Munich Cancer Registry

- Survival
- Selection Matrix
- Homepage
- *Deutsch*

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

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

Cancer statistics: Baseline statistics

C56, D39.1: Ovarian cancer

Year of diagnosis	1998-2013
Patients	7,091
Diseases	7,108
Creation date	05/19/2015
Export date	12/30/2014
Population (females)	2.36 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 4.64 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
D39.1	Neoplasm of uncertain or unknown behaviour of female genital organs: Ovary

... if not 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	295	36	12.2	18.6	78.0	99.0	
1999	282	25	8.9	21.6	73.0	98.2	
2000	294	32	10.9	24.5	68.0	98.6	
2001	255	34	13.3	22.4	68.6	98.4	
2002	474	74	15.6	28.9	73.0	97.7	#
2003	494	73	14.8	23.5	70.2	97.2	
2004	458	59	12.9	24.2	69.9	96.7	
2005	438	47	10.7	23.3	65.8	96.3	
2006	477	41	8.6	21.8	62.3	96.0	
2007	578	69	11.9	24.4	60.0	84.3	# ##
2008	590	62	10.5	19.3	56.3	73.9	
2009	493	44	8.9	21.1	49.9	71.4	
2010	543	55	10.1	24.7	48.1	72.6	
2011	516	53	10.3	21.3	44.0	71.1	
2012	481	36	7.5	22.9	34.9	70.5	
2013	440	44	10.0	20.9	24.3	98.0	###
1998-2013	7108	784	11.0	22.8	57.6	87.0	

\# 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	295	25.1	13.9	18.9	22.4
1999	282	23.8	12.3	17.2	20.7
2000	294	24.5	12.8	17.9	21.4
2001	255	21.0	11.7	15.6	18.4
2002	474	24.2	12.6	17.4	20.9
2003	494	25.1	13.2	18.2	21.7
2004	458	23.2	12.6	17.2	20.1
2005	438	22.0	11.6	15.8	18.8
2006	477	23.7	12.4	16.9	20.2
2007	578	25.0	12.8	17.8	21.2
2008	590	25.4	13.4	18.4	21.7
2009	493	21.2	10.8	15.0	18.0
2010	543	23.2	11.8	16.3	19.4
2011	516	21.9	11.6	15.8	18.6
2012	481	20.4	10.5	14.3	17.0
2013	440	18.6	10.1	13.6	15.9
1998-2013	7108	22.9	12.0	16.5	19.6

The computation of the incidence measures includes all primaries, irrespective of first or subsequent malignancy.

Table 3

Age distribution parameters by year of diagnosis
(incl. DCO)

Year of diagnosis	Cases n	Mean	Std. dev.	Min.	Max.	10%	25%	Median 50%	75%	90%
1998	295	64.2	16.2	14.6	92.1	43.5	54.6	65.7	76.8	84.8
1999	282	66.1	14.6	16.5	96.5	47.9	57.5	65.5	77.1	84.2
2000	294	65.5	14.9	19.9	94.8	46.0	55.0	65.4	78.1	84.2
2001	255	63.7	16.3	18.8	98.8	41.1	53.6	64.9	76.4	84.2
2002	474	65.6	15.5	6.6	96.6	44.3	57.6	67.0	77.6	83.1
2003	494	65.3	15.8	7.6	95.3	43.5	54.8	66.8	77.6	83.3
2004	458	64.3	15.7	11.5	97.3	43.4	53.3	65.7	76.5	83.7
2005	438	65.1	16.0	18.9	96.4	43.2	54.2	66.9	77.9	84.5
2006	477	65.3	15.9	12.8	95.8	42.5	54.6	67.0	77.3	84.1
2007	578	65.9	15.4	17.8	98.1	45.0	56.3	67.3	78.1	84.9
2008	590	64.7	15.7	11.1	102	42.7	54.8	66.0	77.4	84.1
2009	493	64.9	15.9	11.2	97.6	43.3	53.4	67.3	77.5	83.6
2010	543	65.7	15.7	16.3	98.5	45.4	54.5	67.4	77.1	85.3
2011	516	64.9	15.0	4.1	95.5	45.8	55.1	66.9	75.7	83.1
2012	481	65.3	16.2	5.4	95.9	44.3	54.7	67.9	77.3	84.2
2013	440	64.2	15.8	10.1	100	44.9	53.6	65.5	75.5	84.1
1998-2013	7108	65.1	15.7	4.1	102	43.9	54.9	66.6	77.1	84.1

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	3	0.0	0.1
10-14	14	0.2	0.3
15-19	35	0.5	0.7
20-24	39	0.5	1.3
25-29	75	1.1	2.3
30-34	123	1.7	4.1
35-39	191	2.7	6.8
40-44	312	4.4	11.2
45-49	417	5.9	17.0
50-54	585	8.2	25.3
55-59	656	9.2	34.5
60-64	820	11.5	46.0
65-69	882	12.4	58.4
70-74	818	11.5	69.9
75-79	832	11.7	81.6
80-84	707	9.9	91.6
85+	598	8.4	100.0
All ages	7108	100.0	

Included in the statistics are 26.9% 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	3	0.2		2.4
10-14	14	1.0		8.2
15-19	35	2.4		12.0
20-24	39	2.2		7.4
25-29	75	3.7	1.3	6.8
30-34	122	5.5		5.9
35-39	190	8.0	1.1	5.1
40-44	312	12.5	2.6	5.0
45-49	416	18.0	2.6	4.8
50-54	585	28.5	2.1	5.3
55-59	656	34.1	3.8	4.8
60-64	820	43.7	3.0	4.8
65-69	882	51.1	5.6	4.6
70-74	817	53.8	9.1	4.4
75-79	832	70.0	14.9	4.7
80-84	707	75.8	26.3	4.5
85+	598	66.9	44.6	3.5
All ages	7104		11.0	4.6
Incidence				
Raw		22.9		
WS		12.0		
ES		16.5		
BRD-S		19.5		

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	0.9	2.1	0.3	7.7		0.7	
C15 Oesophagus	2	0.9	2.3	0.3	8.4		0.7	
C16 Stomach	18	5.1	3.6	2.1	5.6	#	8.2	5.6
C17 Small intestine	4	0.7	5.7	1.5	14.5	#	2.1	
C18 Colon	47	14.1	3.3	2.5	4.4	#	20.8	19.1
C19-C20 Rectum	16	6.4	2.5	1.4	4.1	#	6.1	6.3
C21 Anus/canal	2	0.8	2.5	0.3	9.0		0.8	
C22 Liver	3	1.6	1.9	0.4	5.4		0.9	33.3
C23-C24 Bile	5	2.0	2.5	0.8	5.8		1.9	40.0
C25 Pancreas	13	5.9	2.2	1.2	3.7	#	4.5	38.5
C26 GI cancer	2	0.2	8.9	1.1	32.2	#	1.1	
C33-C34 Lung	23	10.7	2.2	1.4	3.2	#	7.8	21.7
C38,C45 Mesothelioma	2	0.3	7.6	0.9	27.4		1.1	
C43 Malign. melanoma	7	5.7	1.2	0.5	2.5		0.8	
C46,C49 Soft tissue	4	0.9	4.6	1.3	11.9	#	2.0	
C48 Peritoneal	6	0.5	11.1	4.1	24.2	#	3.5	
C50 Breast	120	48.5	2.5	2.0	3.0	#	45.2	5.0
C51 Vulva	5	1.3	3.8	1.2	8.8	#	2.3	20.0
C53 Cervix uteri	12	2.3	5.1	2.6	8.9	#	6.1	
C54 Corpus uteri	116	8.6	13.5	11.1	16.2	#	67.9	5.2
C56 Ovary	12	6.3	1.9	1.0	3.3		3.6	
C64 Kidney	10	3.7	2.7	1.3	5.0	#	4.0	
C65 Renal pelvis	4	0.4	9.5	2.6	24.4	#	2.3	
C67 Bladder	7	2.5	2.8	1.1	5.7	#	2.8	
C70-C72 CNS cancer	3	2.1	1.4	0.3	4.1		0.5	
C73 Thyroid	8	3.2	2.5	1.1	4.9	#	3.0	
C76-C79 CUP	6	2.4	2.5	0.9	5.4		2.3	33.3
C82-C85 NHL	11	5.6	2.0	1.0	3.5		3.4	
C90 Mult. myeloma	5	1.8	2.8	0.9	6.6		2.0	20.0
C91-C96 Leukaemia	5	2.3	2.2	0.7	5.2		1.7	20.0
Other primaries	1	0.2	4.7	0.1	26.2		0.5	
Not observed	0	3.8	0.0	0.0	1.0	#	-2.4	
All mult. primaries	481	151.8	3.2	2.9	3.5	#	208.0	8.5

Patients	4545
Median age at second malignancy (years)	67.3
Person-years	15824
Mean observation time (years)	3.5
Median observation time (years)	2.3

The occurrence of second malignancy is statistically significant.

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

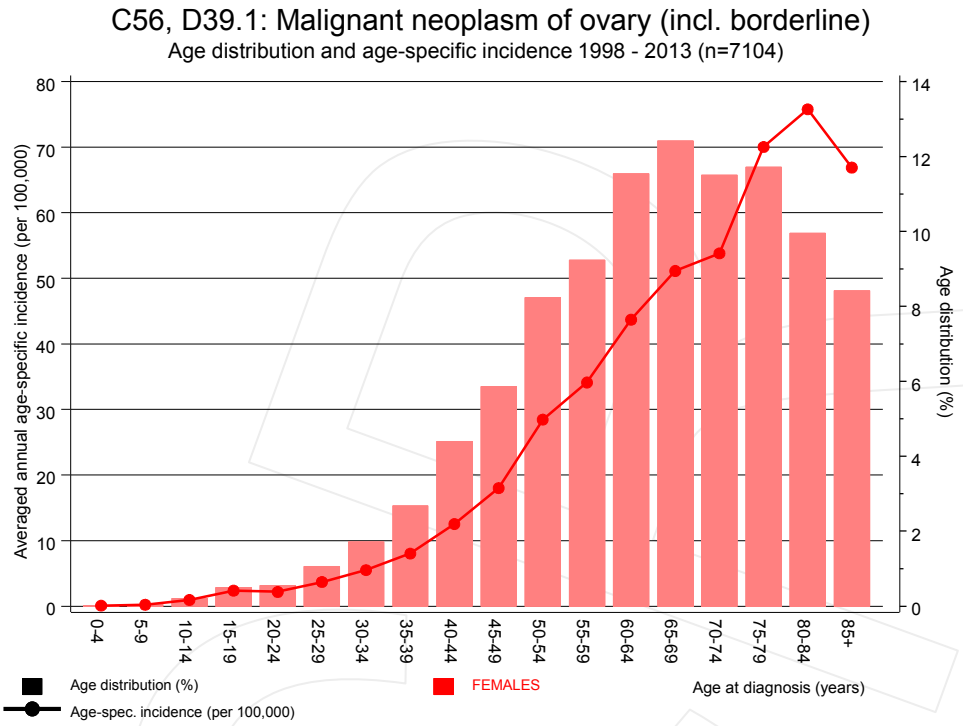

Figure 7. Age distribution and age-specific incidence

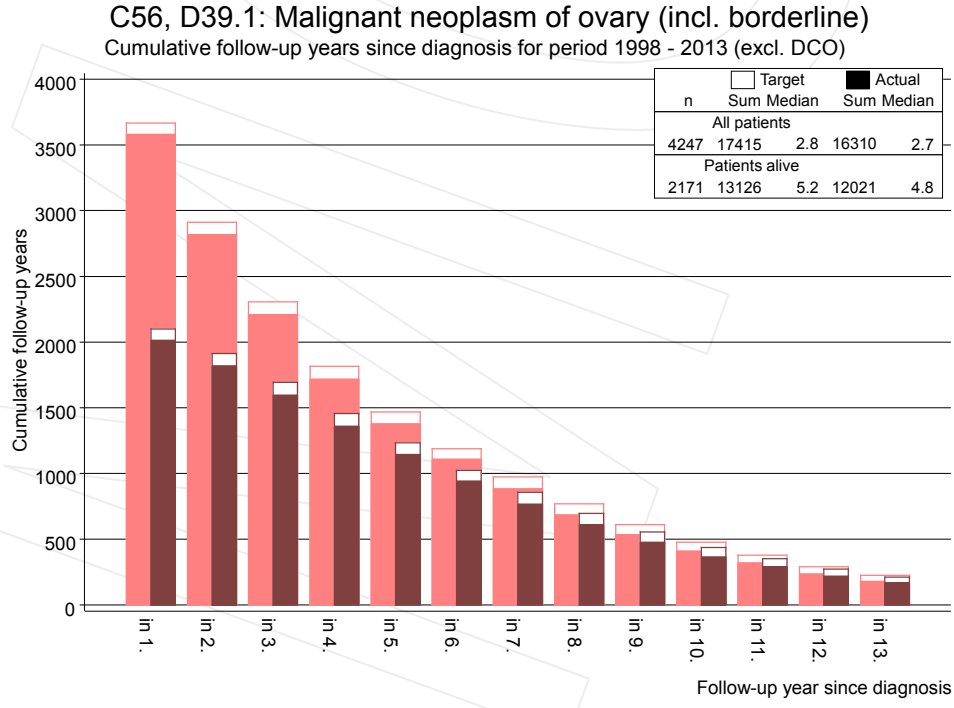

Figure 8. Cumulative follow-up years depending on time since diagnosis

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

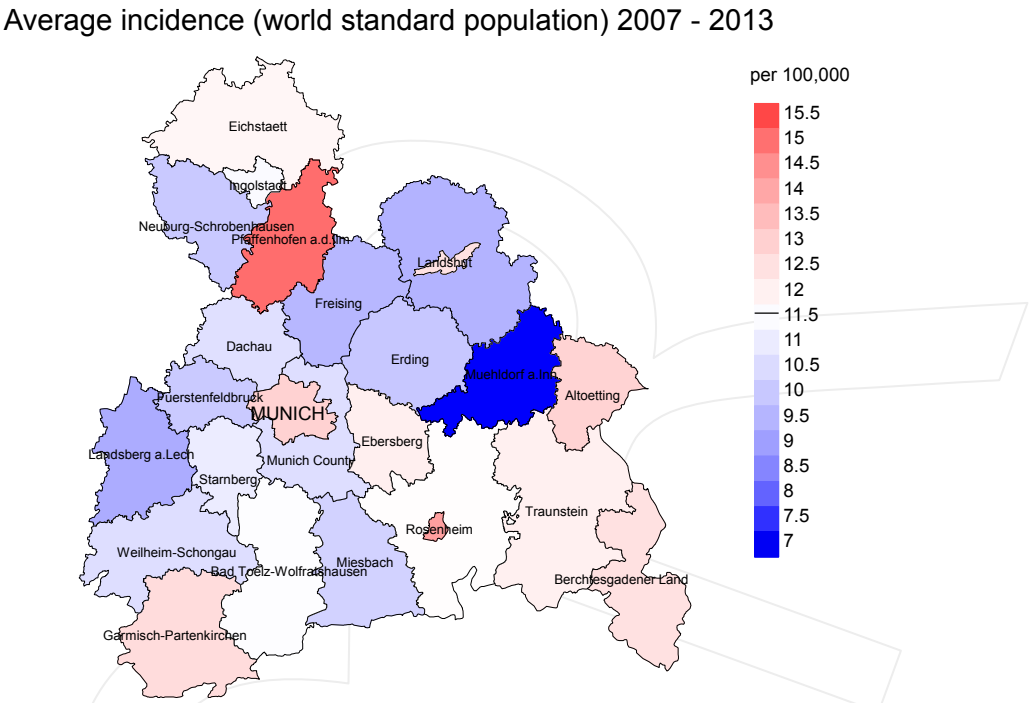

Figure 9a. Map of cancer incidence (world standard population, incl. DCO cases) by county averaged for period 2007 to 2013. According to their individual incidence rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (11.6/100,000 WS N=3,637).

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 107 women were identified with newly diagnosed ovarian cancer. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 12.1/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 9.0 and 16.2/100,000.

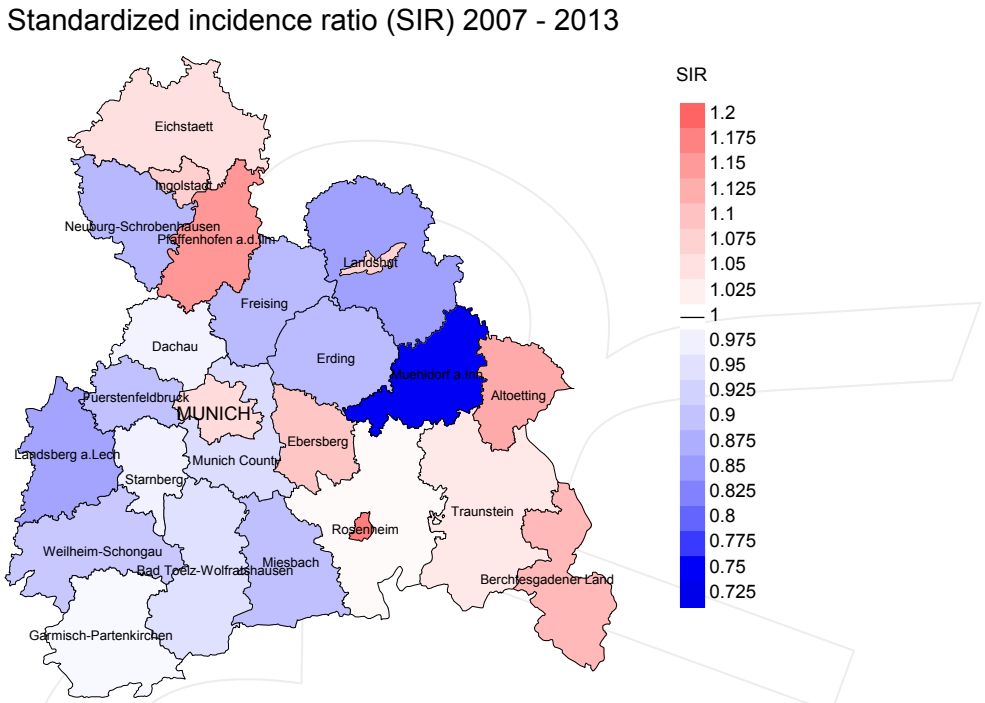

Figure 9b. Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2007 to 2013. According to their individual SIR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (N=3,637).

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 107 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 1.09. Though, the value of this parameter may vary with an underlying probability of 99% between 0.84 and 1.39, 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	295	99.0	12.2	230	78.0	88.7
1999	282	98.2	8.9	206	73.0	94.2
2000	294	98.6	10.9	200	68.0	94.5
2001	255	98.4	13.3	175	68.6	98.3
2002	474	97.7	15.6	346	73.0	96.5
2003	494	97.2	14.8	347	70.2	97.4
2004	458	96.7	12.9	320	69.9	98.1
2005	438	96.3	10.7	288	65.8	99.0
2006	477	96.0	8.6	297	62.3	98.0
2007	578	84.3	11.9	347	60.0	97.1
2008	590	73.9	10.5	332	56.3	97.3
2009	493	71.4	8.9	246	49.9	98.8
2010	543	72.6	10.1	261	48.1	95.4
2011	516	71.1	10.3	227	44.0	97.4
2012	481	70.5	7.5	168	34.9	97.0
2013	440	98.0	10.0	107	24.3	90.7
1998-2013	7108	87.0	11.0	4097	57.6	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	295	187	87.2	65	22.0
1999	282	194	87.1	56	19.9
2000	294	180	90.6	60	20.4
2001	255	206	93.7	56	22.0
2002	474	314	96.5	135	28.5
2003	494	303	98.7	121	24.5
2004	458	295	98.3	104	22.7
2005	438	315	98.1	89	20.3
2006	477	294	95.9	101	21.2
2007	578	343	98.8	124	21.5
2008	590	362	100.0	121	20.5
2009	493	369	99.5	95	19.3
2010	543	363	98.6	119	21.9
2011	516	343	96.8	106	20.5
2012	481	307	96.4	84	17.5
2013	440	362	98.6	84	19.1
1998-2013	7108	4737	96.7	1520	21.4

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	187	79.1	20.9	94.5
1999	194	81.4	18.6	92.3
2000	180	88.9	11.1	94.5
2001	206	86.9	13.1	93.3
2002	314	87.6	12.4	94.7
2003	303	88.1	11.9	92.6
2004	295	89.5	10.5	92.4
2005	315	91.1	8.9	93.9
2006	294	86.4	13.6	94.7
2007	343	89.2	10.8	92.3
2008	362	92.5	7.5	94.8
2009	369	87.3	12.7	92.1
2010	363	92.8	7.2	95.3
2011	343	86.6	13.4	91.9
2012	307	85.0	15.0	91.9
2013	362	85.6	14.4	89.6
1998-2013	4737	87.8	12.2	93.1

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	187	74.5	73.4	79.0	74.7
1999	194	74.3	72.0	79.7	75.0
2000	180	72.9	72.9	71.9	73.5
2001	206	74.4	70.4	86.0	72.6
2002	314	73.6	72.5	83.1	72.8
2003	303	74.2	73.1	83.7	73.3
2004	295	73.8	73.2	82.5	73.3
2005	315	73.3	71.9	83.5	72.0
2006	294	74.3	73.2	82.7	73.9
2007	343	75.8	74.2	83.9	75.1
2008	362	74.6	73.8	87.7	74.0
2009	369	72.8	72.0	80.9	72.2
2010	363	75.0	74.4	83.7	74.8
2011	343	72.9	71.7	82.2	72.4
2012	307	75.9	74.1	85.0	74.3
2013	362	74.7	73.4	87.3	74.1
1998-2013	4737	74.2	73.1	83.0	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	0.50	5.5	0.40	8.3	0.44	10.6	0.47
1999	158	13.3	0.56	5.8	0.47	8.8	0.51	11.4	0.55
2000	160	13.3	0.54	5.7	0.45	8.6	0.48	11.2	0.52
2001	179	14.7	0.70	6.6	0.56	9.7	0.62	12.2	0.66
2002	275	14.0	0.58	6.3	0.50	9.3	0.53	11.8	0.56
2003	267	13.6	0.54	5.8	0.44	8.6	0.47	11.2	0.51
2004	264	13.4	0.58	5.6	0.45	8.3	0.48	10.8	0.54
2005	287	14.4	0.66	6.2	0.54	9.2	0.58	11.7	0.62
2006	254	12.6	0.53	5.3	0.43	7.8	0.46	10.1	0.50
2007	306	13.3	0.53	5.2	0.41	7.9	0.44	10.4	0.49
2008	335	14.4	0.57	5.8	0.43	8.6	0.47	11.3	0.52
2009	322	13.8	0.65	5.9	0.55	8.7	0.58	11.0	0.61
2010	337	14.4	0.62	5.5	0.47	8.3	0.51	11.0	0.57
2011	297	12.6	0.58	5.3	0.46	7.9	0.50	10.0	0.54
2012	261	11.1	0.54	4.3	0.41	6.5	0.46	8.5	0.51
2013	310	13.1	0.70	5.2	0.51	7.7	0.57	10.0	0.63
1998-2013	4160	13.4	0.59	5.6	0.46	8.3	0.50	10.7	0.55

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	7	0.2	0.3
30-34	12	0.3	0.6
35-39	27	0.6	1.2
40-44	66	1.6	2.8
45-49	135	3.2	6.0
50-54	188	4.5	10.6
55-59	292	7.0	17.6
60-64	406	9.7	27.3
65-69	556	13.3	40.6
70-74	650	15.6	56.2
75-79	631	15.1	71.3
80-84	625	15.0	86.3
85+	570	13.7	100.0
All ages	4170	100.0	

Included in the statistics are 26.9% 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	0.06	5.4
20-24	3	0.2	0.08	5.9
25-29	7	0.3	0.09	6.1
30-34	12	0.5	0.10	5.3
35-39	27	1.1	0.14	5.2
40-44	66	2.7	0.21	5.8
45-49	135	5.8	0.32	6.7
50-54	188	9.1	0.32	6.1
55-59	292	15.2	0.45	6.1
60-64	406	21.6	0.50	6.2
65-69	556	32.2	0.63	6.7
70-74	650	42.8	0.79	6.6
75-79	631	53.1	0.76	5.9
80-84	625	67.0	0.88	5.6
85+	570	63.8	0.95	4.2
All ages	4170			5.8
Mortality				
Raw		13.4	0.59	
WS		5.6	0.47	
ES		8.3	0.51	
BRD-S		10.8	0.55	
PYLL-70				
per 100,000		68.2		
ES		58.4		
AYLL-70		10.7		

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

Table 15

Multiple primaries in deaths in period 1998-2013

Diagnosis		Total n	Total %↓	Pre n	Pre ←%	Syn-chron ±30d n	Syn-chron ±30d ←%	Post n	Post ←%
C16	Stomach	52	3.9	14	26.9	7	13.5	31	59.6
C18	Colon	149	11.2	64	43.0	33	22.1	52	34.9
C19-C20	Rectum	50	3.7	20	40.0	13	26.0	17	34.0
C23-C24	Bile	15	1.1	7	46.7	2	13.3	6	40.0
C25	Pancreas	45	3.4	10	22.2	7	15.6	28	62.2
C33-C34	Lung	46	3.4	5	10.9	7	15.2	34	73.9
C43	Malign. melanoma	41	3.1	27	65.9	1	2.4	13	31.7
C44	Skin others	30	2.2	14	46.7	6	20.0	10	33.3
C48	Peritoneal	41	3.1	20	48.8	8	19.5	13	31.7
C50	Breast	409	30.6	276	67.5	39	9.5	94	23.0
C51	Vulva	11	0.8	2	18.2	3	27.3	6	54.5
C53	Cervix uteri	62	4.6	40	64.5	16	25.8	6	9.7
C54	Corpus uteri	130	9.7	29	22.3	82	63.1	19	14.6
C55,C57	Fem. genitals un	11	0.8	4	36.4	3	27.3	4	36.4
C56	Ovary	12	0.9					12	100.0
C64	Kidney	26	1.9	11	42.3	4	15.4	11	42.3
C67	Bladder	31	2.3	17	54.8	1	3.2	13	41.9
C70-C72	CNS cancer	15	1.1	3	20.0	3	20.0	9	60.0
C73	Thyroid	20	1.5	16	80.0	1	5.0	3	15.0
C76-C79	CUP	28	2.1	13	46.4	2	7.1	13	46.4
C82-C85	NHL	30	2.2	18	60.0	4	13.3	8	26.7
C91-C96	Leukaemia	14	1.0	1	7.1	1	7.1	12	85.7
Other primaries		68	5.1	19	27.9	12	17.6	37	54.4
All mult. primaries		1336	100.0	630	47.2	255	19.1	451	33.8

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	0.06	6.1
20-24	3	0.2	0.08	6.4
25-29	5	0.2	0.07	4.6
30-34	11	0.5	0.10	5.5
35-39	25	1.1	0.15	5.4
40-44	55	2.2	0.20	5.5
45-49	109	4.7	0.31	6.3
50-54	147	7.1	0.31	5.6
55-59	243	12.6	0.45	6.1
60-64	339	18.1	0.51	6.4
65-69	445	25.8	0.62	6.6
70-74	521	34.3	0.80	6.7
75-79	509	42.9	0.78	5.9
80-84	512	54.9	0.91	5.8
85+	465	52.0	0.96	4.2
All ages	3391			5.8
Mortality				
Raw		10.9	0.58	
WS		4.6	0.46	
ES		6.8	0.50	
BRD-S		8.8	0.54	
PYLL-70				
per 100,000		56.2		
ES		48.1		
AYLL-70		10.8		

* See corresponding tables with multiple primaries.

Table 17

Age-specific mortality (cancer-related) and proportion of all cancers
for period 1998-2013
(**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	0.06	7.1
20-24	3	0.2	0.08	6.8
25-29	4	0.2	0.06	3.9
30-34	10	0.5	0.09	5.5
35-39	21	0.9	0.13	4.9
40-44	52	2.1	0.20	5.7
45-49	97	4.2	0.30	6.3
50-54	125	6.1	0.28	5.3
55-59	225	11.7	0.44	6.3
60-64	310	16.5	0.50	6.7
65-69	403	23.4	0.60	7.1
70-74	474	31.2	0.79	7.2
75-79	456	38.4	0.75	6.3
80-84	460	49.3	0.86	6.2
85+	417	46.7	0.87	4.4
All ages	3059			6.1
Mortality				
Raw		9.8	0.56	
WS		4.1	0.44	
ES		6.1	0.48	
BRD-S		7.9	0.52	
PYLL-70				
per 100,000		50.6		
ES		43.3		
AYLL-70		10.7		

* See corresponding tables with multiple primaries.

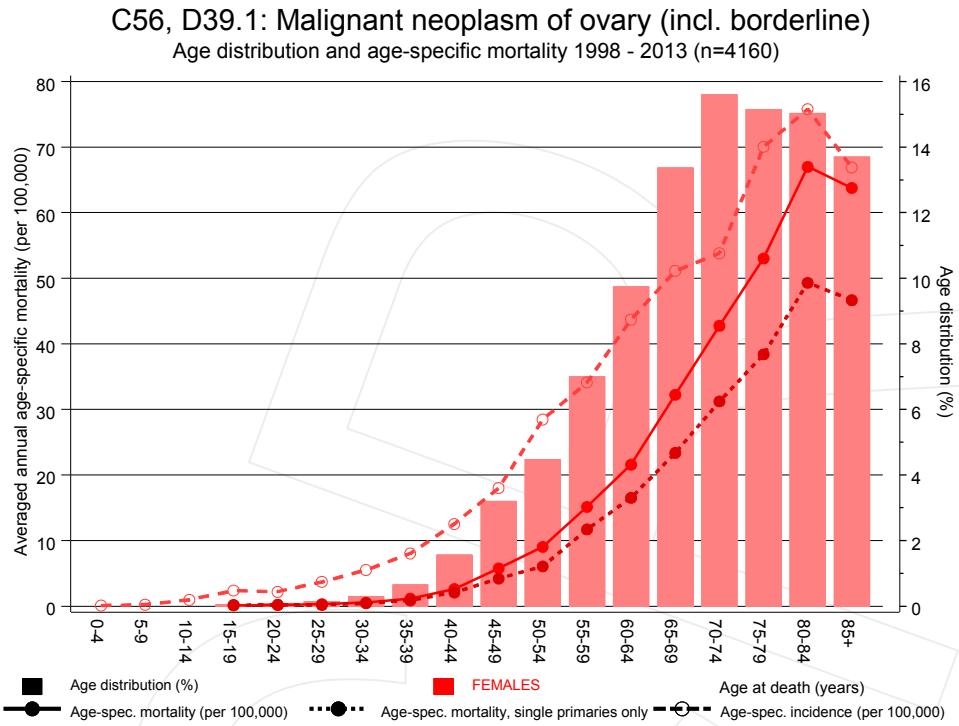

Figure 18. Distribution of age at death (bars) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

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

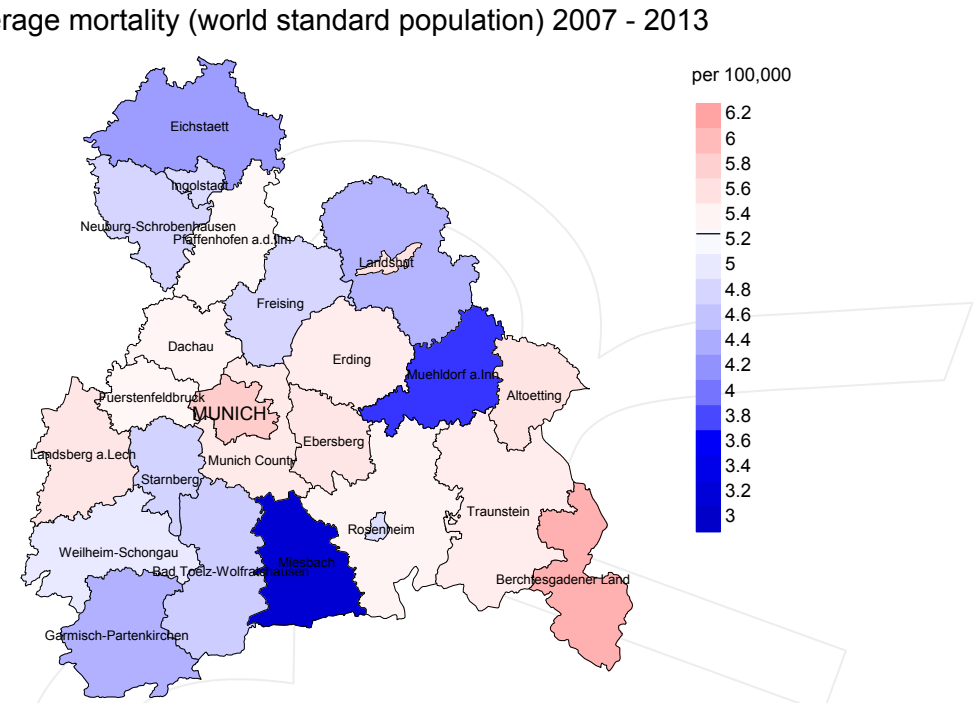

Figure 19a. Map of cancer mortality (world standard population) by county averaged for period 2007 to 2013. According to their individual mortality rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (5.3/100,000 WS N=2,150).

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 64 women died from ovarian cancer. Therefore, the mean mortality rate for this cancer type in this area can be calculated at 5.6/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 3.8 and 8.0/100,000.

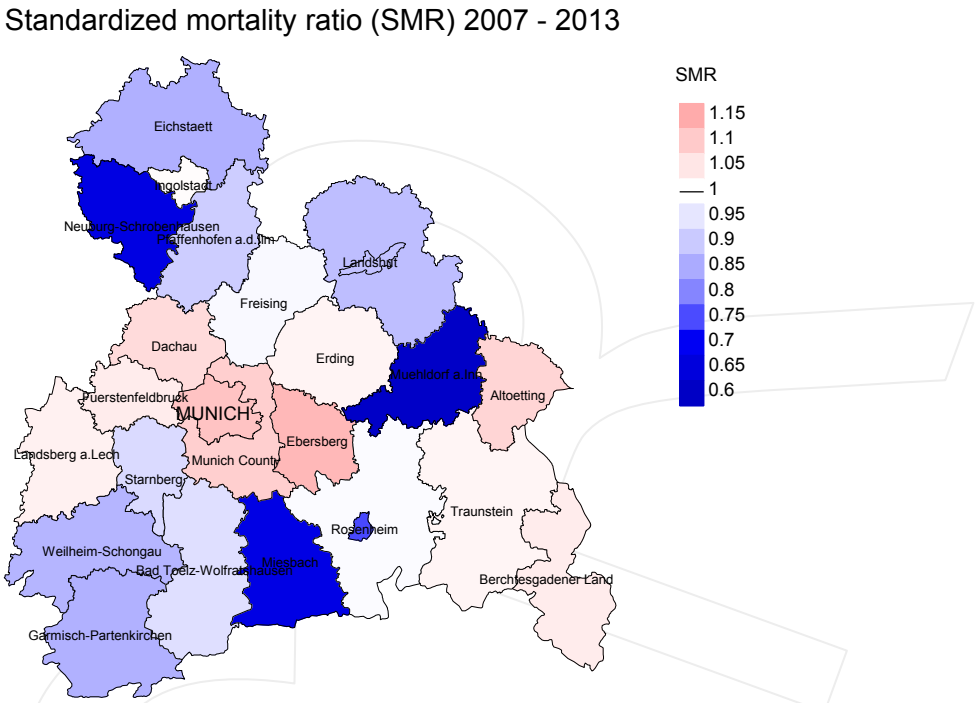

Figure 19b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2007 to 2013. According to their individual SMR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (N=2,150).

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 64 women died from ovarian cancer. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 1.13. Though, the value of this parameter may vary with an underlying probability of 99% between 0.80 and 1.55, and is therefore not statistically striking.

Statistical Notes

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

1. **All multiple primaries included**

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

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

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

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

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

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

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

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

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

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

Shortcuts

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

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