Munich Cancer Registry

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

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

Cancer statistics: Baseline statistics

C56: Ovarian cancer

Year of diagnosis	1998-2013
Patients	6,046
Diseases	6,048
Creation date	05/19/2015
Export date	12/30/2014
Population (females)	2.36 m

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
C56	Malignant neoplasm of ovary

... if <u>not</u> existing any of ...

Topography codes (ICD-O-3 2000) used for specifying cancer site

Code	Description
C48.-	Retroperitoneum and peritoneum
C49.-	Connective, subcutaneous and other soft tissues
C57.0	Other and unspecified female genital organs: Fallopian tube

Extra-ovarian carcinomas are additionally excluded by internal coding.

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	276	36	13.0	17.8	81.5	99.3
1999	258	25	9.7	21.3	77.5	98.8
2000	263	32	12.2	24.3	73.8	99.2
2001	232	34	14.7	22.4	73.7	98.7
2002	431	74	17.2	29.5	79.1	98.8 #
2003	444	73	16.4	23.4	75.2	98.0
2004	389	59	15.2	23.9	78.1	97.4
2005	363	47	12.9	23.7	76.6	97.0
2006	404	41	10.1	22.3	72.8	97.8
2007	489	69	14.1	25.4	69.3	90.0 # ##
2008	493	62	12.6	20.9	66.1	82.2
2009	399	44	11.0	21.8	59.9	78.2
2010	442	55	12.4	26.9	58.1	80.3
2011	411	53	12.9	23.6	55.0	79.3
2012	397	36	9.1	22.9	41.8	76.1
2013	357	44	12.3	22.1	29.4	98.0 ###
1998–2013	6048	784	13.0	23.5	66.1	90.9

\#   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 4.64 m as of 2007, respectively)

Year of diagnosis	Cases n	Incidence raw	Incidence WS	Incidence ES	Incidence BRD-S
1998	276	23.5	12.8	17.5	20.8
1999	258	21.7	10.8	15.4	18.8
2000	263	21.9	11.2	15.8	19.1
2001	232	19.1	10.1	13.9	16.4
2002	431	22.0	10.9	15.4	18.9
2003	444	22.5	11.4	16.0	19.3
2004	389	19.7	10.2	14.1	16.9
2005	363	18.2	8.8	12.4	15.1
2006	404	20.1	9.7	13.8	16.8
2007	489	21.2	10.2	14.5	17.6
2008	493	21.2	10.6	14.8	17.9
2009	399	17.2	8.2	11.6	14.3
2010	442	18.9	8.9	12.6	15.4
2011	411	17.4	8.4	11.8	14.4
2012	397	16.8	8.1	11.2	13.7
2013	357	15.1	7.7	10.6	12.6
1998-2013	6048	19.5	9.6	13.5	16.4

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	276	64.7	16.1	14.6	92.1	43.5	55.2	65.9	76.9	84.9
1999	258	67.2	14.2	16.5	96.5	49.4	58.3	67.6	78.2	85.1
2000	263	66.7	14.2	19.9	94.8	47.9	57.4	66.4	78.8	85.3
2001	232	64.9	15.6	26.3	98.8	42.6	55.3	65.5	76.7	85.4
2002	431	67.3	14.2	13.2	96.6	48.5	59.0	68.2	78.2	83.2
2003	444	66.6	14.9	7.6	95.3	46.8	56.8	67.5	78.1	83.5
2004	389	66.2	15.1	15.9	97.3	45.6	56.6	66.6	77.9	84.4
2005	363	67.4	14.9	19.2	96.4	45.5	57.6	68.1	79.7	84.9
2006	404	67.6	14.4	24.9	95.8	45.8	57.8	68.9	79.0	84.6
2007	489	68.0	14.4	18.3	98.1	48.1	58.4	69.4	79.3	85.8
2008	493	66.9	15.0	11.1	102	46.5	58.1	68.5	78.4	84.9
2009	399	67.4	14.9	11.2	97.6	46.7	56.7	69.2	78.8	84.5
2010	442	68.3	14.5	17.0	98.5	49.2	58.6	69.4	78.7	86.7
2011	411	67.7	13.6	4.1	94.5	50.3	59.1	69.4	77.5	83.8
2012	397	67.6	15.4	5.4	95.9	46.7	58.4	69.9	79.0	85.3
2013	357	66.5	14.8	10.1	100	48.0	57.4	68.8	76.6	84.6
1998-2013	6048	67.1	14.8	4.1	102	47.2	57.8	68.2	78.3	84.8

Table 4

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

Age at diagnosis Years	Cases n	%	Cum.%
0-4	1	0.0	0.0
5-9	2	0.0	0.0
10-14	10	0.2	0.2
15-19	23	0.4	0.6
20-24	21	0.3	0.9
25-29	34	0.6	1.5
30-34	57	0.9	2.4
35-39	116	1.9	4.4
40-44	220	3.6	8.0
45-49	296	4.9	12.9
50-54	457	7.6	20.5
55-59	540	8.9	29.4
60-64	701	11.6	41.0
65-69	789	13.0	54.0
70-74	755	12.5	66.5
75-79	769	12.7	79.2
80-84	676	11.2	90.4
85+	581	9.6	100.0
All ages	6048	100.0	

Included in the statistics are 27.9% 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=784 %	Prop. all cancers n=153136 %
0- 4	1	0.1		0.4
5- 9	2	0.1		1.6
10-14	10	0.7		5.9
15-19	23	1.6		7.9
20-24	21	1.2		4.0
25-29	34	1.7	2.9	3.1
30-34	57	2.6		2.8
35-39	116	4.9	1.7	3.1
40-44	220	8.8	3.6	3.5
45-49	296	12.8	3.7	3.4
50-54	457	22.2	2.6	4.1
55-59	540	28.1	4.6	3.9
60-64	701	37.4	3.6	4.1
65-69	789	45.7	6.2	4.2
70-74	755	49.7	9.8	4.1
75-79	769	64.7	16.1	4.4
80-84	676	72.5	27.5	4.3
85+	581	65.0	46.0	3.4
All ages	6048		13.0	3.9

Incidence	
Raw	19.5
WS	9.6
ES	13.5
BRD-S	16.4

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	2	0.8	2.5	0.3	9.2		1.0	
C16 Stomach	14	4.4	3.2	1.8	5.4	#	7.6	7.1
C17 Small intestine	3	0.6	5.1	1.1	14.9	#	1.9	
C18 Colon	41	12.1	3.4	2.4	4.6	#	22.7	22.0
C19-C20 Rectum	13	5.4	2.4	1.3	4.1	#	5.9	7.7
C22 Liver	2	1.4	1.5	0.2	5.3		0.5	50.0
C23-C24 Bile	5	1.7	2.9	0.9	6.8		2.6	40.0
C25 Pancreas	9	5.1	1.8	0.8	3.4		3.1	44.4
C33-C34 Lung	20	9.0	2.2	1.4	3.4	#	8.6	25.0
C43 Malign. melanoma	5	4.7	1.1	0.3	2.5		0.3	
C48 Peritoneal	5	0.5	11.0	3.6	25.8	#	3.6	
C50 Breast	105	40.6	2.6	2.1	3.1	#	50.6	5.7
C51 Vulva	5	1.1	4.4	1.4	10.4	#	3.0	20.0
C53 Cervix uteri	8	1.9	4.2	1.8	8.3	#	4.8	
C54 Corpus uteri	111	7.3	15.2	12.5	18.3	#	81.4	4.5
C56 Ovary	4	5.4	0.7	0.2	1.9		-1.1	
C64 Kidney	7	3.1	2.2	0.9	4.6		3.0	
C65 Renal pelvis	3	0.4	8.4	1.7	24.5	#	2.1	
C67 Bladder	6	2.2	2.8	1.0	6.0	#	3.0	
C70-C72 CNS cancer	2	1.8	1.1	0.1	4.0		0.1	
C73 Thyroid	7	2.6	2.7	1.1	5.5	#	3.4	
C76-C79 CUP	3	2.1	1.5	0.3	4.3		0.7	66.7
C82-C85 NHL	9	4.8	1.9	0.9	3.6		3.3	
C90 Mult. myeloma	5	1.5	3.3	1.1	7.7	#	2.7	20.0
C91-C96 Leukaemia	4	1.9	2.1	0.6	5.3		1.6	25.0
Other primaries	5	2.5	2.0	0.6	4.6		1.9	
Not observed	0	3.4	0.0	0.0	1.1		-2.7	
All mult. primaries	403	128.1	3.1	2.8	3.5	#	215.7	9.7

Patients	3914
Median age at second malignancy (years)	67.6
Person-years	12742
Mean observation time (years)	3.3
Median observation time (years)	2.1

The occurrence of second malignancy is statistically significant.

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

C56: Malignant neoplasm of ovary (invasive)

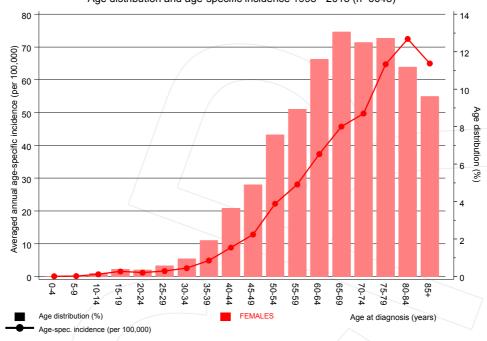Age distribution and age-specific incidence 1998 - 2013 (n=6048)
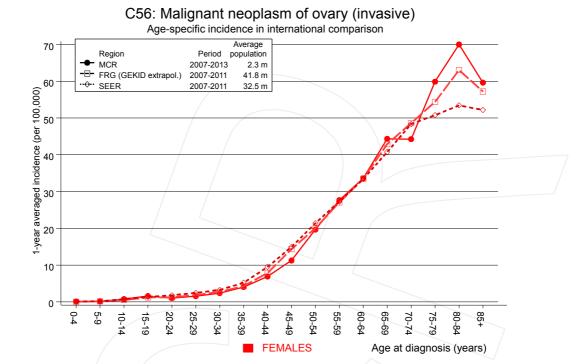

Figure 7. Age distribution and age-specific incidence

C56: Malignant neoplasm of ovary (invasive)
Age-specific incidence in international comparison

Region	Period	Average population
MCR	2007-2013	2.3 m
FRG (GEKID extrapol.)	2007-2011	41.8 m
SEER	2007-2011	32.5 m

FEMALES

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, 2014. http://www.gekid.de. Last access: 02/11/2015

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.
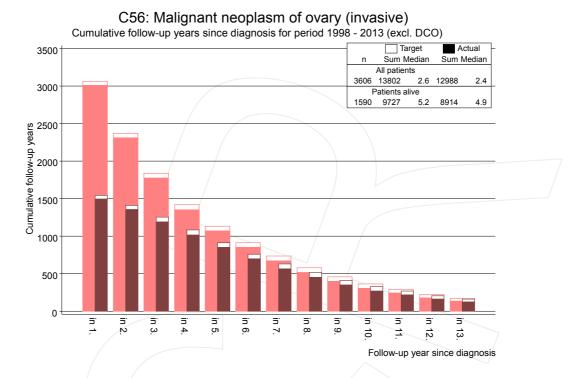
C56: Malignant neoplasm of ovary (invasive)

Cumulative follow-up years since diagnosis for period 1998 - 2013 (excl. DCO)

	Target		Actual	
n	Sum	Median	Sum	Median
All patients				
3606	13802	2.6	12988	2.4
Patients alive				
1590	9727	5.2	8914	4.9

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
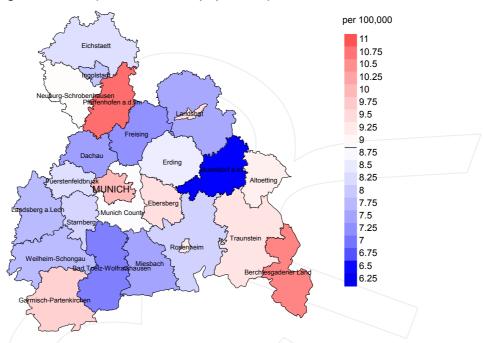
Figure 9a. Map of cancer incidence (world standard population, incl. DCO cases) by county averaged for period 2007 to 2013. According to their individual incidence rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (8.9/100,000 WS N=2,988).

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 90 women were identified with newly diagnosed ovarian cancer. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 9.4/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 6.8 and 12.8/100,000.
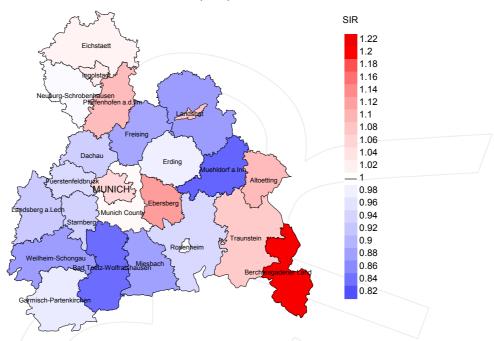
Standardized incidence ratio (SIR) 2007 - 2013

Figure 9b. Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2007 to 2013. According to their individual SIR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (N=2,988).

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 90 women were identified with newly diagnosed ovarian cancer. Therefore, the mean standardized incidence ratio (SIR) for this cancer type in this area can be calculated at 1.12. Though, the value of this parameter may vary with an underlying probability of 99% between 0.84 and 1.47, 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	276	99.3	13.0	225	81.5	88.4
1999	258	98.8	9.7	200	77.5	94.0
2000	263	99.2	12.2	194	73.8	94.3
2001	232	98.7	14.7	171	73.7	98.2
2002	431	98.8	17.2	341	79.1	96.8
2003	444	98.0	16.4	334	75.2	97.6
2004	389	97.4	15.2	304	78.1	98.0
2005	363	97.0	12.9	278	76.6	98.9
2006	404	97.8	10.1	294	72.8	98.0
2007	489	90.0	14.1	339	69.3	97.1
2008	493	82.2	12.6	326	66.1	97.2
2009	399	78.2	11.0	239	59.9	98.7
2010	442	80.3	12.4	257	58.1	95.3
2011	411	79.3	12.9	226	55.0	97.3
2012	397	76.1	9.1	166	41.8	97.0
2013	357	98.0	12.3	105	29.4	90.5
1998-2013	6048	90.9	13.0	3999	66.1	96.5

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	276	186	87.6	65	23.6
1999	258	191	86.9	56	21.7
2000	263	177	90.4	59	22.4
2001	232	201	93.5	56	24.1
2002	431	312	96.5	135	31.3
2003	444	295	99.0	117	26.4
2004	389	291	98.3	104	26.7
2005	363	307	98.0	89	24.5
2006	404	288	96.2	101	25.0
2007	489	333	98.8	122	24.9
2008	493	357	100.0	121	24.5
2009	399	357	99.4	94	23.6
2010	442	353	98.6	118	26.7
2011	411	334	96.7	105	25.5
2012	397	290	96.2	84	21.2
2013	357	347	98.6	83	23.2
1998-2013	6048	4619	96.7	1509	25.0

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	186	79.6	20.4	94.5
1999	191	82.2	17.8	93.4
2000	177	89.3	10.7	95.0
2001	201	88.1	11.9	93.6
2002	312	87.5	12.5	94.7
2003	295	88.8	11.2	92.8
2004	291	90.4	9.6	93.4
2005	307	92.2	7.8	95.0
2006	288	86.8	13.2	94.9
2007	333	90.7	9.3	93.9
2008	357	93.0	7.0	95.2
2009	357	88.5	11.5	93.5
2010	353	93.8	6.2	96.3
2011	334	86.8	13.2	92.3
2012	290	86.2	13.8	93.5
2013	347	87.0	13.0	90.9
1998-2013	4619	88.6	11.4	93.9

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	186	74.6	73.4	79.8	74.7
1999	191	74.3	72.0	79.7	75.2
2000	177	72.9	73.0	70.8	73.7
2001	201	73.1	70.1	86.6	72.0
2002	312	73.7	72.5	83.1	73.1
2003	295	74.3	73.2	84.3	73.3
2004	291	73.7	73.2	83.0	73.3
2005	307	73.6	72.0	84.2	72.4
2006	288	74.5	73.2	82.9	73.9
2007	333	75.8	74.2	83.9	75.1
2008	357	74.6	74.0	87.7	74.1
2009	357	72.8	71.9	80.9	72.1
2010	353	74.9	74.8	85.1	74.9
2011	334	73.1	71.9	82.7	72.5
2012	290	76.0	74.3	86.5	74.7
2013	347	74.5	73.5	87.2	74.1
1998-2013	4619	74.2	73.1	83.5	73.6

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	148	12.6	0.54	5.5	0.43	8.3	0.48	10.6	0.51
1999	157	13.2	0.61	5.7	0.53	8.7	0.56	11.3	0.60
2000	158	13.2	0.60	5.6	0.50	8.5	0.54	11.1	0.58
2001	177	14.6	0.76	6.5	0.65	9.6	0.69	12.1	0.74
2002	273	13.9	0.63	6.2	0.57	9.2	0.60	11.7	0.62
2003	262	13.3	0.59	5.7	0.50	8.4	0.53	11.0	0.57
2004	263	13.3	0.68	5.6	0.55	8.3	0.59	10.7	0.64
2005	283	14.2	0.78	6.1	0.69	9.0	0.73	11.6	0.76
2006	250	12.4	0.62	5.2	0.53	7.7	0.56	9.9	0.59
2007	302	13.1	0.62	5.2	0.51	7.8	0.54	10.3	0.59
2008	332	14.3	0.67	5.7	0.54	8.5	0.58	11.2	0.63
2009	316	13.6	0.79	5.8	0.71	8.5	0.74	10.8	0.76
2010	331	14.1	0.75	5.4	0.61	8.1	0.64	10.8	0.71
2011	290	12.3	0.71	5.2	0.61	7.6	0.65	9.8	0.68
2012	250	10.6	0.63	4.1	0.50	6.2	0.55	8.2	0.60
2013	302	12.8	0.85	5.0	0.65	7.5	0.71	9.7	0.77
1998-2013	4094	13.2	0.68	5.5	0.57	8.2	0.60	10.6	0.65

Table 13

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

Age at death Years	Cases n	%	Cum.%
15-19	2	0.0	0.0
20-24	3	0.1	0.1
25-29	6	0.1	0.3
30-34	12	0.3	0.6
35-39	26	0.6	1.2
40-44	62	1.5	2.7
45-49	129	3.1	5.9
50-54	182	4.4	10.3
55-59	288	7.0	17.3
60-64	397	9.7	27.0
65-69	548	13.4	40.4
70-74	637	15.5	55.9
75-79	624	15.2	71.2
80-84	618	15.1	86.3
85+	563	13.7	100.0
All ages	4097	100.0	

Included in the statistics are 27.9% 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		0.0		
5- 9		0.0		
10-14		0.0		
15-19	2	0.1	0.09	5.4
20-24	3	0.2	0.14	5.9
25-29	6	0.3	0.18	5.2
30-34	12	0.5	0.21	5.3
35-39	26	1.1	0.22	5.0
40-44	62	2.5	0.28	5.5
45-49	129	5.6	0.44	6.4
50-54	182	8.9	0.40	5.9
55-59	288	15.0	0.53	6.1
60-64	397	21.2	0.57	6.1
65-69	548	31.8	0.69	6.6
70-74	637	42.0	0.84	6.4
75-79	624	52.5	0.81	5.8
80-84	618	66.2	0.91	5.5
85+	563	63.0	0.97	4.1
All ages	4097			5.7
Mortality				
Raw		13.2	0.68	
WS		5.5	0.57	
ES		8.2	0.60	
BRD-S		10.6	0.65	
PYLL-70				
per 100,000		66.1		
ES		56.6		
AYLL-70		10.6		

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	48	3.8	14	29.2	7	14.6	27	56.3
C18	Colon	145	11.4	64	44.1	31	21.4	50	34.5
C19-C20	Rectum	50	3.9	20	40.0	13	26.0	17	34.0
C23-C24	Bile	15	1.2	7	46.7	2	13.3	6	40.0
C25	Pancreas	36	2.8	7	19.4	5	13.9	24	66.7
C33-C34	Lung	41	3.2	5	12.2	7	17.1	29	70.7
C43	Malign. melanoma	41	3.2	27	65.9	1	2.4	13	31.7
C44	Skin others	30	2.4	14	46.7	6	20.0	10	33.3
C48	Peritoneal	40	3.1	20	50.0	8	20.0	12	30.0
C50	Breast	399	31.3	272	68.2	37	9.3	90	22.6
C51	Vulva	11	0.9	2	18.2	3	27.3	6	54.5
C53	Cervix uteri	59	4.6	39	66.1	15	25.4	5	8.5
C54	Corpus uteri	124	9.7	29	23.4	78	62.9	17	13.7
C55,C57	Fem. genitals un	11	0.9	4	36.4	3	27.3	4	36.4
C64	Kidney	21	1.6	9	42.9	2	9.5	10	47.6
C67	Bladder	29	2.3	17	58.6	1	3.4	11	37.9
C70-C72	CNS cancer	14	1.1	3	21.4	3	21.4	8	57.1
C73	Thyroid	19	1.5	16	84.2	1	5.3	2	10.5
C76-C79	CUP	26	2.0	13	50.0	2	7.7	11	42.3
C82-C85	NHL	29	2.3	17	58.6	4	13.8	8	27.6
C91-C96	Leukaemia	14	1.1	1	7.1	1	7.1	12	85.7
Other primaries		72	5.7	19	26.4	10	13.9	43	59.7
All mult. primaries		1274	100.0	619	48.6	240	18.8	415	32.6

Multiple primaries with number of cases 1 to 10 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		0.0		
5- 9		0.0		
10-14		0.0		
15-19	2	0.1	0.09	6.1
20-24	3	0.2	0.14	6.4
25-29	4	0.2	0.13	3.7
30-34	11	0.5	0.20	5.5
35-39	24	1.0	0.24	5.2
40-44	52	2.1	0.28	5.2
45-49	105	4.5	0.44	6.1
50-54	142	6.9	0.39	5.4
55-59	240	12.5	0.55	6.0
60-64	333	17.8	0.59	6.2
65-69	440	25.5	0.69	6.6
70-74	513	33.8	0.86	6.6
75-79	505	42.5	0.84	5.9
80-84	509	54.6	0.94	5.7
85+	460	51.5	0.97	4.2
All ages	3343			5.7
Mortality				
Raw		10.8	0.68	
WS		4.5	0.57	
ES		6.7	0.61	
BRD-S		8.6	0.65	
PYLL-70				
per 100,000		54.6		
ES		46.7		
AYLL-70		10.7		

* 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		0.0		
5- 9		0.0		
10-14		0.0		
15-19	2	0.1	0.09	7.1
20-24	3	0.2	0.14	6.8
25-29	4	0.2	0.14	3.9
30-34	10	0.5	0.19	5.5
35-39	20	0.8	0.21	4.7
40-44	50	2.0	0.28	5.5
45-49	97	4.2	0.44	6.3
50-54	125	6.1	0.36	5.3
55-59	224	11.7	0.53	6.3
60-64	308	16.4	0.59	6.6
65-69	402	23.3	0.66	7.1
70-74	471	31.0	0.85	7.2
75-79	454	38.2	0.80	6.3
80-84	459	49.2	0.88	6.2
85+	415	46.4	0.89	4.4
All ages	3044			6.1
Mortality				
Raw		9.8	0.66	
WS		4.1	0.55	
ES		6.1	0.59	
BRD-S		7.9	0.63	
PYLL-70				
per 100,000		50.1		
ES		42.9		
AYLL-70		10.7		

* See corresponding tables with multiple primaries.

C56: Malignant neoplasm of ovary (invasive)
Age distribution and age-specific mortality 1998 - 2013 (n=4094)
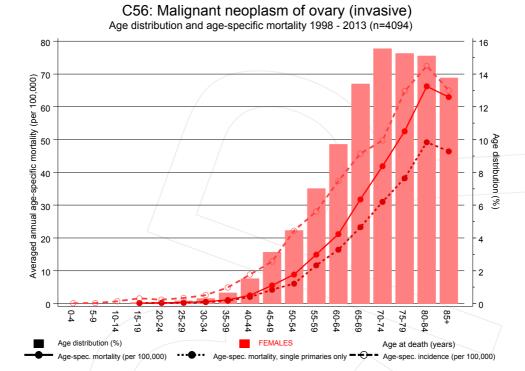
Figure 18. Distribution of age at death (bars) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

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

Average mortality (world standard population) 2007 - 2013
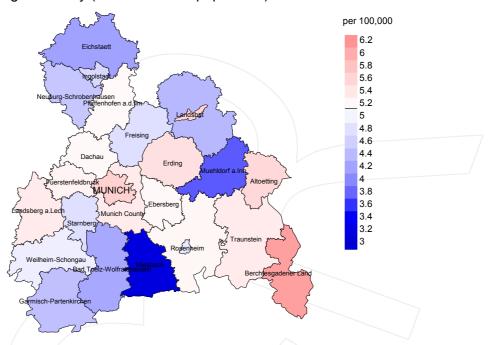
Figure 19a. Map of cancer mortality (world standard population) by county averaged for period 2007 to 2013. According to their individual mortality rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (5.1/100,000 WS N=2,105).

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 61 women died from ovarian cancer. Therefore, the mean mortality rate for this cancer type in this area can be calculated at 5.2/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 3.5 and 7.6/100,000.

Standardized mortality ratio (SMR) 2007 - 2013
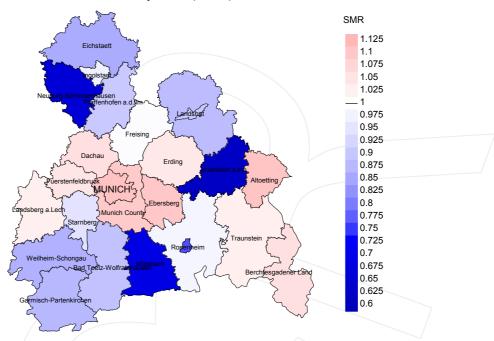
Figure 19b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2007 to 2013. According to their individual SMR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (N=2,105).

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 61 women died from ovarian cancer. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 1.10. Though, the value of this parameter may vary with an underlying probability of 99% between 0.77 and 1.52, 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

Recommended Citation

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