Munich Cancer Registry

- Survival
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- *Deutsch*

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

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

Cancer statistics: Baseline statistics

C52: Vaginal cancer

Year of diagnosis	1998-2013
Patients	271
Diseases	271
Creation date	05/19/2015
Export date	12/30/2014
Population (females)	2.36 m

http://www.tumorregister-muenchen.de/en/facts/base/base_C52__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
C52	Malignant neoplasm of vagina

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	13			38.5	69.2	92.3	
1999	7	1	14.3	28.6	100.0	100.0	
2000	10			10.0	30.0	100.0	
2001	12	1	8.3	41.7	83.3	100.0	
2002	11	1	9.1	45.5	81.8	100.0	#
2003	20	1	5.0	25.0	80.0	100.0	
2004	19	4	21.1	15.8	84.2	100.0	
2005	15	1	6.7	20.0	53.3	100.0	
2006	18	1	5.6	33.3	77.8	88.9	
2007	28			39.3	53.6	89.3	# ##
2008	13	2	15.4	15.4	53.8	84.6	
2009	23	3	13.0	52.2	60.9	78.3	
2010	24	2	8.3	41.7	58.3	66.7	
2011	25	1	4.0	24.0	60.0	76.0	
2012	17	1	5.9	35.3	35.3	94.1	
2013	16	1	6.3	37.5	25.0	100.0	###
1998-2013	271	20	7.4	32.5	61.6	89.7	

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	13	1.1	0.5	0.8	1.0
1999	7	0.6	0.2	0.4	0.5
2000	10	0.8	0.5	0.6	0.8
2001	12	1.0	0.5	0.7	0.9
2002	11	0.6	0.2	0.4	0.5
2003	20	1.0	0.4	0.6	0.8
2004	19	1.0	0.6	0.7	0.8
2005	15	0.8	0.4	0.5	0.6
2006	18	0.9	0.3	0.5	0.7
2007	28	1.2	0.5	0.7	1.0
2008	13	0.6	0.2	0.3	0.4
2009	23	1.0	0.4	0.6	0.8
2010	24	1.0	0.5	0.7	0.8
2011	25	1.1	0.4	0.6	0.8
2012	17	0.7	0.3	0.5	0.6
2013	16	0.7	0.4	0.5	0.6
1998-2013	271	0.9	0.4	0.6	0.7

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	13	67.6	16.4	32.6	89.4	48.6	54.6	73.8	79.0	82.7
1999	7	71.3	15.8	42.4	89.2	42.4	59.1	75.0	82.3	89.2
2000	10	59.6	15.7	37.5	80.1	40.3	45.7	60.2	75.0	77.9
2001	12	70.2	20.9	14.7	93.2	55.1	61.7	75.6	83.7	84.9
2002	11	72.1	14.6	46.1	96.1	52.8	63.0	73.3	82.5	83.9
2003	20	73.1	11.0	54.0	85.8	57.7	61.3	78.9	82.4	84.5
2004	19	65.0	22.4	2.9	92.5	25.2	57.9	67.0	82.0	91.1
2005	15	70.2	22.2	17.6	89.4	25.4	59.5	75.5	85.1	88.7
2006	18	74.5	15.8	49.9	96.0	50.2	60.8	79.4	86.9	95.1
2007	28	72.4	14.7	26.6	92.7	52.6	65.8	76.9	82.4	88.1
2008	13	76.6	12.5	47.8	91.3	64.5	68.1	80.4	85.5	88.8
2009	23	70.0	16.0	33.3	95.5	45.9	59.7	71.9	82.0	87.9
2010	24	69.7	14.4	46.7	95.3	49.5	57.4	70.1	81.1	87.7
2011	25	72.3	13.3	42.2	90.3	49.5	67.4	74.7	82.0	88.0
2012	17	68.8	11.9	29.9	84.3	59.4	68.8	71.6	73.3	81.7
2013	16	63.3	21.6	0.7	90.3	32.3	59.8	67.6	75.5	84.2
1998-2013	271	70.1	16.3	0.7	96.1	49.5	60.7	72.9	82.3	87.9

Table 4

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

Age at diagnosis Years	Cases n	%	Cum.%
0-4	2	0.7	0.7
5-9	0	0.0	0.7
10-14	1	0.4	1.1
15-19	1	0.4	1.5
20-24	0	0.0	1.5
25-29	4	1.5	3.0
30-34	3	1.1	4.1
35-39	2	0.7	4.8
40-44	4	1.5	6.3
45-49	13	4.8	11.1
50-54	14	5.2	16.2
55-59	20	7.4	23.6
60-64	19	7.0	30.6
65-69	30	11.1	41.7
70-74	39	14.4	56.1
75-79	32	11.8	67.9
80-84	48	17.7	85.6
85+	39	14.4	100.0
All ages	271	100.0	

Included in the statistics are 48.3% 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=20 %	Prop. all cancers n=153136 %
0- 4	2	0.1		0.8
5- 9		0.0		
10-14	1	0.1		0.6
15-19	1	0.1		0.3
20-24		0.0		
25-29	4	0.2		0.4
30-34	3	0.1		0.1
35-39	2	0.1		0.1
40-44	4	0.2		0.1
45-49	13	0.6		0.1
50-54	14	0.7		0.1
55-59	20	1.0		0.1
60-64	19	1.0	5.3	0.1
65-69	30	1.7	3.3	0.2
70-74	39	2.6	5.1	0.2
75-79	32	2.7	3.1	0.2
80-84	48	5.1	10.4	0.3
85+	39	4.4	25.6	0.2
All ages	271		7.4	0.2
Incidence				
Raw		0.9		
WS		0.4		
ES		0.6		
BRD-S		0.7		

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 %
C18 Colon	3	0.8	4.0	0.8	11.7	39.3	33.3
C19-C20 Rectum	2	0.3	6.5	0.8	23.4	29.5	50.0
C50 Breast	2	1.9	1.1	0.1	3.9	2.4	
C53 Cervix uteri	2	0.1	22.5	2.7	81.4 #	33.4	
C54 Corpus uteri	4	0.3	11.9	3.2	30.5 #	64.0	25.0
Other primaries	5	0.8	5.9	1.9	13.9 #	72.6	
Not observed	0	2.5	0.0	0.0	1.5	-43.5	
All mult. primaries	18	6.7	2.7	1.6	4.3 #	197.6	16.7

Patients	188
Median age at second malignancy (years)	81.1
Person-years	573
Mean observation time (years)	3.0
Median observation time (years)	1.5

The occurrence of second malignancy is statistically significant.

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

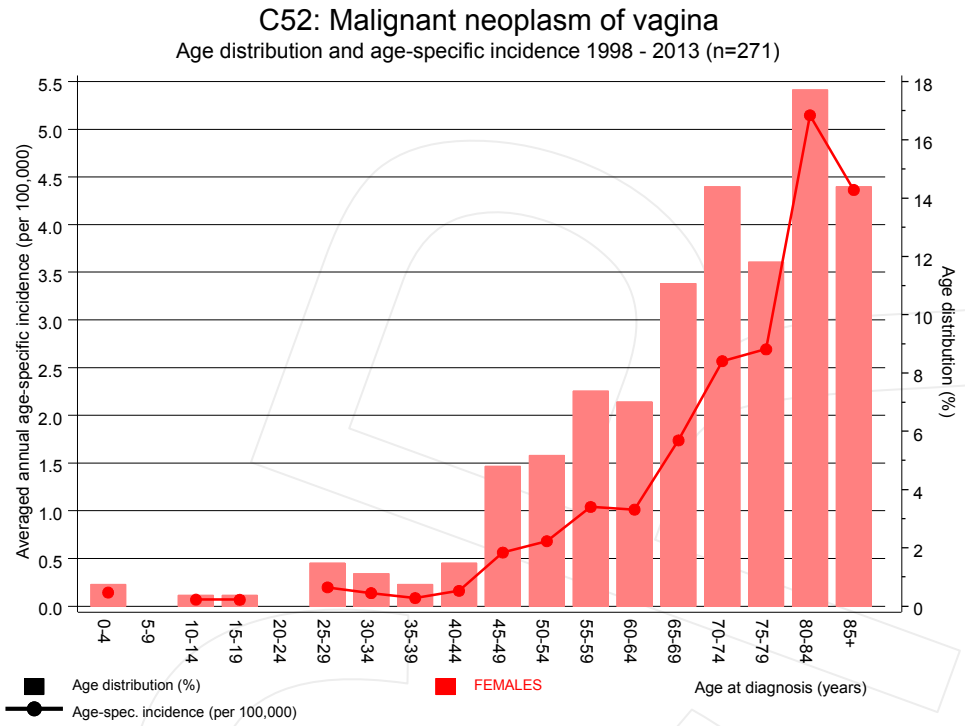

Figure 7. Age distribution and age-specific incidence

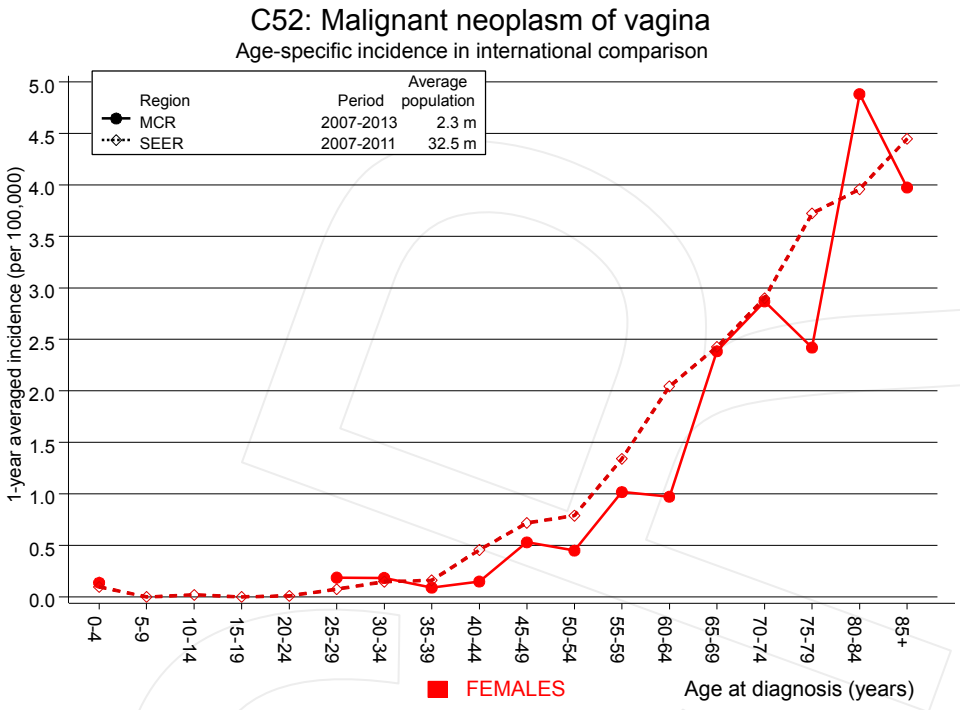

Figure 7a. Age-specific incidence in MCR registry areas compared to SEER (Surveillance, Epidemiology, and End Results, USA).

Reference:

Surveillance, Epidemiology, and End Results (SEER) Program SEER*Stat Database: Incidence - SEER 18 Regs Research Data, released April 2014, based on the November 2013 submission. http://www.seer.cancer.gov.

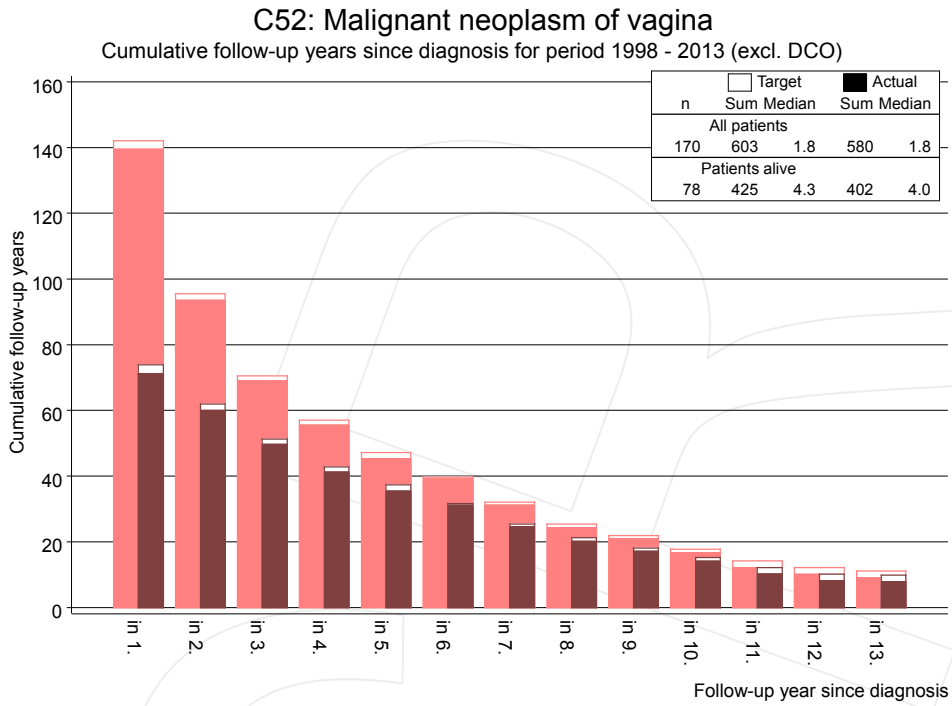

Figure 8. Cumulative follow-up years depending on time since diagnosis

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

Average incidence (world standard population) 2007 - 2013

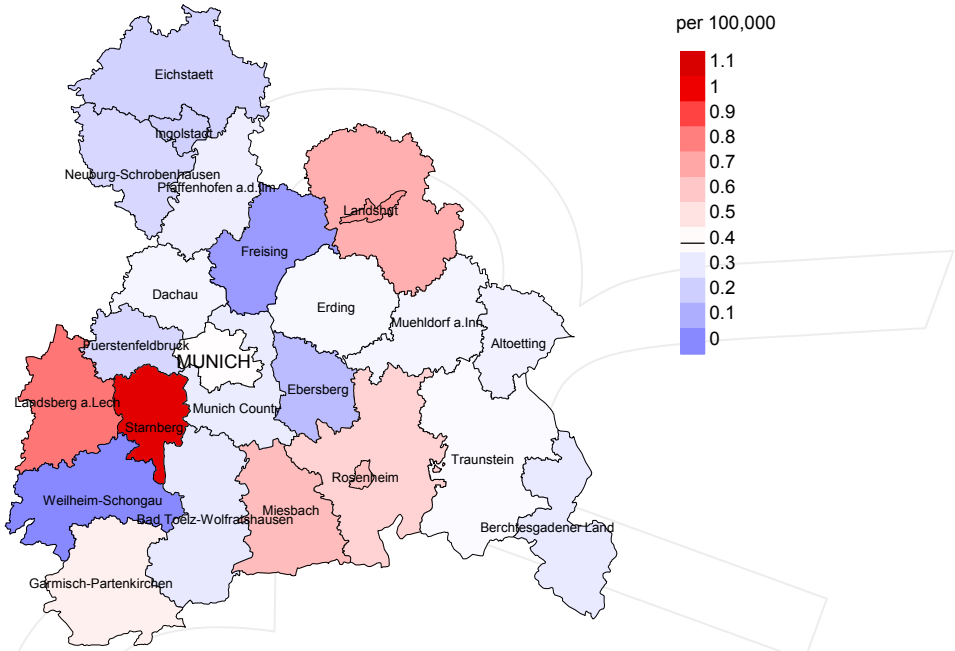

Figure 9a. Map of cancer incidence (world standard population, incl. DCO cases) by county averaged for period 2007 to 2013. According to their individual incidence rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (0.4/100,000 WS N=146).

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 2 women were identified with newly diagnosed vaginal cancer. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 0.1/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 0.0 and 0.8/100,000.

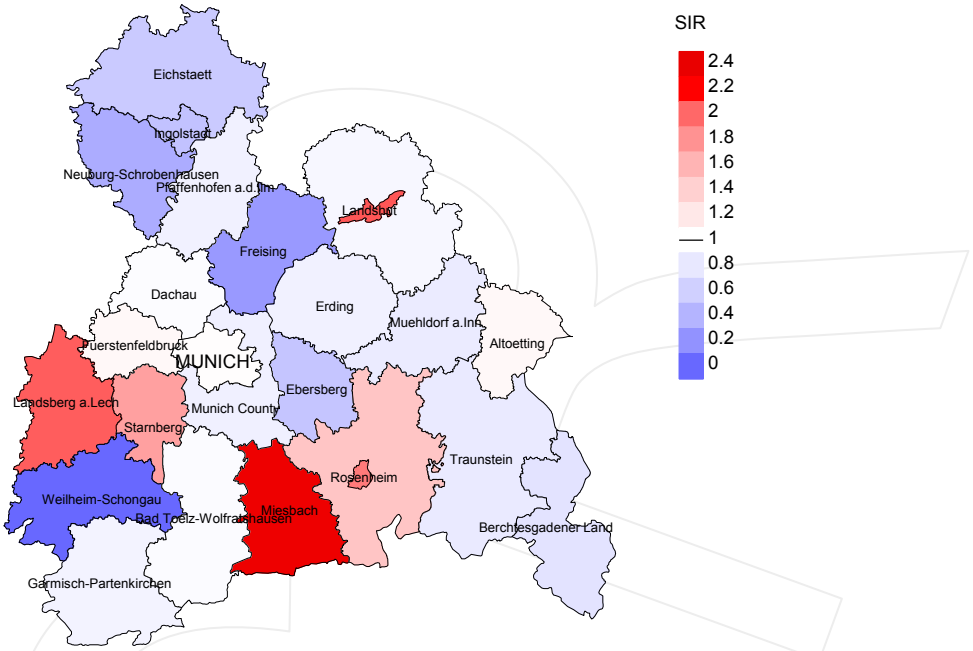

Figure 9b. Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2007 to 2013. According to their individual SIR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (N=146).

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 2 women were identified with newly diagnosed vaginal cancer. Therefore, the mean standardized incidence ratio (SIR) for this cancer type in this area can be calculated at 0.52. Though, the value of this parameter may vary with an underlying probability of 99% between 0.03 and 2.41, 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	13	92.3		9	69.2	100.0
1999	7	100.0	14.3	7	100.0	71.4
2000	10	100.0		3	30.0	66.7
2001	12	100.0	8.3	10	83.3	90.0
2002	11	100.0	9.1	9	81.8	88.9
2003	20	100.0	5.0	16	80.0	93.8
2004	19	100.0	21.1	16	84.2	93.8
2005	15	100.0	6.7	8	53.3	100.0
2006	18	88.9	5.6	14	77.8	92.9
2007	28	89.3		15	53.6	100.0
2008	13	84.6	15.4	7	53.8	85.7
2009	23	78.3	13.0	14	60.9	100.0
2010	24	66.7	8.3	14	58.3	100.0
2011	25	76.0	4.0	15	60.0	100.0
2012	17	94.1	5.9	6	35.3	100.0
2013	16	100.0	6.3	4	25.0	75.0
1998-2013	271	89.7	7.4	167	61.6	94.0

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	13	9	100.0	2	15.4
1999	7	11	90.9	1	14.3
2000	10	10	90.0	1	10.0
2001	12	10	90.0	6	50.0
2002	11	12	83.3	2	18.2
2003	20	6	100.0	3	15.0
2004	19	22	95.5	6	31.6
2005	15	13	100.0	4	26.7
2006	18	12	100.0	5	27.8
2007	28	21	95.2	4	14.3
2008	13	12	100.0	2	15.4
2009	23	9	100.0	4	17.4
2010	24	13	100.0	5	20.8
2011	25	11	100.0	2	8.0
2012	17	21	100.0	3	17.6
2013	16	19	100.0	2	12.5
1998-2013	271	211	96.7	52	19.2

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	9	66.7	33.3	77.8
1999	11	72.7	27.3	80.0
2000	10	90.0	10.0	100.0
2001	10	70.0	30.0	88.9
2002	12	50.0	50.0	60.0
2003	6	66.7	33.3	83.3
2004	22	86.4	13.6	90.5
2005	13	92.3	7.7	92.3
2006	12	66.7	33.3	75.0
2007	21	71.4	28.6	80.0
2008	12	66.7	33.3	83.3
2009	9	33.3	66.7	44.4
2010	13	84.6	15.4	84.6
2011	11	90.9	9.1	90.9
2012	21	76.2	23.8	85.7
2013	19	84.2	15.8	94.7
1998-2013	211	74.9	25.1	83.3

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	9	62.0	59.8	83.0	61.2
1999	11	82.2	82.1	85.0	82.1
2000	10	76.0	72.7	80.2	79.4
2001	10	72.3	71.8	81.6	77.3
2002	12	82.3	76.5	85.5	80.8
2003	6	82.9	79.1	88.8	82.4
2004	22	80.1	81.0	77.1	81.0
2005	13	79.2	77.0	89.0	77.0
2006	12	83.9	83.1	88.3	83.7
2007	21	79.3	78.9	84.5	79.1
2008	12	82.1	79.7	82.1	82.1
2009	9	79.5	83.8	75.0	84.3
2010	13	82.5	82.2	91.8	82.2
2011	11	77.4	78.5	74.1	78.5
2012	21	77.4	76.0	86.4	76.0
2013	19	76.8	75.3	90.3	75.3
1998-2013	211	79.6	77.7	83.5	79.3

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	6	0.5	0.46	0.3	0.48	0.4	0.47	0.4	0.38
1999	8	0.7	1.14	0.2	1.03	0.4	1.02	0.6	1.17
2000	9	0.7	0.90	0.3	0.65	0.5	0.71	0.6	0.79
2001	7	0.6	0.58	0.3	0.53	0.4	0.60	0.5	0.53
2002	6	0.3	0.55	0.1	0.53	0.2	0.54	0.3	0.56
2003	4	0.2	0.20	0.1	0.14	0.1	0.15	0.2	0.19
2004	19	1.0	1.00	0.4	0.64	0.6	0.81	0.7	0.90
2005	12	0.6	0.80	0.2	0.59	0.3	0.67	0.4	0.70
2006	8	0.4	0.44	0.1	0.34	0.2	0.36	0.3	0.44
2007	15	0.6	0.54	0.3	0.66	0.4	0.60	0.5	0.52
2008	8	0.3	0.62	0.1	0.65	0.2	0.70	0.3	0.68
2009	3	0.1	0.13	0.0	0.05	0.0	0.07	0.1	0.11
2010	11	0.5	0.46	0.1	0.30	0.2	0.33	0.3	0.39
2011	10	0.4	0.40	0.1	0.29	0.2	0.33	0.3	0.37
2012	16	0.7	0.94	0.2	0.71	0.4	0.80	0.5	0.89
2013	16	0.7	1.00	0.3	0.68	0.4	0.82	0.5	0.94
1998-2013	158	0.5	0.58	0.2	0.49	0.3	0.52	0.4	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.%
5-9	1	0.6	0.6
10-14	0	0.0	0.6
15-19	0	0.0	0.6
20-24	0	0.0	0.6
25-29	0	0.0	0.6
30-34	2	1.3	1.9
35-39	0	0.0	1.9
40-44	1	0.6	2.5
45-49	5	3.2	5.7
50-54	8	5.1	10.8
55-59	9	5.7	16.5
60-64	13	8.2	24.7
65-69	11	7.0	31.6
70-74	19	12.0	43.7
75-79	21	13.3	57.0
80-84	32	20.3	77.2
85+	36	22.8	100.0
All ages	158	100.0	

Included in the statistics are 48.3% 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	1	0.1	1.00	2.5
10-14		0.0		
15-19		0.0		
20-24		0.0		
25-29		0.0		
30-34	2	0.1	0.67	0.9
35-39		0.0		
40-44	1	0.0	0.25	0.1
45-49	5	0.2	0.38	0.2
50-54	8	0.4	0.57	0.3
55-59	9	0.5	0.45	0.2
60-64	13	0.7	0.68	0.2
65-69	11	0.6	0.37	0.1
70-74	19	1.3	0.49	0.2
75-79	21	1.8	0.66	0.2
80-84	32	3.4	0.67	0.3
85+	36	4.0	0.92	0.3
All ages	158			0.2
Mortality				
Raw		0.5	0.58	
WS		0.2	0.49	
ES		0.3	0.52	
BRD-S		0.4	0.55	
PYLL-70				
per 100,000		2.5		
ES		2.3		
AYLL-70		13.1		

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

Table 15

Multiple primaries in deaths in period 1998-2013

Diagnosis	Total n	Total %↓	Pre n	Pre ←%	Syn-chron ±30d n	Syn-chron ±30d ←%	Post n	Post ←%
C03-C06 Oral cavity	1	1.2					1	100.0
C15 Oesophagus	1	1.2			1	100.0		
C16 Stomach	1	1.2	1	100.0				
C17 Small intestine	1	1.2					1	100.0
C18 Colon	3	3.6	1	33.3	1	33.3	1	33.3
C19-C20 Rectum	5	6.0	2	40.0			3	60.0
C21 Anus/canal	1	1.2					1	100.0
C22 Liver	1	1.2					1	100.0
C23-C24 Bile	1	1.2					1	100.0
C33-C34 Lung	5	6.0	1	20.0	1	20.0	3	60.0
C43 Malign. melanoma	1	1.2					1	100.0
C44 Skin others	3	3.6	1	33.3			2	66.7
C50 Breast	10	12.0	6	60.0			4	40.0
C51 Vulva	4	4.8	1	25.0	1	25.0	2	50.0
C52 Vagina	4	4.8					4	100.0
C53 Cervix uteri	17	20.5	12	70.6	3	17.6	2	11.8
C54 Corpus uteri	11	13.3	7	63.6	3	27.3	1	9.1
C55,C57 Fem. genitals un	2	2.4			1	50.0	1	50.0
C56 Ovary	1	1.2					1	100.0
C64 Kidney	1	1.2					1	100.0
C65 Renal pelvis	1	1.2	1	100.0				
C67 Bladder	3	3.6	2	66.7			1	33.3
C69 Eye carcinoma	1	1.2	1	100.0				
C70-C72 CNS cancer	1	1.2					1	100.0
C91-C96 Leukaemia	3	3.6					3	100.0
All mult. primaries	83	100.0	36	43.4	11	13.3	36	43.4

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	1	0.1	1.00	2.7
10-14		0.0		
15-19		0.0		
20-24		0.0		
25-29		0.0		
30-34	2	0.1	2.00	1.0
35-39		0.0		
40-44		0.0		
45-49	5	0.2	0.42	0.3
50-54	7	0.3	0.64	0.3
55-59	7	0.4	0.50	0.2
60-64	10	0.5	0.56	0.2
65-69	9	0.5	0.41	0.1
70-74	14	0.9	0.70	0.2
75-79	14	1.2	0.54	0.2
80-84	21	2.3	0.60	0.2
85+	27	3.0	0.87	0.2
All ages	117			0.2
Mortality				
Raw		0.4	0.58	
WS		0.2	0.49	
ES		0.2	0.53	
BRD-S		0.3	0.55	
PYLL-70				
per 100,000		2.1		
ES		2.0		
AYLL-70		13.6		

* 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	1	0.1	1.00	2.8
10-14		0.0		
15-19		0.0		
20-24		0.0		
25-29		0.0		
30-34	2	0.1	2.00	1.1
35-39		0.0		
40-44		0.0		
45-49	5	0.2	0.45	0.3
50-54	4	0.2	0.44	0.2
55-59	7	0.4	0.54	0.2
60-64	8	0.4	0.53	0.2
65-69	7	0.4	0.33	0.1
70-74	11	0.7	0.58	0.2
75-79	10	0.8	0.45	0.1
80-84	19	2.0	0.58	0.3
85+	23	2.6	0.82	0.2
All ages	97			0.2
Mortality				
Raw		0.3	0.53	
WS		0.1	0.45	
ES		0.2	0.48	
BRD-S		0.2	0.50	
PYLL-70				
per 100,000		1.8		
ES		1.7		
AYLL-70		14.3		

* See corresponding tables with multiple primaries.

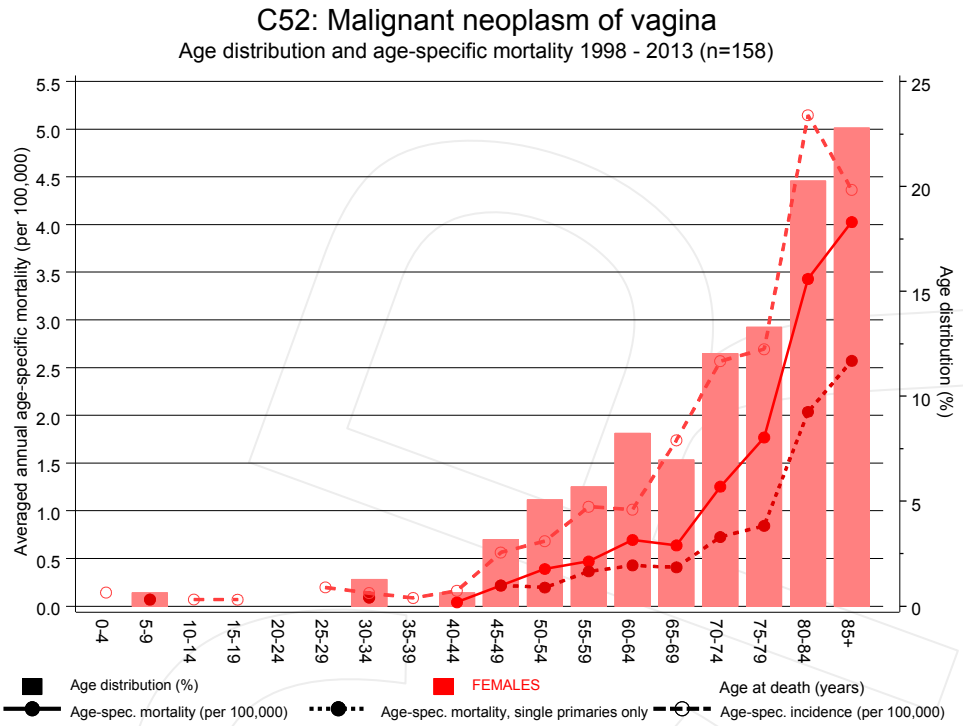

Figure 18. Distribution of age at death (bars) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

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

Average mortality (world standard population) 2007 - 2013

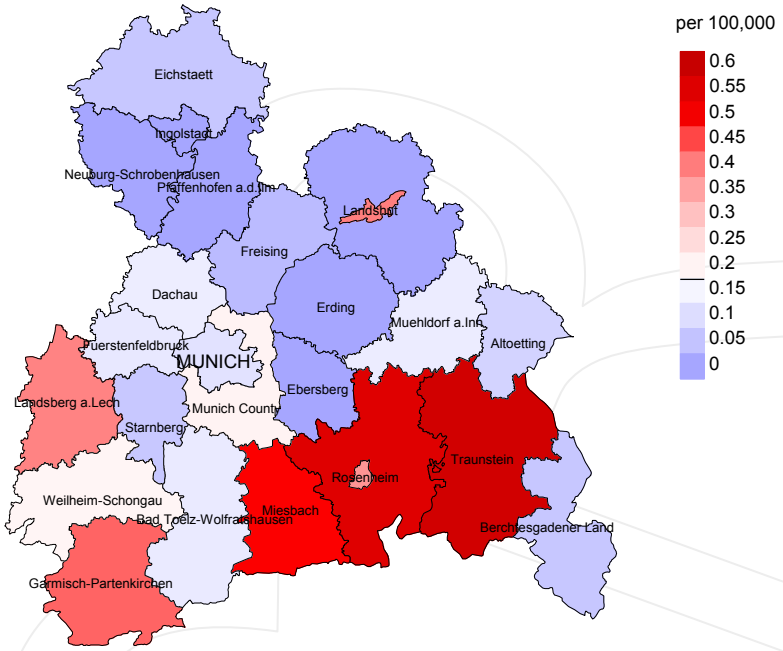

Figure 19a. Map of cancer mortality (world standard population) by county averaged for period 2007 to 2013. According to their individual mortality rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (0.2/100,000 WS N=74).

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 0 women died from vaginal cancer. Therefore, the mean mortality rate for this cancer type in this area can be calculated at 0.0/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 0.0 and 1.2/100,000.

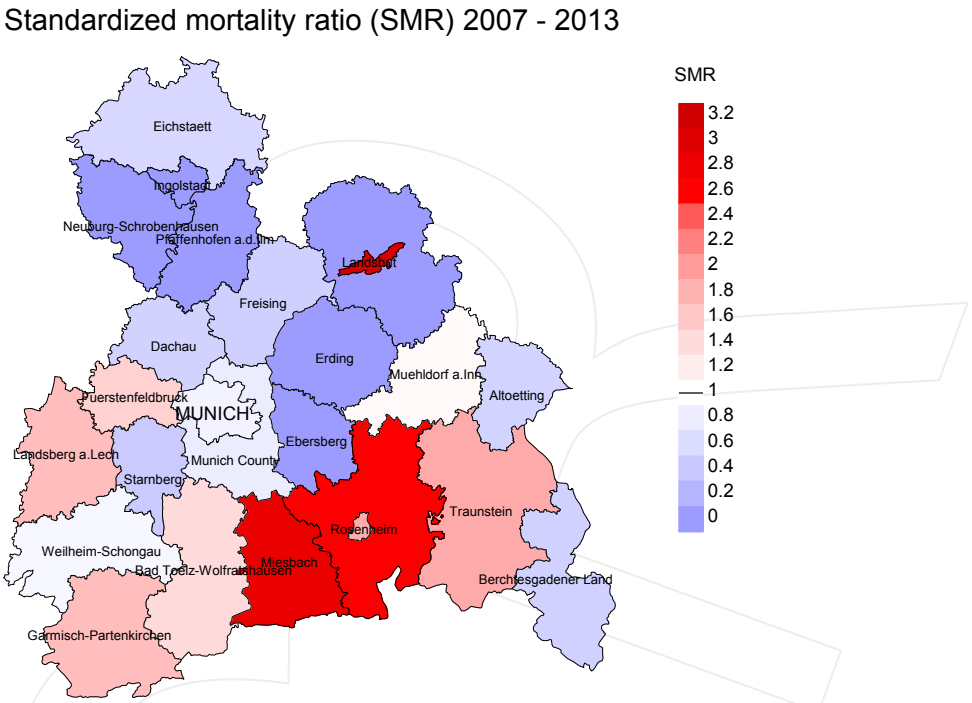

Figure 19b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2007 to 2013. According to their individual SMR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (N=74).

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 0 women died from vaginal cancer. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 0.00. Though, the value of this parameter may vary with an underlying probability of 99% between 0.00 and 2.78, 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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