister-muenchen.de/en/facts/base/bC5158E-ICD-10-C51-C58-Fem.-genitale-cancer-incidence-and-mortality.pdf

Global Statements about the statistics on the Internet −
Baseline Statistics (grey button), **Survival** (red button)

In these analyses, the clinics and physicians of Upper Bavaria and the city and county of Landshut[#], with a total of 4.64 million inhabitants, account for the frequency of cancer diseases[##] and the achieved long term results. Additionally, the long term survival evaluated by the Munich Cancer Registry (MCR) is compared with the results of the population-based registry in the USA (SEER), which is useful for checking the consistency of the data on an international level.

In comparing several tables, inconsistent figures may be detected. This is based on the fact that different patient cohorts are included in the base calculation, for example when proportions of multiple tumors or DCO-cases[###] are concerned. In other cases the individual tumor diagnosis is the basis for calculation, for example with incidence.

The foot notes describe the currentness of the data. The baseline statistics and survival data are updated annually. This yearly analysis comprises the Annual Report of the MCR.

Clinics and physicians have access to essentially more detailed data, with which they can check, compare and in the best case optimize their own data and results.

We would be pleased to receive corrections, critique and useful suggestions. Just send an e-mail to tumor@ibe.med.uni-muenchen.de.

Munich Cancer Registry, April 2016

[#] Base data has been collected since 1998. An increase in new diseases is apparent, which is an effect of two extensions in the MCR catchment area (from a base population of 2.51 million to 3.96 in 2002, and to 4.52 million in 2007).

[##] Due to the high frequency and good prognosis of non-malignant skin cancer (C44), no systematic ascertainment is performed for this diagnosis. C44 is not designated as a primary, but rather as a secondary tumor.

[###] DCO (death certificate only) identifies a cancer case that first becomes available to the MCR through the death certificate.

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

Code	Description
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

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

Year of diagnosis	Cases n	DCO cases n	Prop. DCO %	Prop. mult. primaries %	Prop. deaths %	Prop. actively followed %
1998	835	62	7.4	23.6	64.2	96.4
1999	822	51	6.2	22.7	61.3	97.1
2000	805	62	7.7	24.6	58.9	97.1
2001	805	67	8.3	24.3	59.6	95.8
2002	1333	156	11.7	24.8	60.9	97.2 #
2003	1334	134	10.0	25.0	59.3	95.7
2004	1277	124	9.7	23.8	58.5	95.8
2005	1294	100	7.7	23.0	53.6	94.6
2006	1298	77	5.9	21.1	51.1	92.6
2007	1545	127	8.2	23.8	52.0	80.4 #
2008	1552	107	6.9	22.0	48.0	68.9
2009	1441	86	6.0	21.9	44.3	66.9
2010	1486	109	7.3	23.9	43.0	68.5
2011	1478	90	6.1	21.9	38.7	67.8
2012	1449	90	6.2	24.0	34.0	70.5
2013	1458	91	6.2	20.2	26.3	99.0
2014	1124	82	7.3	21.5	17.4	95.2 ##
1998-2014	21336	1615	7.6	23.0	47.7	85.3

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

Please be aware that data of recent annual patient cohorts may not yet be fully processed. The years under evaluation can be found in the respective headings.

Table 2

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

Year of diagnosis	Cases n	Incidence raw	Incidence WS	Incidence ES	Incidence BRD-S
1998	835	71.0	38.5	53.1	63.0
1999	822	69.3	36.4	50.5	60.2
2000	805	67.0	35.4	49.3	58.9
2001	805	66.2	35.2	48.6	57.5
2002	1333	68.1	34.7	48.4	58.1
2003	1334	67.7	34.4	48.2	57.6
2004	1277	64.6	33.1	46.2	54.8
2005	1294	65.0	32.8	45.6	54.3
2006	1298	64.6	32.5	45.3	53.9
2007	1545	66.9	33.6	47.1	56.0
2008	1552	66.9	33.8	47.0	55.8
2009	1441	62.0	31.4	43.7	51.8
2010	1486	63.5	31.0	43.6	52.1
2011	1478	62.6	31.2	43.4	51.6
2012	1449	61.4	30.1	41.9	50.1
2013	1458	61.8	31.2	43.2	51.5
2014	1124	47.6	24.0	33.3	39.4
1998-2014	21336	63.8	32.3	45.0	53.6

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.	Median 10%	25%	50%	75%	90%
1998	835	64.6	15.3	14.6	97.0	43.5	54.6	65.6	76.3	84.5
1999	822	65.0	15.8	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	805	64.8	15.3	14.7	98.8	41.7	55.1	65.3	76.1	83.8
2002	1333	66.2	15.0	13.2	99.4	44.5	57.9	67.1	77.7	83.9
2003	1334	66.4	14.9	7.6	99.4	45.9	56.9	66.8	78.4	84.2
2004	1277	66.0	15.2	1.2	99.8	44.7	56.2	66.7	77.8	84.3
2005	1294	66.3	15.2	1.7	103	43.6	57.2	67.4	77.6	84.9
2006	1298	66.3	15.1	22.9	99.4	44.3	56.2	67.4	77.8	85.2
2007	1545	66.2	14.9	18.3	100	44.4	56.8	67.8	77.3	85.0
2008	1552	66.0	14.8	11.1	102	44.9	56.6	67.8	77.2	84.8
2009	1441	65.9	15.1	11.2	102	44.3	55.5	67.7	77.2	84.5
2010	1486	66.8	14.8	17.0	98.7	46.0	57.0	68.7	77.3	85.5
2011	1478	66.1	14.8	4.1	98.5	45.4	56.2	68.7	76.9	84.2
2012	1449	66.8	15.0	0.3	101	45.7	57.5	69.1	77.4	85.1
2013	1458	66.0	15.3	0.7	105	45.5	55.9	67.6	77.2	84.6
2014	1124	65.7	15.8	16.2	100	43.2	54.8	67.8	77.2	85.3
1998–2014	21336	66.0	15.1	0.3	105	44.5	56.3	67.5	77.3	84.7

Table 4

Age distribution by 5-year age group for period 2007-2014
(incl. DCO)

Age at diagnosis Years	Cases n	%	Cum.%
0-4	3	0.0	0.0
5-9	2	0.0	0.0
10-14	6	0.1	0.1
15-19	18	0.2	0.3
20-24	20	0.2	0.4
25-29	93	0.8	1.2
30-34	198	1.7	2.9
35-39	307	2.7	5.6
40-44	504	4.4	10.0
45-49	631	5.5	15.5
50-54	852	7.4	22.8
55-59	1061	9.2	32.0
60-64	1206	10.5	42.5
65-69	1453	12.6	55.1
70-74	1667	14.5	69.5
75-79	1332	11.5	81.1
80-84	1066	9.2	90.3
85+	1114	9.7	100.0
All ages	11533	100.0	

Included in the statistics are 25.3% multiple primaries.

Table 5

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

Age at diagnosis Years	Cases n	Age-spec. incidence	DCO rate n=774 %	Prop. all cancers n=89596 %
0- 4	3	0.4	33.3	2.2
5- 9	2	0.2		2.6
10-14	6	0.7		6.7
15-19	18	2.0		10.9
20-24	20	1.8		6.4
25-29	91	7.4	1.1	13.8
30-34	198	15.9		17.1
35-39	301	23.9	0.3	15.2
40-44	498	32.6	1.0	13.3
45-49	617	40.7	1.6	11.3
50-54	835	65.2	1.0	12.3
55-59	1045	93.0	2.0	14.0
60-64	1188	112.0	1.9	12.9
65-69	1428	136.8	2.9	12.5
70-74	1645	157.4	4.6	13.9
75-79	1309	183.5	6.3	13.0
80-84	1052	187.6	14.2	12.0
85+	1107	191.6	32.2	10.8
All ages	11363		6.8	12.7
Incidence				
Raw		60.7		
WS		30.3		
ES		42.2		
BRD-S		50.2		

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).

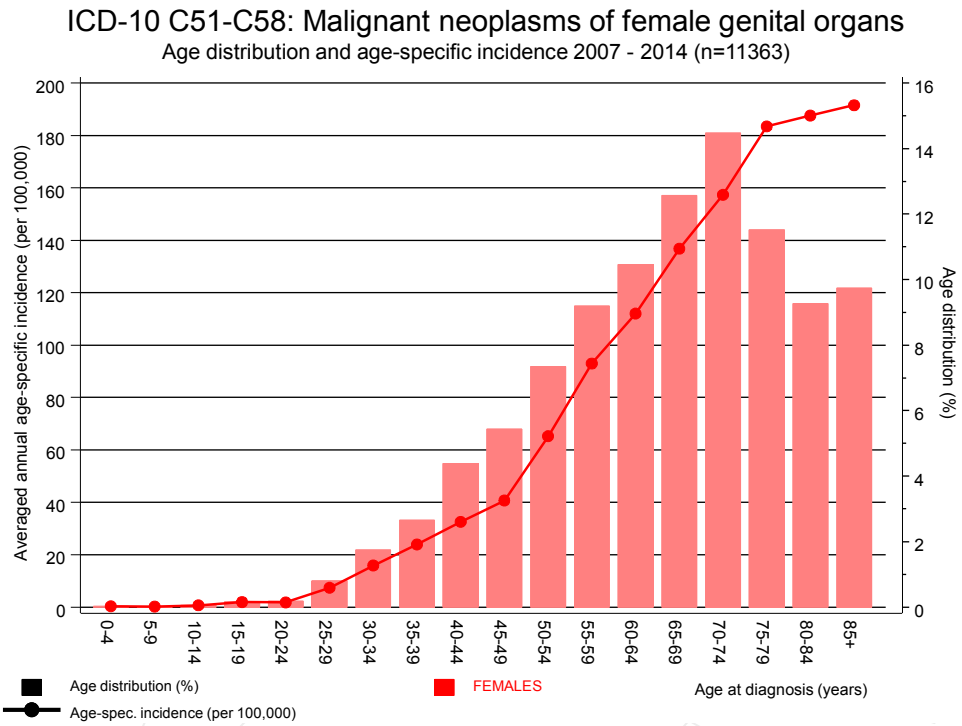

Figure 6. Age distribution and age-specific incidence

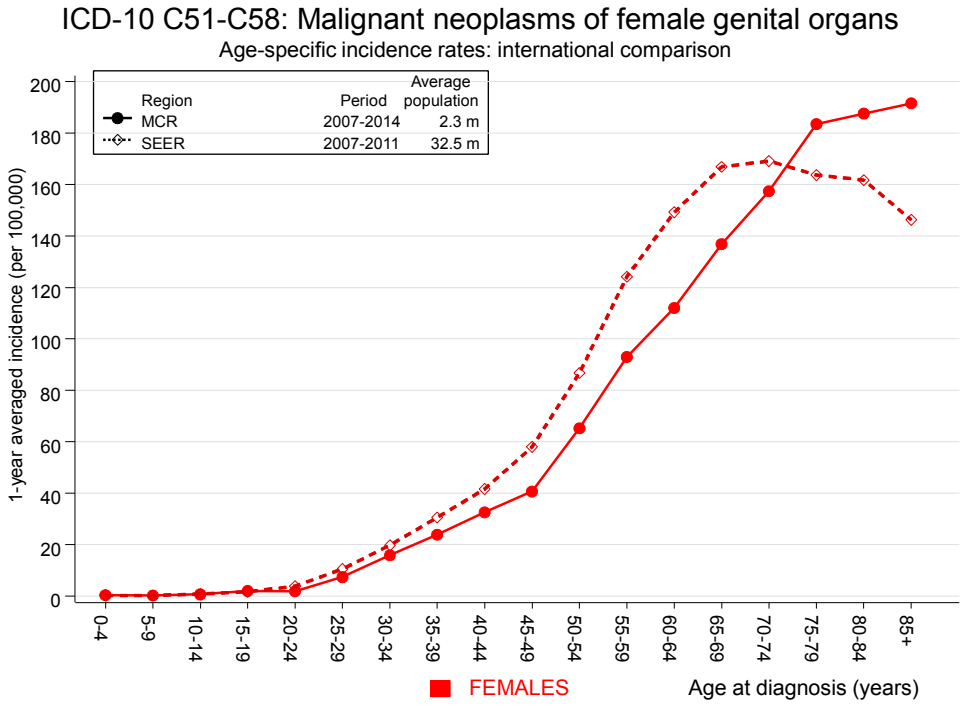

Figure 6a. Age-specific incidence in MCR registry areas compared to SEER (Surveillance, Epidemiology, and End Results, USA).

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.

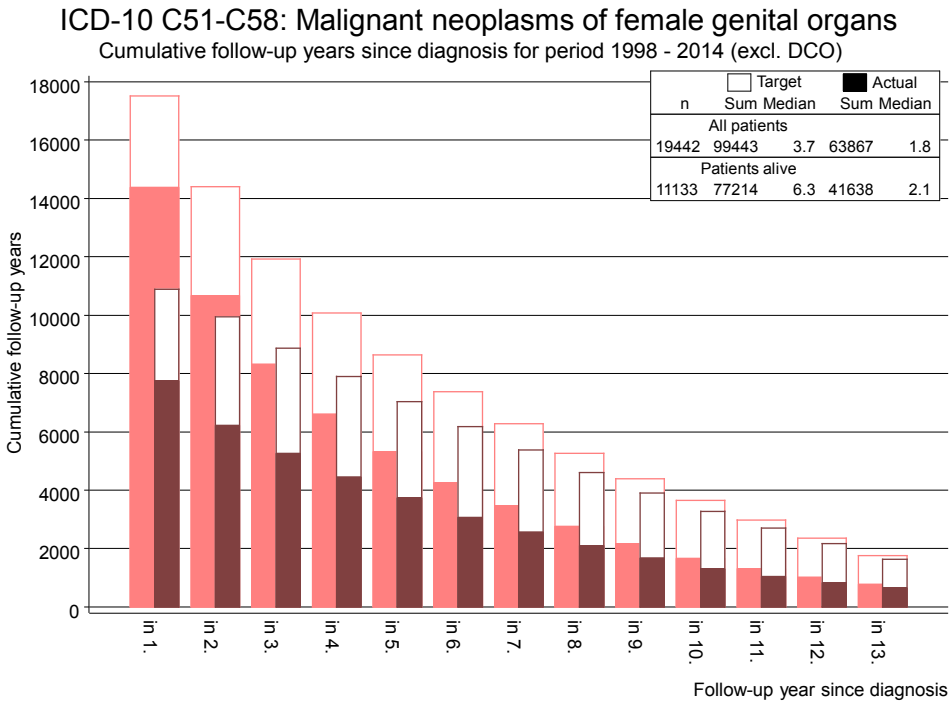

Figure 7. Cumulative follow-up years depending on time since diagnosis

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

Table 8

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

Diagnosis		Observed n	Expected n	SIR	LCL 95%	UCL 95%		EAR	DCO %
C03-C06	Oral cavity	8	3.9	2.0	0.9	4.0		0.6	
C09-C10	Oropharynx	5	2.7	1.8	0.6	4.3		0.4	
C15	Oesophagus	7	3.9	1.8	0.7	3.7		0.5	14.3
C16	Stomach	44	23.2	1.9	1.4	2.5	#	3.3	15.9
C17	Small intestine	18	3.1	5.8	3.4	9.1	#	2.4	5.6
C18	Colon	189	64.8	2.9	2.5	3.4	#	19.8	14.8
C19-C20	Rectum	65	28.0	2.3	1.8	3.0	#	5.9	12.3
C21	Anus/canal	16	3.4	4.6	2.7	7.5	#	2.0	6.3
C22	Liver	15	7.6	2.0	1.1	3.3	#	1.2	13.3
C23-C24	Bile	20	9.3	2.1	1.3	3.3	#	1.7	15.0
C25	Pancreas	60	28.6	2.1	1.6	2.7	#	5.0	30.0
C26	GI cancer	5	1.2	4.3	1.4	10.1	#	0.6	40.0
C30-C31	Sinuses	4	0.8	5.0	1.4	12.8	#	0.5	
C33-C34	Lung	145	47.3	3.1	2.6	3.6	#	15.6	13.1
C38,C45	Mesothelioma	4	1.2	3.4	0.9	8.7		0.4	
C43	Malign. melanoma	43	24.6	1.7	1.3	2.3	#	2.9	9.3
C46,C49	Soft tissue	16	3.7	4.3	2.5	7.0	#	2.0	
C48	Peritoneal	25	2.5	10.1	6.5	14.9	#	3.6	
C50	Breast	512	203.3	2.5	2.3	2.7	#	49.2	4.9
C51	Vulva	25	6.5	3.8	2.5	5.7	#	2.9	8.0
C52	Vagina	13	1.3	10.3	5.5	17.6	#	1.9	
C53	Cervix uteri	37	9.4	4.0	2.8	5.4	#	4.4	32.4
C54	Corpus uteri	148	37.1	4.0	3.4	4.7	#	17.7	14.2
C55,C57	Fem. genitals un	4	1.5	2.7	0.7	6.8		0.4	50.0
C56	Ovary	190	27.3	7.0	6.0	8.0	#	25.9	18.9
C64	Kidney	35	16.4	2.1	1.5	3.0	#	3.0	5.7
C65	Renal pelvis	11	2.0	5.4	2.7	9.7	#	1.4	9.1
C66	Ureter	3	1.0	2.9	0.6	8.5		0.3	33.3
C67	Bladder	41	12.2	3.4	2.4	4.6	#	4.6	7.3
C68	Urethra	3	0.2	14.9	3.1	43.4	#	0.4	
C70-C72	CNS cancer	18	9.2	2.0	1.2	3.1	#	1.4	16.7
C73	Thyroid	29	12.0	2.4	1.6	3.5	#	2.7	3.4
C76-C79	CUP	29	11.6	2.5	1.7	3.6	#	2.8	13.8
C81	Hodgkin lymphoma	5	1.3	4.0	1.3	9.3	#	0.6	
C82-C85	NHL	56	25.3	2.2	1.7	2.9	#	4.9	3.6
C90	Mult. myeloma	12	8.0	1.5	0.8	2.6		0.6	16.7
C91-C96	Leukaemia	27	10.5	2.6	1.7	3.7	#	2.6	29.6
Other primaries		12	7.6	1.6	0.8	2.7		0.7	16.7
Not observed		0	1.4	0.0	0.0	2.7		-0.2	
All mult. primaries		1899	664.9	2.9	2.7	3.0	#	196.6	11.6

Table 8

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

Diagnosis	Observed n	Expected n	SIR	LCL 95%	UCL 95%	EAR	DCO %
Patients			19469				
Median age at second malignancy (years)			71.0				
Person-years			62774				
Mean observation time (years)			3.2				
Median observation time (years)			1.8				

The occurrence of second malignancy is statistically significant.

Observed second primaries with count 1 to 2 are pooled in category “Other primaries”

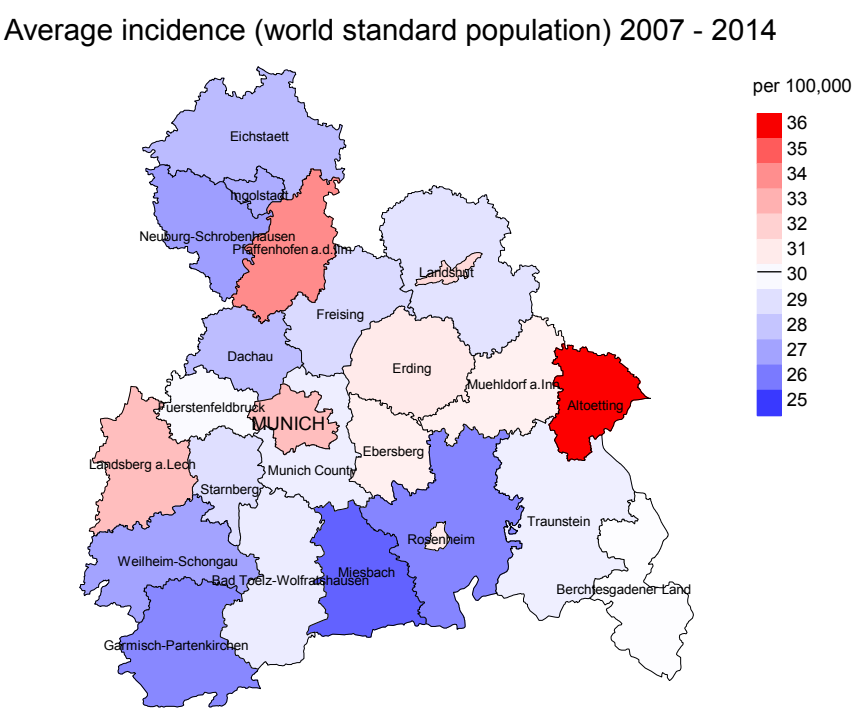

Figure 9a. Map of cancer incidence (world standard population, incl. DCO cases) by county averaged for period 2007 to 2014. According to their individual incidence rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (30.2/100,000 WS N=11,363).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 65,347 female residents (averaged) in the period from 2007 to 2014 a total of 323 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 30.8/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 26.2 and 36.0/100,000.

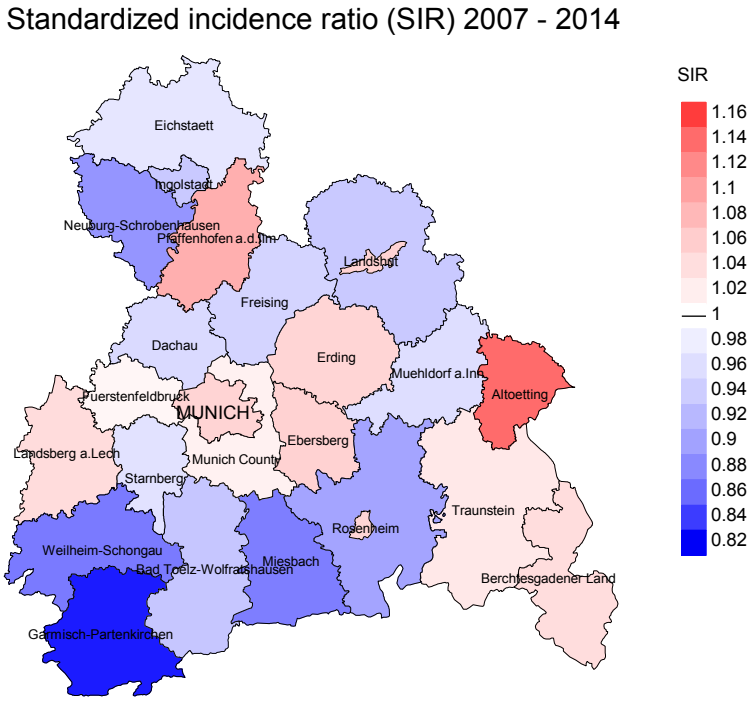

Figure 9b. Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2007 to 2014. According to their individual SIR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (N=11,363).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 64,924 female residents (averaged) in the period from 2007 to 2014 a total of 323 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 1.05. Though, the value of this parameter may vary with an underlying probability of 99% between 0.91 and 1.21, 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	835	96.4	7.4	536	64.2	90.1
1999	822	97.1	6.2	504	61.3	94.2
2000	805	97.1	7.7	474	58.9	94.5
2001	805	95.8	8.3	480	59.6	96.7
2002	1333	97.2	11.7	812	60.9	97.0
2003	1334	95.7	10.0	791	59.3	97.7
2004	1277	95.8	9.7	747	58.5	97.9
2005	1294	94.6	7.7	694	53.6	97.7
2006	1298	92.6	5.9	663	51.1	98.5
2007	1545	80.4	8.2	803	52.0	98.4
2008	1552	68.9	6.9	745	48.0	98.3
2009	1441	66.9	6.0	639	44.3	98.1
2010	1486	68.5	7.3	639	43.0	98.6
2011	1478	67.8	6.1	572	38.7	97.2
2012	1449	70.5	6.2	492	34.0	98.2
2013	1458	99.0	6.2	383	26.3	94.8
2014	1124	95.2	7.3	196	17.4	90.3
1998-2014	21336	85.3	7.6	10170	47.7	96.9

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	835	463	88.6	122	14.6
1999	822	495	88.9	117	14.2
2000	805	481	92.3	118	14.7
2001	805	481	92.5	112	13.9
2002	1333	780	95.6	269	20.2
2003	1334	806	97.3	228	17.1
2004	1277	794	97.6	217	17.0
2005	1294	819	96.6	189	14.6
2006	1298	774	96.6	180	13.9
2007	1545	912	97.7	249	16.1
2008	1552	926	99.4	218	14.0
2009	1441	937	99.1	181	12.6
2010	1486	956	98.8	229	15.4
2011	1478	1008	97.5	212	14.3
2012	1449	932	97.9	213	14.7
2013	1458	1058	98.1	211	14.5
2014	1124	912	98.7	164	14.6
1998-2014	21336	13534	96.8	3229	15.1

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	780	73.3	26.7	84.3
2003	806	73.6	26.4	82.9
2004	794	74.8	25.2	82.7
2005	819	75.1	24.9	82.8
2006	774	70.2	29.8	80.7
2007	912	73.2	26.8	80.5
2008	926	74.6	25.4	79.9
2009	937	71.0	29.0	78.0
2010	956	75.1	24.9	81.3
2011	1008	70.6	29.4	78.2
2012	932	69.1	30.9	77.7
2013	1058	70.3	29.7	77.2
2014	912	69.0	31.0	77.0
1998-2014	13534	71.8	28.2	80.5

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	780	77.5	73.9	84.7	75.4
2003	806	77.2	74.2	84.3	75.1
2004	794	77.5	74.1	84.2	75.2
2005	819	78.2	73.9	84.6	75.4
2006	774	78.2	74.6	85.0	75.8
2007	912	79.1	75.2	85.8	77.0
2008	926	77.9	73.7	85.9	74.6
2009	937	77.4	72.9	85.2	74.4
2010	956	78.2	74.9	85.5	75.7
2011	1008	77.6	73.5	85.5	74.9
2012	932	79.6	76.2	87.0	76.7
2013	1058	78.3	74.5	86.9	75.9
2014	912	77.4	74.5	85.3	75.1
1998-2014	13534	78.0	74.3	85.0	75.7

By 2010, life expectancy at birth was 77.5 years for boys and 82.6 years for girls.

Deaths of patients are considered to be cancer-related, in case that fact was recorded on the death certificate, or patients had suffered from metastasis or recurrence.

Table 12

Mortality measures (cancer-related death) and mortality-incidence-index
by year of death

Year of death	Deaths n	Mort. raw	MI-Index raw	Mort. WS	MI-Index WS	Mort. ES	MI-Index ES	Mort. BRD-S	MI-Index BRD-S
1998	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	0.33	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	0.43
2004	594	30.0	0.47	12.3	0.38	18.4	0.40	23.9	0.44
2005	615	30.9	0.48	12.5	0.39	18.7	0.42	24.2	0.45
2006	543	27.0	0.42	10.8	0.34	16.2	0.36	21.3	0.40
2007	668	28.9	0.44	11.2	0.34	16.8	0.37	22.1	0.41
2008	691	29.8	0.45	11.8	0.36	17.7	0.38	22.9	0.42
2009	665	28.6	0.47	11.6	0.37	17.3	0.40	22.1	0.43
2010	718	30.7	0.49	11.7	0.38	17.7	0.41	23.1	0.45
2011	713	30.2	0.49	11.8	0.39	17.8	0.42	22.9	0.45
2012	644	27.3	0.45	9.9	0.34	15.3	0.37	20.5	0.41
2013	746	31.6	0.52	12.1	0.40	18.3	0.43	23.9	0.47
2014	630	26.7	0.57	10.2	0.43	15.5	0.47	20.4	0.52
1998-2014	9718	29.1	0.46	11.6	0.36	17.5	0.39	22.8	0.43

Table 13

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

Age at death Years	Cases n	%	Cum.%
5-9	1	0.0	0.0
10-14	0	0.0	0.0
15-19	2	0.0	0.1
20-24	1	0.0	0.1
25-29	8	0.1	0.2
30-34	18	0.3	0.5
35-39	44	0.8	1.3
40-44	109	1.9	3.2
45-49	180	3.2	6.4
50-54	223	4.0	10.4
55-59	335	5.9	16.3
60-64	417	7.4	23.7
65-69	683	12.1	35.8
70-74	890	15.8	51.6
75-79	850	15.1	66.7
80-84	847	15.0	81.7
85+	1032	18.3	100.0
All ages	5640	100.0	

Included in the statistics are 25.3% multiple primaries.

Table 14

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

Age at death Years	Cases n	Age-spec. mortality	MI-index	Prop. all cancers %
0- 4		0.0		
5- 9	1	0.1	0.50	5.6
10-14		0.0		
15-19	2	0.2	0.11	9.1
20-24	1	0.1	0.05	3.6
25-29	8	0.6	0.09	12.5
30-34	18	1.4	0.09	16.4
35-39	44	3.5	0.14	17.1
40-44	109	7.1	0.22	17.2
45-49	180	11.9	0.29	14.8
50-54	223	17.4	0.26	12.5
55-59	335	29.8	0.32	12.8
60-64	417	39.3	0.35	11.7
65-69	683	65.4	0.47	13.1
70-74	890	85.1	0.53	13.5
75-79	850	119.2	0.64	13.5
80-84	847	151.1	0.79	12.9
85+	1032	178.6	0.93	11.9
All ages	5640			12.9
Mortality				
Raw		30.1	0.49	
WS		11.7	0.38	
ES		17.6	0.41	
BRD-S		23.0	0.45	
PYLL-70				
per 100,000		142.9		
ES		121.2		
AYLL-70		11.2		

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

Table 15

Multiple primaries in deaths in period 1998–2014

Diagnosis		Total n	Total %↓	Pre n	Pre ←%	Syn-chron ±30d n	Syn-chron ±30d ←%	Post n	Post ←%
C16	Stomach	121	3.2	20	16.5	12	9.9	89	73.6
C18	Colon	382	10.0	124	32.5	52	13.6	206	53.9
C19–C20	Rectum	203	5.3	72	35.5	17	8.4	114	56.2
C21	Anus/canal	32	0.8	10	31.3			22	68.8
C22	Liver	36	0.9	4	11.1	1	2.8	31	86.1
C23–C24	Bile	45	1.2	10	22.2	2	4.4	33	73.3
C25	Pancreas	134	3.5	10	7.5	8	6.0	116	86.6
C33–C34	Lung	295	7.7	28	9.5	21	7.1	246	83.4
C43	Malign. melanoma	108	2.8	60	55.6	2	1.9	46	42.6
C44	Skin others	117	3.1	51	43.6	14	12.0	52	44.4
C48	Peritoneal	56	1.5	24	42.9	13	23.2	19	33.9
C50	Breast	1032	27.0	591	57.3	90	8.7	351	34.0
C51	Vulva	55	1.4			4	7.3	51	92.7
C52	Vagina	37	1.0			8	21.6	29	78.4
C53	Cervix uteri	41	1.1			7	17.1	34	82.9
C54	Corpus uteri	68	1.8			19	27.9	49	72.1
C56	Ovary	214	5.6			94	43.9	120	56.1
C64	Kidney	73	1.9	28	38.4	6	8.2	39	53.4
C67	Bladder	164	4.3	41	25.0	14	8.5	109	66.5
C70–C72	CNS cancer	69	1.8	18	26.1	6	8.7	45	65.2
C73	Thyroid	41	1.1	25	61.0	1	2.4	15	36.6
C76–C79	CUP	75	2.0	20	26.7	9	12.0	46	61.3
C82–C85	NHL	91	2.4	30	33.0	7	7.7	54	59.3
C91–C96	Leukaemia	82	2.1	11	13.4	5	6.1	66	80.5
Other primaries		257	6.7	69	26.8	22	8.6	166	64.6
All mult. primaries		3828	100.0	1246	32.5	434	11.3	2148	56.1

Multiple primaries with number of cases 1 to 27 are pooled in category “Other primaries”

ICD-10 C44 (Other malignant neoplasms of skin) is not systematically recorded by MCR and therefore not considered for evaluation as a particular primary but at least as a multiple malignancy.

Table 16

Age-specific mortality (cancer-related) and proportion of all cancers
for period 2007-2014
(**First primaries only** *)

Age at death Years	Cases n	Age-spec. mortality	MI-index	Prop. all cancers %
0- 4		0.0		
5- 9	1	0.1	0.50	5.6
10-14		0.0		
15-19	2	0.2	0.11	10.0
20-24	1	0.1	0.05	3.8
25-29	6	0.5	0.07	10.2
30-34	14	1.1	0.07	14.7
35-39	40	3.2	0.14	17.6
40-44	101	6.6	0.22	18.2
45-49	147	9.7	0.28	14.3
50-54	184	14.4	0.26	12.4
55-59	284	25.3	0.31	13.2
60-64	340	32.1	0.34	12.0
65-69	545	52.2	0.45	13.3
70-74	717	68.6	0.55	14.1
75-79	679	95.2	0.66	14.0
80-84	673	120.0	0.81	13.4
85+	838	145.0	0.97	12.4
All ages	4572			13.3
Mortality				
Raw		24.4	0.48	
WS		9.5	0.37	
ES		14.3	0.40	
BRD-S		18.6	0.44	
PYLL-70				
per 100,000		120.4		
ES		102.2		
AYLL-70		11.4		

* See corresponding tables with multiple primaries.

Table 17

Age-specific mortality (cancer-related) and proportion of all cancers
for period 2007-2014
(**Single primaries only** *)

Age at death Years	Cases n	Age-spec. mortality	MI-index	Prop. all cancers %
0- 4		0.0		
5- 9	1	0.1	0.50	5.6
10-14		0.0		
15-19	2	0.2	0.11	11.1
20-24	1	0.1	0.05	4.2
25-29	6	0.5	0.07	10.7
30-34	12	1.0	0.06	14.5
35-39	36	2.9	0.13	17.6
40-44	92	6.0	0.20	18.1
45-49	130	8.6	0.26	14.2
50-54	156	12.2	0.23	11.8
55-59	248	22.1	0.29	13.2
60-64	282	26.6	0.30	11.6
65-69	441	42.2	0.40	13.0
70-74	569	54.4	0.47	13.8
75-79	516	72.3	0.54	13.0
80-84	490	87.4	0.62	12.0
85+	639	110.6	0.77	11.4
All ages	3621			12.6
Mortality				
Raw		19.3	0.40	
WS		7.8	0.32	
ES		11.6	0.34	
BRD-S		14.9	0.37	
PYLL-70				
per 100,000		104.8		
ES		89.1		
AYLL-70		11.8		

* See corresponding tables with multiple primaries.

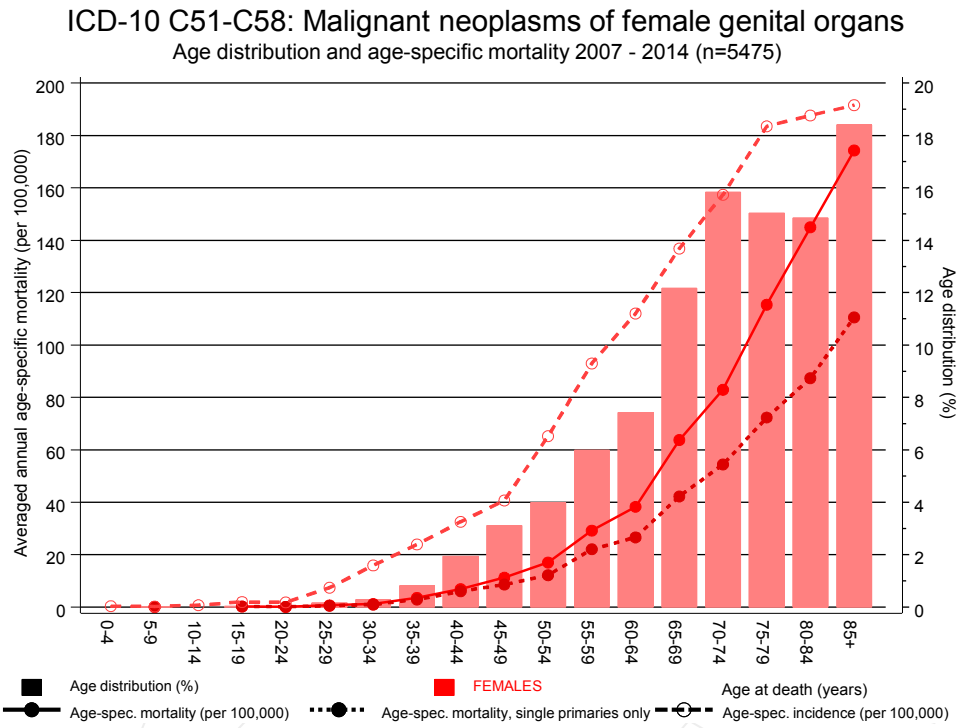

Figure 18. Distribution of age at death (bars) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

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 - 2014

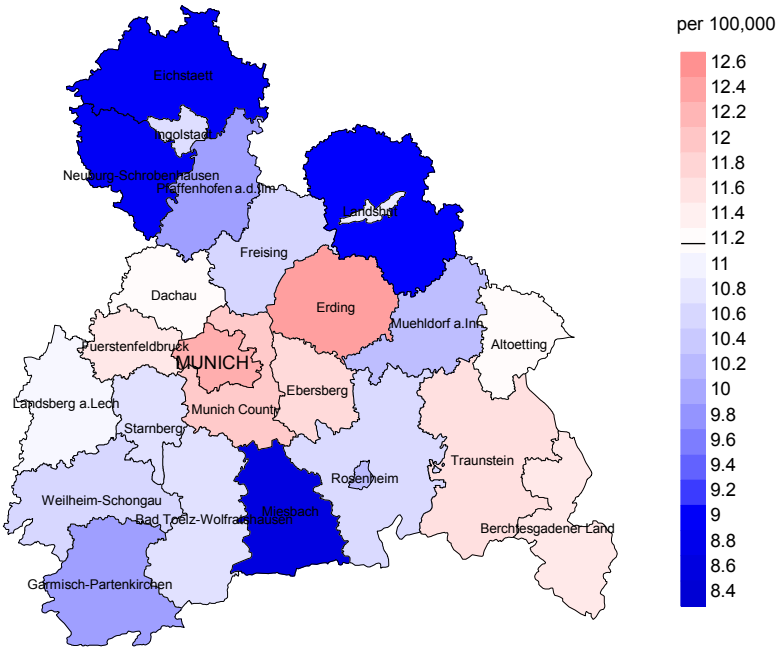

Figure 19a. Map of cancer mortality (world standard population) by county averaged for period 2007 to 2014. According to their individual mortality rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (11.2/100,000 WS N=5,433).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 65,347 female residents (averaged) in the period from 2007 to 2014 a total of 153 women died from fem. genitale cancer. Therefore, the mean mortality rate for this cancer type in this area can be calculated at 11.7/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 9.2 and 14.8/100,000.

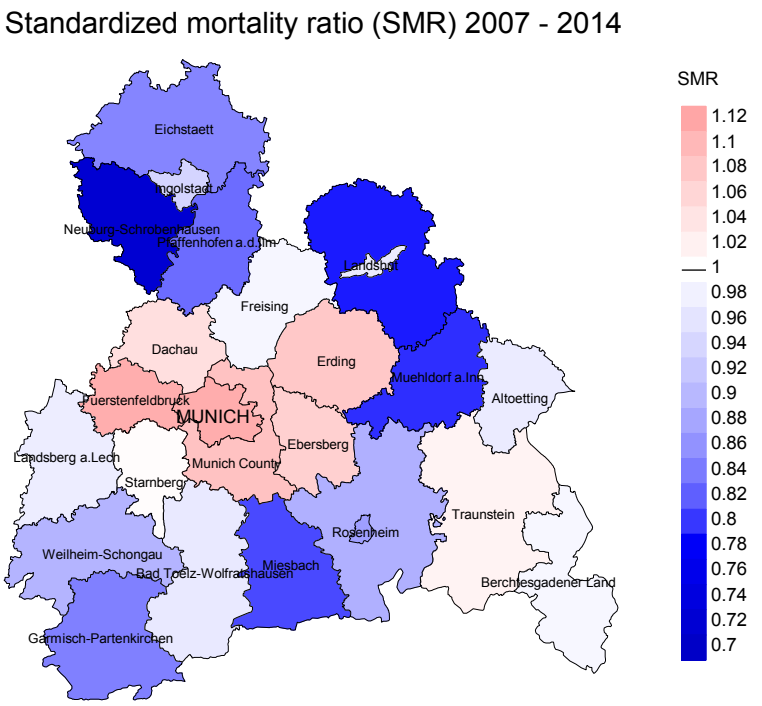

Figure 19b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2007 to 2014. According to their individual SMR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (N=5,433).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 64,924 female residents (averaged) in the period from 2007 to 2014 a total of 153 women died from fem. genitale cancer. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 1.07. Though, the value of this parameter may vary with an underlying probability of 99% between 0.86 and 1.31, and is therefore not statistically striking.

Statistical Notes

In all tables and figures the respective reference values should be carefully considered. The incidence rates include diagnoses (with multiple primary), and death certificate only (DCO) cases, where applicable. For mortality statistics patients, diagnoses and progressive course of disease are presented. In the calculations, all courses of disease are considered whereby progressions occurred and/or death certificate identified progressive cancers were ascertained. Additionally there are three groups of disease course to consider:

1. **All multiple primaries included**

   The mortality statistic describes the tumor-specific death, independent of any malignancy. The patient perspective, induced secondary malignancies, and the problem of multiple malignancies from the same primary tumor all have reasons for their inclusion.

2. **First singular primary** (no information about other prior or synchronous malignancy)

   The mortality statistic describes the cancer-related death for patients who have no therapeutic restrictions due to a previous or synchronous cancer. These statistics are comparable to studies that have exclusion criteria based on a second malignancy.

3. **Single primary** (no information about other prior, syn- or metachronous malignancy)

   The mortality statistic describes the tumor-specific death that occurs without any impact through secondary primaries, earlier, synchronous, later or induced. Precisely the difference between disease group 1 and 2 highlight the magnitude of the problem of secondary malignancies.

For this reason differences appear concerning official mono-causal mortality statistics. To judge the maximum deviation, 2 further tables are presented. In the first table the distribution of secondary malignancies before, at or after the described cancer are shown, that could be an alternative cause of death. In the second table, the age-specific mortality rates for all courses of disease, without designation of secondary malignancies are shown.

A previously minimally acknowledged statistic is the **age at death**, which allows for a good assessment of the quality of classification of the apparent tumor-specific death. For assumed tumor-independent deaths, the age of death should be estimated from the age of diagnosis and the normal life expectancy, whereas tumor-dependent deaths can be estimated from the age of diagnosis plus the average tumor-specific life expectancy. The comparison of different tumors demonstrates this association, if the causes of cancer and the competing cause of death are independent of each other (e.g. breast and colon versus head/neck and lung).

The index from mortality and incidence (Mortality-Incidence ratio, **MI-index**) is a statistic that allows for the evaluation of the quality of data. For diseases with poor prognoses, comparable values are obtained from all age groups, because to a large extent, the numerator and denominator contain the same cases. For tumors with a good prognosis, increasing and decreasing incidence and age-specific differences in prognosis can more strongly alter the MI- index. Additionally, attention should be paid to the confidence intervals where fewer cases are reported.

The complexity of problems identified here emphasizes the importance of relative survival data for the appropriate analysis of long term results.

As a measurement of the burden of disease, the number of potential life years loss due to premature deaths in a cohort can be calculated (**PYLL**, potential years of life lost, standardized per 100,000 persons or per European standard) as well as the average loss of life years per individual (**AYLL**, average years of life lost). Depending upon the analytic aim (health economy, prevention, health care research) different methods exist for the generation of these measurements. In the results presented here, the age for a premature death is considered to be before 70 years, according to the guidelines of the OECD and the WHO (as seen in the abbreviation PYLL-70 or AYLL-70).

Shortcuts

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

Recommended Citation

Munich Cancer Registry. ICD-10 C51-C58: Fem. genitale cancer - Incidence and Mortality [Internet]. 2016 [updated 2016 Apr 13; cited 2016 Jun 1]. Available from: http://www.tumorregister-muenchen.de/en/facts/base/bC5158E-ICD-10-C51-C58-Fem.-genitale-cancer-incidence-and-mortality.pdf

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