Munich Cancer Registry

- Survival
- Selection Matrix
- Homepage

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

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

Cancer statistics: Baseline statistics

C56, D39.1: Ovarian cancer

Year of diagnosis	1998-2012
Patients	6,641
Diseases	6,656
Creation date	03/20/2014
Export date	02/12/2014
Population (females)	2.3 m

http://www.tumorregister-muenchen.de/en/facts/base/base_C56D_E.pdf

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

In these analyses, the clinics and physicians of Upper Bavaria and the city and county of Landshut[#], with a total of 4.5 million inhabitants, account for the frequency of cancer diseases[##] and the achieved long term results. Additionally, the long term survival evaluated by the Munich Cancer Registry (MCR) is compared with the results of the population-based registry in the USA (SEER), which is useful for checking the consistency of the data on an international level.

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

The foot notes describe the currentness of the data. The baseline statistics and survival data are updated annually. This yearly analysis comprises the Annual Report of the MCR. The time-delayed acquisition of data and the occasionally high DCO-rates indicate optimizing reserves, among others, because of current financial and legal conditions that hinder the analyses.

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

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

Munich Cancer Registry, March 2014

[#] Base data has been collected since 1998. An increase in new diseases is apparent, which is an effect of two extensions in the MCR catchment area (from a base population of 2.51 million to 3.96 in 2002, and to 4.52 million in 2007). Death certificates from 2013 are incorporated into these analyses.

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

[###] DCO (death certificate only) identifies a cancer case that first becomes available to the MCR through the death certificate. A high proportion of DCO cases (≥5%) in particular cancer types indicate insufficient participation of specific cancer specializations.

ICD-10 codes used for specifying cancer site

ICD-10	Description
C56	Malignant neoplasm of ovary
D39.1	Neoplasm of uncertain or unknown behaviour: Ovary Excl. primary extraovarian carcinoma without ovarian involvement; topography codes C48 Retroperitoneum and peritoneum, C49 Connective, subcutaneous and other soft tissues, C57.0 Fallopian/uterine tube

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	298	36	12.1	18.8	77.5	99.0	
1999	284	25	8.8	22.2	71.1	98.2	
2000	300	32	10.7	25.0	66.7	98.3	
2001	259	34	13.1	22.4	68.0	98.5	
2002	476	74	15.5	29.0	72.3	97.5	#
2003	503	73	14.5	23.5	68.8	97.4	#
2004	464	59	12.7	24.1	68.5	97.0	#
2005	441	48	10.9	23.1	64.6	96.1	#
2006	482	42	8.7	21.0	60.4	95.4	#
2007	578	68	11.8	23.9	57.8	84.3	# ##
2008	588	62	10.5	18.5	54.9	74.0	
2009	496	44	8.9	20.2	46.4	68.5	
2010	539	56	10.4	23.6	44.0	71.6	
2011	515	54	10.5	21.2	37.5	70.7	
2012	433	38	8.8	22.2	27.5	96.3	###
1998-2012	6656	745	11.2	22.6	57.5	87.8	

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

Since 2007 the percentage of actively followed patients sharply declined compared to the previous years. This is a consequence of ambiguous data protection rules that currently forbid cancer registries in Bavaria to obtain the essential life status informations from competent registration offices.

Please be aware that data of recent annual patient cohorts may not yet be fully processed. Therefore, the presented figures and tables are potentially related to different time periods as pointed out in the respective headlines or legends.

Table 2

Incidence measures by year of diagnosis and gender including DCO cases
(with respect to registry area expansion from 2.51 to 3.96 m as of 2002,
and from 3.96 to 4.52 m as of 2007, respectively)

Year of diagnosis	Cases n	Incidence raw	Incidence WS	Incidence ES	Incidence BRD-S
1998	298	25.3	13.9	19.0	22.5
1999	284	23.9	12.4	17.3	20.8
2000	300	25.0	13.1	18.4	21.9
2001	259	21.3	11.9	15.9	18.7
2002	476	24.3	12.6	17.4	21.0
2003	503	25.5	13.5	18.6	22.2
2004	464	23.5	12.8	17.4	20.4
2005	441	22.2	11.8	16.0	19.0
2006	482	24.0	12.5	17.2	20.4
2007	578	25.0	12.8	17.8	21.2
2008	588	25.3	13.4	18.3	21.6
2009	496	21.3	11.0	15.1	18.2
2010	539	23.0	11.7	16.2	19.2
2011	515	21.8	11.5	15.7	18.6
2012	433	18.3	9.4	12.9	15.3
1998-2012	6656	23.2	12.2	16.7	19.8

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	298	64.4	16.0	14.6	92.1	43.5	55.2	65.8	76.8	84.8
1999	284	66.2	14.6	16.5	96.5	47.9	57.7	65.5	77.1	84.2
2000	300	65.4	15.0	19.9	94.8	45.4	54.7	65.2	78.1	84.0
2001	259	63.7	16.2	18.8	98.8	41.1	53.6	64.9	76.3	84.2
2002	476	65.6	15.5	6.6	96.6	43.9	57.7	67.0	77.6	83.1
2003	503	65.3	15.7	7.6	95.3	43.6	54.8	66.8	77.6	83.2
2004	464	64.2	15.8	11.5	97.3	43.1	53.2	65.7	76.5	83.7
2005	441	64.8	16.2	18.9	96.4	43.2	54.1	66.8	77.6	84.4
2006	482	65.1	16.0	12.8	95.8	42.2	54.5	66.7	77.3	84.1
2007	578	66.0	15.3	17.8	98.1	45.0	56.3	67.4	78.1	84.9
2008	588	64.7	15.7	11.1	102	42.6	54.8	66.0	77.4	84.1
2009	496	64.7	16.0	11.2	97.6	43.1	53.2	67.2	77.5	83.6
2010	539	65.7	15.7	16.3	98.5	45.3	54.4	67.5	77.1	85.4
2011	515	65.0	15.0	4.1	95.5	45.9	55.2	66.9	75.8	83.1
2012	433	65.2	16.1	11.3	95.9	43.9	54.3	67.9	77.3	84.0
1998-2012	6656	65.1	15.7	4.1	102	43.8	54.9	66.6	77.3	84.1

Table 4

Age distribution by 5-year age group for period 1998-2012
(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	12	0.2	0.2
15-19	30	0.5	0.7
20-24	38	0.6	1.2
25-29	72	1.1	2.3
30-34	116	1.7	4.1
35-39	187	2.8	6.9
40-44	296	4.4	11.3
45-49	372	5.6	16.9
50-54	550	8.3	25.2
55-59	612	9.2	34.4
60-64	766	11.5	45.9
65-69	832	12.5	58.4
70-74	758	11.4	69.8
75-79	783	11.8	81.5
80-84	670	10.1	91.6
85+	559	8.4	100.0
All ages	6656	100.0	

Included in the statistics are 26.4% multiple primaries.

Table 5

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

Age at diagnosis Years	Cases n	Age-spec. incidence	DCO rate n=745 %	Prop. all cancers n=142297 %
0- 4	1	0.1		0.4
5- 9	2	0.2		1.8
10-14	12	0.9		7.4
15-19	30	2.2		11.2
20-24	38	2.3		7.8
25-29	72	3.8	1.4	7.0
30-34	115	5.6		6.1
35-39	186	8.4	1.1	5.3
40-44	296	12.9	2.7	5.1
45-49	371	17.5	2.7	4.6
50-54	550	29.1	2.2	5.4
55-59	612	34.4	3.6	4.8
60-64	766	44.0	3.1	4.7
65-69	832	51.9	5.5	4.7
70-74	757	54.9	9.1	4.5
75-79	783	71.6	15.6	4.8
80-84	670	77.6	27.0	4.5
85+	559	68.2	44.4	3.5
All ages	6652		11.2	4.7
Incidence				
Raw		23.2		
WS		12.1		
ES		16.7		
BRD-S		19.8		

The age-specific incidence characterizes the disease risk in a particular age group. The age distribution depends on the patient population frequency in each age group and reflects the tangible clinical picture of everyday patients care (see following chart).

Table 6

Standardized incidence ratio (SIR, with 95% confidence limits), excess absolute risk (EAR) and DCO rate of second primaries for period 1998-2012

Diagnosis		Observed n	Expected n	SIR	LCL 95%	UCL 95%		EAR	DCO %
C03-C06	Oral cavity	2	0.9	2.3	0.3	8.2		0.8	
C16	Stomach	18	4.8	3.7	2.2	5.9	#	8.9	5.6
C17	Small intestine	4	0.7	6.1	1.7	15.7	#	2.3	
C18	Colon	47	13.4	3.5	2.6	4.7	#	22.6	21.3
C19-C20	Rectum	15	6.1	2.5	1.4	4.1	#	6.0	
C21	Anus/canal	2	0.8	2.6	0.3	9.6		0.8	
C22	Liver	3	1.5	2.0	0.4	5.9		1.0	66.7
C23-C24	Bile	4	1.9	2.1	0.6	5.4		1.4	50.0
C25	Pancreas	12	5.6	2.2	1.1	3.8	#	4.3	33.3
C33-C34	Lung	22	10.0	2.2	1.4	3.3	#	8.1	22.7
C43	Malign. melanoma	6	5.3	1.1	0.4	2.5		0.5	
C46,C49	Soft tissue	4	0.8	5.0	1.4	12.8	#	2.2	
C48	Peritoneal	6	0.5	12.7	4.7	27.7	#	3.7	
C50	Breast	110	45.7	2.4	2.0	2.9	#	43.3	5.5
C51	Vulva	5	1.2	4.0	1.3	9.4	#	2.5	20.0
C53	Cervix uteri	12	2.2	5.4	2.8	9.4	#	6.6	
C54	Corpus uteri	111	8.1	13.7	11.3	16.5	#	69.3	3.6
C56	Ovary	12	6.0	2.0	1.0	3.5	#	4.0	
C64	Kidney	8	3.5	2.3	1.0	4.6		3.1	
C65	Renal pelvis	4	0.4	10.1	2.8	25.9	#	2.4	
C67	Bladder	6	2.4	2.6	0.9	5.6		2.5	
C70-C72	CNS cancer	3	2.1	1.5	0.3	4.3		0.6	
C73	Thyroid	7	3.1	2.3	0.9	4.7		2.6	
C76-C79	CUP	6	2.3	2.6	1.0	5.7		2.5	33.3
C82-C85	NHL	11	5.3	2.1	1.0	3.7	#	3.9	
C90	Mult. myeloma	5	1.7	3.0	1.0	7.0		2.2	20.0
C91-C96	Leukaemia	5	2.1	2.4	0.8	5.5		1.9	20.0
Other primaries		4	1.4	2.8	0.8	7.1		1.7	
Not observed		0	3.6	0.0	0.0	1.0		-2.4	
All mult. primaries		454	143.0	3.2	2.9	3.5	#	209.4	8.6

Patients	4458
Mean age at second malignancy (years)	65.8
Person-years	14849
Mean observation time (years)	3.3
Median observation time (years)	2.2

The occurrence of second malignancy is statistically significant.

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

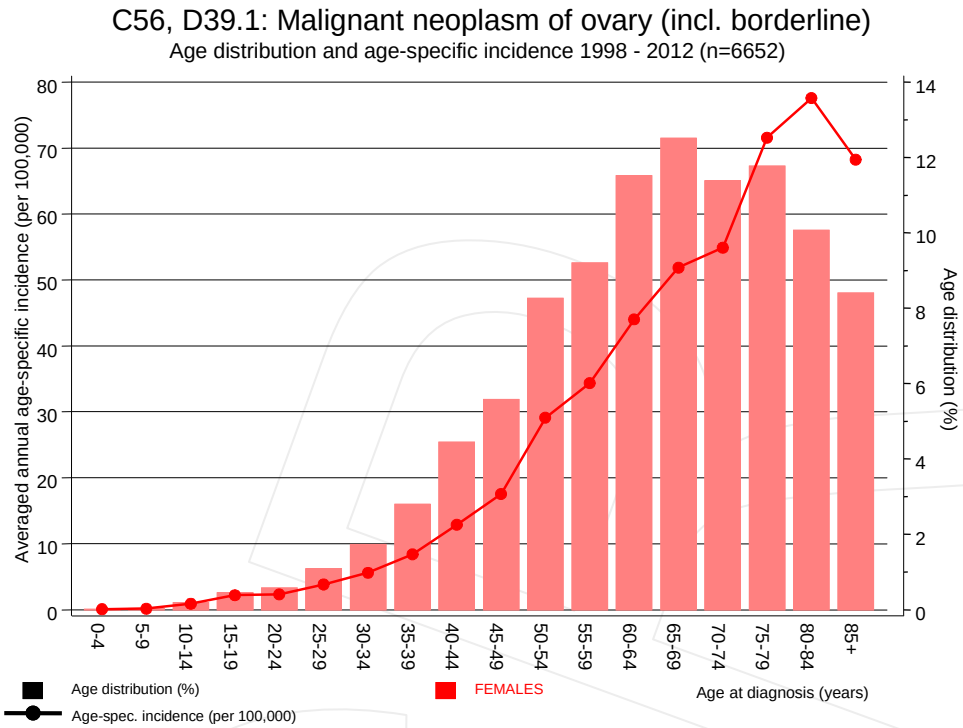

Figure 7. Age distribution and age-specific incidence

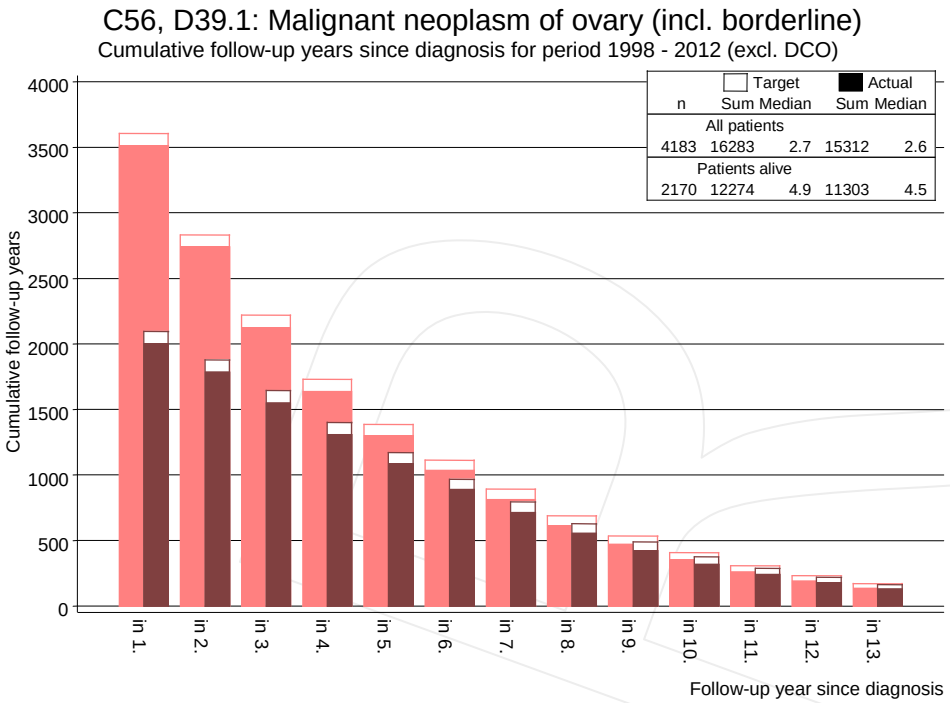

Figure 8. Cumulative follow-up years depending on time since diagnosis

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

Average incidence (world standard population) 2003 - 2008

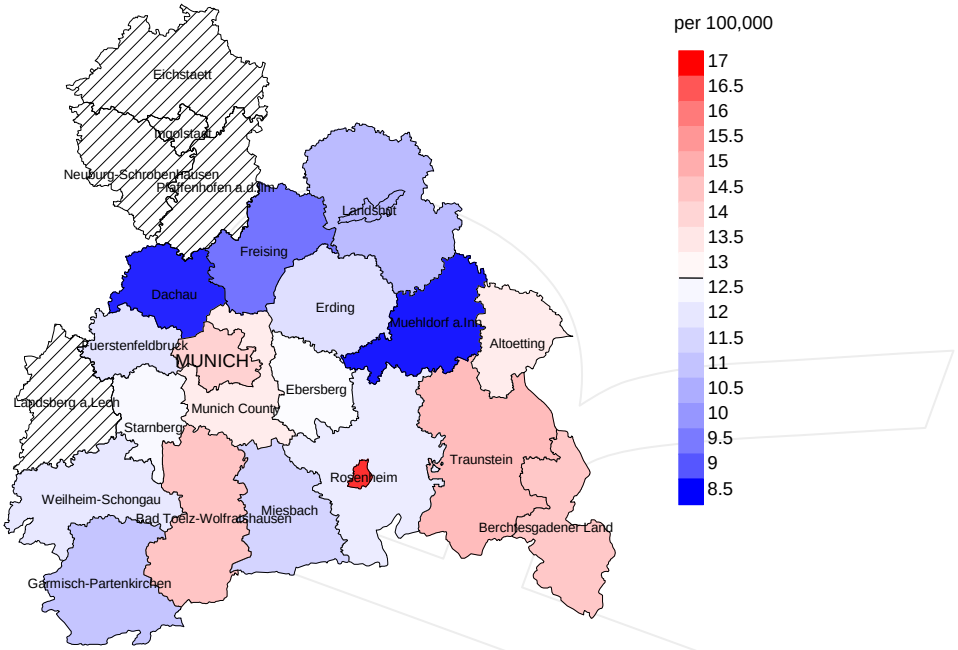

Figure 9a. Map of cancer incidence (world standard population, incl. DCO cases) by county averaged for period 2003 to 2008. According to their individual incidence rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (12.8/100,000 WS N=2,911). Since cancer data are not available in some counties until 2007, the local incidence rates were not calculated, and the map tiles show as shaded.

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 63,131 female residents (averaged) in the period from 2003 to 2008 a total of 88 women were identified with newly diagnosed ovarian cancer. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 12.7/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 9.2 and 17.3/100,000.

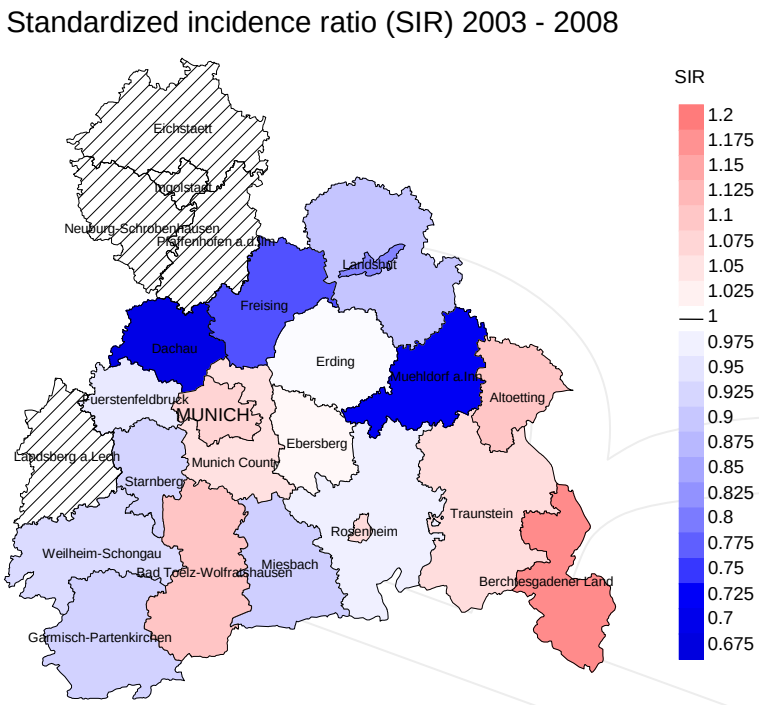

Figure 9b. Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2003 to 2008. According to their individual SIR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (N=2,911). Since cancer data are not available in some counties until 2007, the local SIR values were not calculated, and the map tiles show as shaded.

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 63,131 female residents (averaged) in the period from 2003 to 2008 a total of 88 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 1.01. Though, the value of this parameter may vary with an underlying probability of 99% between 0.75 and 1.32, and is therefore not statistically striking.

MORTALITY

Table 10a

Patient cohorts of incident cancers by year of diagnosis, follow-up status, proportion of DCO, deaths among the annual cohorts, and proportion of available death certificates (with respect to registry area expansion from 2.51 to 3.96 m as of 2002, and from 3.96 to 4.52 m as of 2007, respectively)

Year of diagnosis	Incident cases n	Prop. actively followed %	Prop. DCO %	Deaths n	Prop. deaths %	Prop. deaths with death certific. %
1998	298	99.0	12.1	231	77.5	88.3
1999	284	98.2	8.8	202	71.1	95.0
2000	300	98.3	10.7	200	66.7	94.0
2001	259	98.5	13.1	176	68.0	98.3
2002	476	97.5	15.5	344	72.3	96.8
2003	503	97.4	14.5	346	68.8	97.1
2004	464	97.0	12.7	318	68.5	98.1
2005	441	96.1	10.9	285	64.6	98.9
2006	482	95.4	8.7	291	60.4	97.9
2007	578	84.3	11.8	334	57.8	98.8
2008	588	74.0	10.5	323	54.9	96.9
2009	496	68.5	8.9	230	46.4	98.3
2010	539	71.6	10.4	237	44.0	97.5
2011	515	70.7	10.5	193	37.5	96.9
2012	433	96.3	8.8	119	27.5	91.6
1998-2012	6656	87.8	11.2	3829	57.5	96.7

Table 10b

Annual cohorts of incident cancers and deaths, proportion of death certificates and cases deceased the same year of cancer diagnosis
(incl. DCO)
(with respect to registry area expansion from 2.51 to 3.96 m as of 2002, and from 3.96 to 4.52 m as of 2007, respectively)

Year of diagnosis/ death	Incident cases n	Deaths n	Prop. deaths with death certific. %	Deaths in same year n	Prop. deaths in same year %
1998	298	190	86.3	65	21.8
1999	284	199	86.4	56	19.7
2000	300	182	90.7	61	20.3
2001	259	211	93.8	57	22.0
2002	476	318	96.5	136	28.6
2003	503	308	98.7	122	24.3
2004	464	298	98.0	104	22.4
2005	441	320	98.1	89	20.2
2006	482	303	95.7	102	21.2
2007	578	345	98.8	124	21.5
2008	588	366	100.0	121	20.6
2009	496	371	99.5	95	19.2
2010	539	367	98.4	119	22.1
2011	515	343	97.4	105	20.4
2012	433	303	96.7	81	18.7
1998-2012	6656	4424	96.5	1437	21.6

Table 10c

Annual cohorts of deaths, proportion of cancer-related and not cancer-related deaths, and cancer recorded on death certificates (incl. DCO)
(with respect to registry area expansion from 2.51 to 3.96 m as of 2002, and from 3.96 to 4.52 m as of 2007, respectively)

Year of death	Deaths n	Prop. cancer-related %	Prop. not cancer-related %	Prop. cancer recorded on death certificate %
1998	190	80.0	20.0	93.9
1999	199	82.9	17.1	90.7
2000	182	89.0	11.0	93.9
2001	211	85.3	14.7	91.4
2002	318	88.1	11.9	94.1
2003	308	87.7	12.3	92.1
2004	298	90.3	9.7	92.1
2005	320	90.3	9.7	93.3
2006	303	85.1	14.9	93.1
2007	345	89.6	10.4	92.1
2008	366	92.1	7.9	93.7
2009	371	87.6	12.4	92.1
2010	367	91.3	8.7	93.9
2011	343	87.2	12.8	91.3
2012	303	84.2	15.8	91.5
1998-2012	4424	87.8	12.2	92.6

Table 11

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

Year of death	Deaths n	Age at death (all causes) Years	Age at death (cancer-related) Years	Age at death (not cancer-related) Years	Age at death (according to death certificate) Years
1998	190	72.7	71.4	77.8	73.3
1999	199	72.6	71.7	76.9	73.3
2000	182	72.2	72.0	73.5	72.4
2001	211	72.8	71.0	83.2	71.8
2002	318	71.7	70.6	79.3	70.9
2003	308	72.5	71.4	80.4	71.8
2004	298	72.4	71.2	83.3	71.6
2005	320	72.1	71.2	80.1	71.6
2006	303	73.1	71.8	81.0	72.6
2007	345	73.2	72.4	80.2	72.8
2008	366	73.3	72.3	84.6	72.7
2009	371	71.9	70.8	79.9	71.0
2010	367	74.2	73.6	81.2	73.9
2011	343	72.4	71.0	81.9	71.6
2012	303	74.1	72.6	81.9	72.9
1998-2012	4424	72.8	71.7	80.5	72.2

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	152	12.9	0.51	5.7	0.41	8.6	0.45	10.8	0.48
1999	165	13.9	0.58	6.0	0.48	9.1	0.53	11.9	0.57
2000	162	13.5	0.54	5.8	0.44	8.8	0.48	11.4	0.52
2001	180	14.8	0.69	6.6	0.56	9.7	0.61	12.3	0.66
2002	280	14.3	0.59	6.4	0.51	9.4	0.54	12.0	0.57
2003	270	13.7	0.54	5.9	0.43	8.7	0.47	11.3	0.51
2004	269	13.6	0.58	5.8	0.45	8.5	0.49	11.0	0.54
2005	289	14.5	0.66	6.2	0.53	9.2	0.58	11.8	0.62
2006	258	12.8	0.54	5.3	0.43	7.9	0.46	10.2	0.50
2007	309	13.4	0.53	5.3	0.41	7.9	0.45	10.5	0.50
2008	337	14.5	0.57	5.8	0.44	8.7	0.48	11.4	0.53
2009	325	14.0	0.66	5.9	0.54	8.7	0.58	11.1	0.61
2010	335	14.3	0.62	5.5	0.47	8.3	0.51	11.0	0.57
2011	299	12.7	0.58	5.4	0.46	7.9	0.50	10.1	0.54
2012	255	10.8	0.59	4.2	0.45	6.4	0.50	8.4	0.55
1998-2012	3885	13.5	0.58	5.7	0.47	8.4	0.50	10.9	0.55

Table 13

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

Age at death Years	Cases n	%	Cum.%
15-19	1	0.0	0.0
20-24	3	0.1	0.1
25-29	7	0.2	0.3
30-34	11	0.3	0.6
35-39	26	0.7	1.2
40-44	63	1.6	2.9
45-49	125	3.2	6.1
50-54	174	4.5	10.5
55-59	277	7.1	17.6
60-64	385	9.9	27.5
65-69	520	13.4	40.9
70-74	599	15.4	56.3
75-79	586	15.0	71.3
80-84	589	15.1	86.4
85+	528	13.6	100.0
All ages	3894	100.0	

Included in the statistics are 26.4% multiple primaries.

Table 14

Age-specific mortality (cancer-related) and proportion of all cancers
for period 1998-2012
(**incl. multiple primaries**)

Age at death Years	Cases n	Age-spec. mortality	MI-index	Prop. all cancers %
0- 4		0.0		
5- 9		0.0		
10-14		0.0		
15-19	1	0.1	0.03	2.9
20-24	3	0.2	0.08	6.4
25-29	7	0.4	0.10	6.4
30-34	11	0.5	0.09	5.2
35-39	26	1.2	0.14	5.2
40-44	63	2.7	0.21	5.9
45-49	125	5.9	0.34	6.7
50-54	174	9.2	0.32	6.0
55-59	277	15.5	0.45	6.2
60-64	385	22.1	0.50	6.4
65-69	520	32.4	0.63	6.8
70-74	599	43.4	0.79	6.7
75-79	586	53.6	0.75	5.9
80-84	589	68.2	0.88	5.6
85+	528	64.5	0.94	4.2
All ages	3894			5.8
Mortality				
Raw		13.6	0.59	
WS		5.7	0.47	
ES		8.5	0.51	
BRD-S		10.9	0.55	
PYLL-70				
per 100,000		69.2		
ES		59.3		
AYLL-70		10.7		

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

Table 15

Multiple primaries in deaths in period 1998-2012

Diagnosis		Total n	Total %↓	Pre n	Pre ←%	Syn-chron ±30d n	Syn-chron ±30d ←%	Post n	Post ←%
C16	Stomach	45	3.7	12	26.7	6	13.3	27	60.0
C18	Colon	142	11.7	58	40.8	34	23.9	50	35.2
C19-C20	Rectum	47	3.9	20	42.6	12	25.5	15	31.9
C23-C24	Bile	16	1.3	7	43.8	3	18.8	6	37.5
C25	Pancreas	46	3.8	12	26.1	6	13.0	28	60.9
C33-C34	Lung	43	3.5	5	11.6	7	16.3	31	72.1
C43	Malign. melanoma	33	2.7	23	69.7	1	3.0	9	27.3
C44	Skin others	25	2.1	12	48.0	5	20.0	8	32.0
C48	Peritoneal	34	2.8	16	47.1	7	20.6	11	32.4
C50	Breast	377	31.0	257	68.2	37	9.8	83	22.0
C51	Vulva	12	1.0	2	16.7	3	25.0	7	58.3
C53	Cervix uteri	57	4.7	37	64.9	15	26.3	5	8.8
C54	Corpus uteri	115	9.5	29	25.2	72	62.6	14	12.2
C55,C57	Fem. genitals un	11	0.9	4	36.4	3	27.3	4	36.4
C56	Ovary	11	0.9					11	100.0
C64	Kidney	21	1.7	8	38.1	4	19.0	9	42.9
C67	Bladder	26	2.1	15	57.7	1	3.8	10	38.5
C70-C72	CNS cancer	13	1.1	3	23.1	3	23.1	7	53.8
C73	Thyroid	19	1.6	16	84.2	1	5.3	2	10.5
C76-C79	CUP	23	1.9	11	47.8	2	8.7	10	43.5
C82-C85	NHL	27	2.2	16	59.3	4	14.8	7	25.9
C91-C96	Leukaemia	13	1.1	1	7.7	1	7.7	11	84.6
Other primaries		59	4.9	16	27.1	12	20.3	31	52.5
All mult. primaries		1215	100.0	580	47.7	239	19.7	396	32.6

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

Age at death Years	Cases n	Age-spec. mortality	MI-index	Prop. all cancers %
0- 4		0.0		
5- 9		0.0		
10-14		0.0		
15-19	1	0.1	0.03	3.2
20-24	3	0.2	0.08	7.0
25-29	5	0.3	0.07	4.9
30-34	10	0.5	0.09	5.3
35-39	24	1.1	0.15	5.3
40-44	52	2.3	0.20	5.6
45-49	101	4.8	0.32	6.2
50-54	135	7.1	0.30	5.6
55-59	231	13.0	0.45	6.1
60-64	323	18.6	0.52	6.5
65-69	413	25.8	0.61	6.6
70-74	482	35.0	0.80	6.7
75-79	474	43.3	0.77	6.0
80-84	489	56.6	0.91	5.9
85+	429	52.4	0.95	4.2
All ages	3172			5.8
Mortality				
Raw		11.1	0.58	
WS		4.6	0.46	
ES		6.9	0.50	
BRD-S		8.9	0.54	
PYLL-70				
per 100,000		56.9		
ES		48.7		
AYLL-70		10.8		

* See corresponding tables with multiple primaries.

Table 17

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

Age at death Years	Cases n	Age-spec. mortality	MI-index	Prop. all cancers %
0- 4		0.0		
5- 9		0.0		
10-14		0.0		
15-19	1	0.1	0.03	3.8
20-24	3	0.2	0.08	7.5
25-29	4	0.2	0.06	4.1
30-34	9	0.4	0.09	5.3
35-39	20	0.9	0.13	4.9
40-44	49	2.1	0.20	5.7
45-49	90	4.3	0.31	6.2
50-54	116	6.1	0.27	5.3
55-59	214	12.0	0.45	6.4
60-64	297	17.1	0.52	6.9
65-69	376	23.4	0.59	7.1
70-74	441	32.0	0.79	7.3
75-79	427	39.0	0.74	6.4
80-84	445	51.5	0.86	6.4
85+	386	47.1	0.87	4.4
All ages	2878			6.2
Mortality				
Raw		10.0	0.56	
WS		4.2	0.44	
ES		6.2	0.48	
BRD-S		8.1	0.52	
PYLL-70				
per 100,000		51.3		
ES		43.9		
AYLL-70		10.7		

* See corresponding tables with multiple primaries.

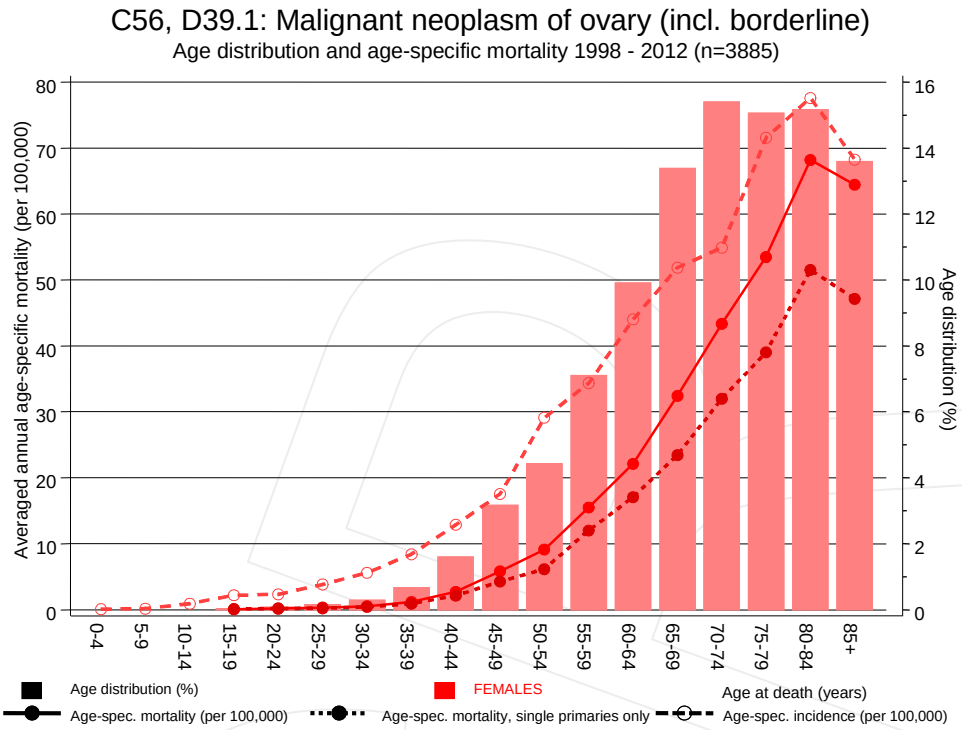

Figure 18. Distribution of age at death (bars) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

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

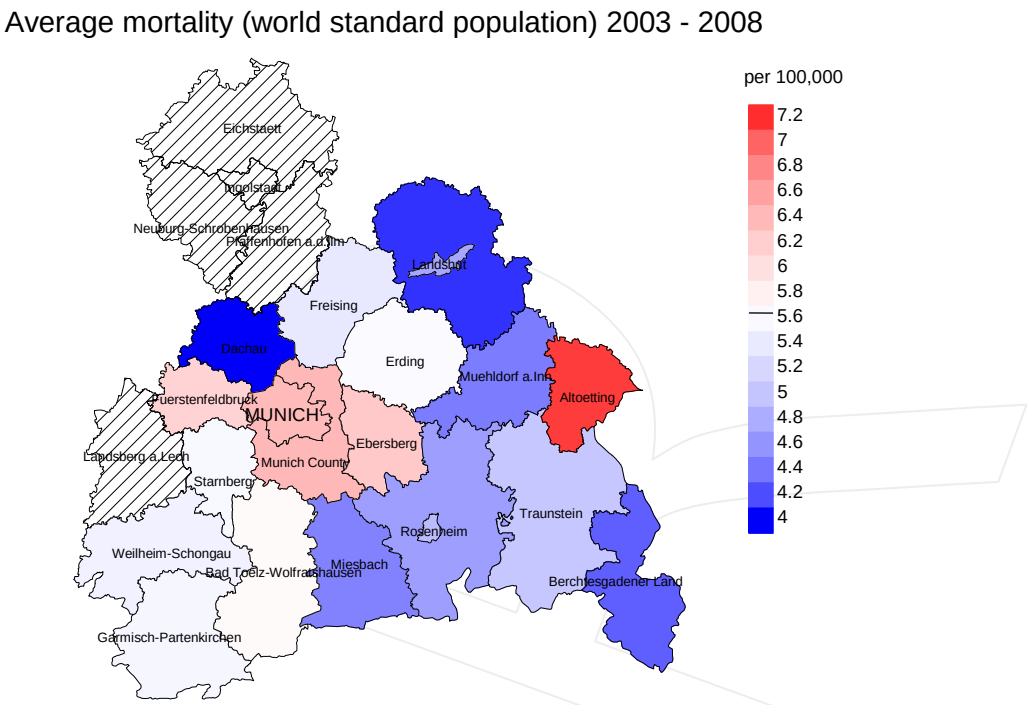

Figure 19a. Map of cancer mortality (world standard population) by county averaged for period 2003 to 2008. According to their individual mortality rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (5.7/100,000 WS N=1,645). Since cancer data are not available in some counties until 2007, the local mortality rates were not calculated, and the map tiles show as shaded.

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 63,131 female residents (averaged) in the period from 2003 to 2008 a total of 53 women died from ovarian cancer. Therefore, the mean mortality rate for this cancer type in this area can be calculated at 6.2/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 4.1 and 9.2/100,000.

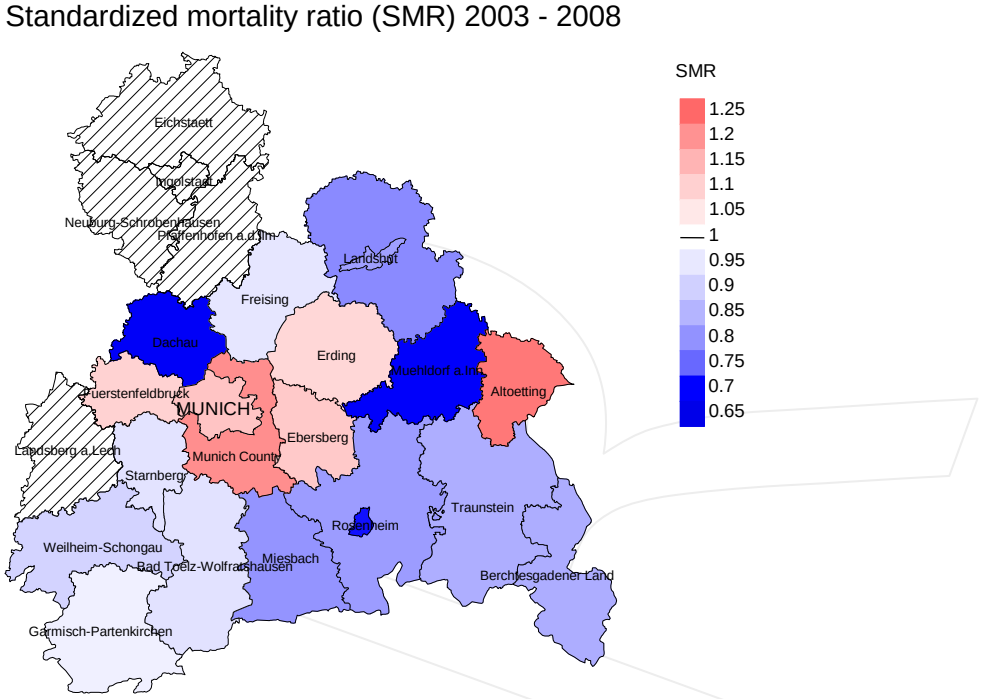

Figure 19b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2003 to 2008. According to their individual SMR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (N=1,645). Since cancer data are not available in some counties until 2007, the local SMR values were not calculated, and the map tiles show as shaded.

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 63,131 female residents (averaged) in the period from 2003 to 2008 a total of 53 women died from ovarian cancer. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 1.11. Though, the value of this parameter may vary with an underlying probability of 99% between 0.76 and 1.57, and is therefore not statistically striking.

Statistical Notes

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

1. **All multiple primaries included**

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

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

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

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

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

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

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

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

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

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

Shortcuts

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

Recommended Citation

Munich Cancer Registry. Baseline statistics C56, D39.1: Ovarian cancer [Internet]. 2014 [updated 2014 Mar 20; cited 2014 May 1]. Available from: http://www.tumorregister-muenchen.de/en/facts/base/base_C56D_E.pdf

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