Munich Cancer Registry

ICD-10 C52: Vaginal cancer

Incidence and Mortality

Year of diagnosis	1998-2014
Patients	295
Diseases	295
Creation date	04/13/2016
Export date	12/23/2015
Population (females)	2.36 m

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

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

http://www.tumorregister-muenchen.de/en/facts/base/bC52__E-ICD-10-C52-Vaginal-cancer-incidence-and-mortality.pdf

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

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

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

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

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

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

Munich Cancer Registry, April 2016

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

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

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

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

Code	Description
C52	Malignant neoplasm of vagina

INCIDENCE

Table 1

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

Year of diagnosis	Cases n	DCO cases n	Prop. DCO %	Prop. mult. primaries %	Prop. deaths %	Prop. actively followed %
1998	13			38.5	69.2	92.3
1999	7	1	14.3	28.6	100.0	100.0
2000	11			18.2	36.4	90.9
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	66.7	100.0
2006	18	1	5.6	33.3	77.8	88.9
2007	28			39.3	53.6	78.6 #
2008	13	2	15.4	15.4	53.8	84.6
2009	23	3	13.0	52.2	60.9	78.3
2010	25	2	8.0	40.0	60.0	68.0
2011	26	1	3.8	26.9	61.5	76.9
2012	18	1	5.6	38.9	50.0	94.4
2013	21	1	4.8	28.6	42.9	100.0
2014	15	1	6.7	40.0	33.3	100.0 ##
1998−2014	295	21	7.1	32.9	62.7	89.2

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

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

Table 2

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

Year of diagnosis	Cases n	Incidence raw	Incidence WS	Incidence ES	Incidence BRD-S
1998	13	1.1	0.5	0.8	1.0
1999	7	0.6	0.2	0.4	0.5
2000	11	0.9	0.6	0.7	0.9
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	25	1.1	0.5	0.7	0.8
2011	26	1.1	0.4	0.6	0.8
2012	18	0.8	0.3	0.5	0.6
2013	21	0.9	0.5	0.6	0.7
2014	15	0.6	0.2	0.4	0.4
1998-2014	295	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	11	58.4	15.5	37.5	80.1	43.0	45.7	57.0	75.0	75.7
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	25	69.8	14.1	46.7	95.3	49.5	58.7	70.4	79.9	87.7
2011	26	72.3	13.0	42.2	90.3	49.5	67.4	74.5	82.0	88.0
2012	18	70.1	12.7	29.9	91.2	59.4	68.8	71.8	73.9	84.3
2013	21	65.6	20.3	0.7	90.3	47.2	60.2	72.0	78.0	82.8
2014	15	72.5	16.0	43.1	94.7	46.2	57.8	73.8	84.4	92.5
1998-2014	295	70.3	16.2	0.7	96.1	49.2	60.7	73.2	82.3	87.9

Table 4

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

Age at diagnosis Years	Cases n	%	Cum.%
0-4	1	0.6	0.6
5-9	0	0.0	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	2	1.2	1.8
30-34	2	1.2	3.0
35-39	1	0.6	3.6
40-44	3	1.8	5.3
45-49	9	5.3	10.7
50-54	6	3.6	14.2
55-59	11	6.5	20.7
60-64	9	5.3	26.0
65-69	23	13.6	39.6
70-74	33	19.5	59.2
75-79	15	8.9	68.0
80-84	30	17.8	85.8
85+	24	14.2	100.0
All ages	169	100.0	

Included in the statistics are 49.7% multiple primaries.

Table 5

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

Age at diagnosis Years	Cases n	Age-spec. incidence	DCO rate n=11 %	Prop. all cancers n=89596 %
0- 4	1	0.1		0.7
5- 9		0.0		
10-14		0.0		
15-19		0.0		
20-24		0.0		
25-29	2	0.2		0.3
30-34	2	0.2		0.2
35-39	1	0.1		0.1
40-44	3	0.2		0.1
45-49	9	0.6		0.2
50-54	6	0.5		0.1
55-59	11	1.0		0.1
60-64	9	0.8		0.1
65-69	23	2.2	4.3	0.2
70-74	33	3.2	6.1	0.3
75-79	15	2.1		0.1
80-84	30	5.4	3.3	0.3
85+	24	4.2	29.2	0.2
All ages	169		6.5	0.2
Incidence				
Raw		0.9		
WS		0.4		
ES		0.5		
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).

ICD-10 C52: Malignant neoplasm of vagina

Age distribution and age-specific incidence 2007 - 2014 (n=169)

Figure 6. Age distribution and age-specific incidence

ICD-10 C52: Malignant neoplasm of vagina
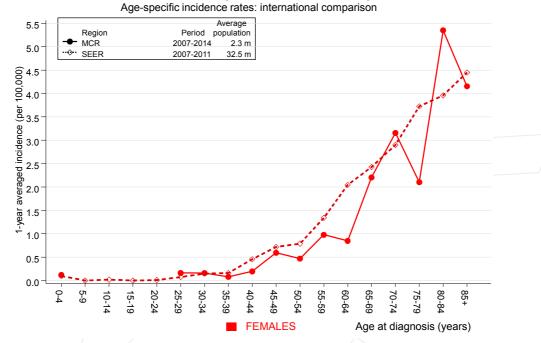### Age-specific incidence rates: international comparison

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

Reference:

Surveillance, Epidemiology, and End Results (SEER) Program SEER*Stat Database: Incidence - SEER 18 Regs Research Data, released April 2014, based on the November 2013 submission. http://www.seer.cancer.gov.
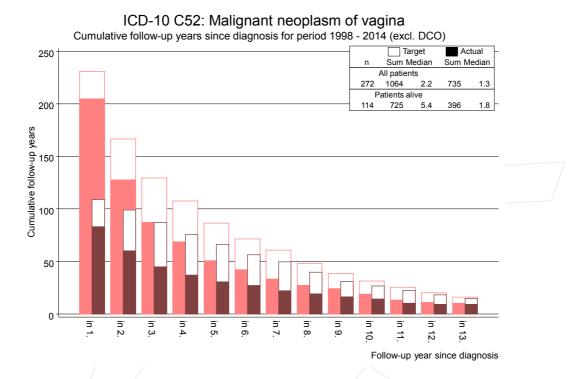
ICD-10 C52: Malignant neoplasm of vagina

Cumulative follow-up years since diagnosis for period 1998 - 2014 (excl. DCO)

	Target		Actual	
n	Sum	Median	Sum	Median
All patients				
272	1064	2.2	735	1.3
Patients alive				
114	725	5.4	396	1.8

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

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

Table 8

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

Diagnosis		Observed n	Expected n	SIR	LCL 95%	UCL 95%		EAR	DCO %
C18	Colon	4	0.9	4.3	1.2	11.1	#	41.8	25.0
C19–C20	Rectum	3	0.4	8.0	1.6	23.3	#	35.7	66.7
C50	Breast	3	2.4	1.3	0.3	3.7		8.2	
C53	Cervix uteri	5	0.1	45.0	14.6	105.0	#	66.4	20.0
C54	Corpus uteri	6	0.4	13.9	5.1	30.2	#	75.6	33.3
C56	Ovary	3	0.3	8.7	1.8	25.6	#	36.1	66.7
Other primaries		8	1.6	5.0	2.1	9.8	#	86.8	
Not observed		0	2.3	0.0	0.0	1.6		−31.1	
All mult. primaries		32	8.5	3.8	2.6	5.3	#	319.5	25.0

Patients	278
Median age at second malignancy (years)	77.0
Person-years	736
Mean observation time (years)	2.6
Median observation time (years)	1.3

The occurrence of second malignancy is statistically significant.

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

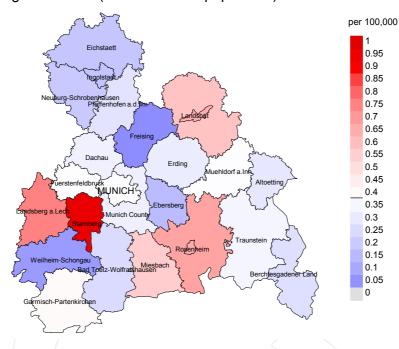## Average incidence (world standard population) 2007 - 2014

Figure 9a. Map of cancer incidence (world standard population, incl. DCO cases) by county averaged for period 2007 to 2014. According to their individual incidence rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (0.4/100,000 WS N=169).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 65,347 female residents (averaged) in the period from 2007 to 2014 a total of 3 women were identified with newly diagnosed vaginal cancer. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 0.2/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 0.0 and 0.7/100,000.
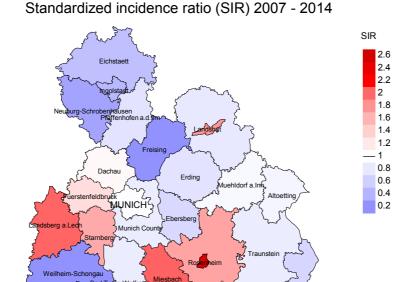
Standardized incidence ratio (SIR) 2007 - 2014

Figure 9b. Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2007 to 2014. According to their individual SIR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (N=169).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 64,924 female residents (averaged) in the period from 2007 to 2014 a total of 3 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 0.67. Though, the value of this parameter may vary with an underlying probability of 99% between 0.08 and 2.45, 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	85.7
2000	11	90.9		4	36.4	50.0
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	100.0
2005	15	100.0	6.7	10	66.7	100.0
2006	18	88.9	5.6	14	77.8	92.9
2007	28	78.6		15	53.6	100.0
2008	13	84.6	15.4	7	53.8	100.0
2009	23	78.3	13.0	14	60.9	100.0
2010	25	68.0	8.0	15	60.0	100.0
2011	26	76.9	3.8	16	61.5	100.0
2012	18	94.4	5.6	9	50.0	88.9
2013	21	100.0	4.8	9	42.9	66.7
2014	15	100.0	6.7	5	33.3	80.0
1998-2014	295	89.2	7.1	185	62.7	93.5

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	13	9	100.0	2	15.4
1999	7	11	90.9	1	14.3
2000	11	10	90.0	1	9.1
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	22	95.5	4	14.3
2008	13	12	100.0	2	15.4
2009	23	9	100.0	4	17.4
2010	25	13	100.0	5	20.0
2011	26	11	100.0	2	7.7
2012	18	21	100.0	3	16.7
2013	21	20	100.0	2	9.5
2014	15	19	89.5	3	20.0
1998-2014	295	232	96.1	55	18.6

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	22	68.2	31.8	81.0
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	20	85.0	15.0	95.0
2014	19	68.4	31.6	64.7
1998-2014	232	74.1	25.9	82.1

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	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	22	79.4	78.9	84.5	79.3
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	20	77.0	76.8	90.3	76.8
2014	19	82.3	76.6	87.6	75.1
1998–2014	232	79.7	77.7	84.2	79.3

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

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

Table 12

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

Year of death	Deaths n	Mort. raw	MI-Index raw	Mort. WS	MI-Index WS	Mort. ES	MI-Index ES	Mort. BRD-S	MI-Index BRD-S
1998	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	0.82	0.3	0.56	0.5	0.62	0.6	0.70
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	0.44	0.1	0.29	0.2	0.32	0.3	0.38
2011	10	0.4	0.38	0.1	0.28	0.2	0.32	0.3	0.35
2012	16	0.7	0.89	0.2	0.69	0.4	0.77	0.5	0.87
2013	17	0.7	0.81	0.3	0.60	0.4	0.71	0.6	0.76
2014	13	0.6	0.87	0.2	0.82	0.3	0.86	0.4	0.97
1998-2014	172	0.5	0.58	0.2	0.49	0.3	0.53	0.4	0.55

Table 13

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

Age at death Years	Cases n	%	Cum.%
5-9	1	1.1	1.1
10-14	0	0.0	1.1
15-19	0	0.0	1.1
20-24	0	0.0	1.1
25-29	0	0.0	1.1
30-34	1	1.1	2.2
35-39	0	0.0	2.2
40-44	1	1.1	3.2
45-49	2	2.2	5.4
50-54	6	6.5	11.8
55-59	3	3.2	15.1
60-64	6	6.5	21.5
65-69	6	6.5	28.0
70-74	11	11.8	39.8
75-79	16	17.2	57.0
80-84	18	19.4	76.3
85+	22	23.7	100.0
All ages	93	100.0	

Included in the statistics are 49.7% multiple primaries.

Table 14

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

Age at death Years	Cases n	Age-spec. mortality	MI-index	Prop. all cancers %
0- 4		0.0		
5- 9	1	0.1	1.00	5.6
10-14		0.0		
15-19		0.0		
20-24		0.0		
25-29		0.0		
30-34	1	0.1	0.50	0.9
35-39		0.0		
40-44	1	0.1	0.33	0.2
45-49	2	0.1	0.22	0.2
50-54	6	0.5	1.00	0.3
55-59	3	0.3	0.27	0.1
60-64	6	0.6	0.67	0.2
65-69	6	0.6	0.26	0.1
70-74	11	1.1	0.33	0.2
75-79	16	2.2	1.07	0.3
80-84	18	3.2	0.60	0.3
85+	22	3.8	0.92	0.3
All ages	93			0.2
Mortality				
Raw		0.5	0.55	
WS		0.2	0.47	
ES		0.3	0.50	
BRD-S		0.4	0.53	
PYLL-70				
per 100,000		2.4		
ES		2.3		
AYLL-70		14.4		

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

Table 15

Multiple primaries in deaths in period 1998–2014

Diagnosis	Total n	Total %↓	Pre n	Pre ←%	Syn-chron ±30d n	Syn-chron ±30d ←%	Post n	Post ←%
C03–C06 Oral cavity	1	1.1					1	100.0
C15 Oesophagus	1	1.1			1	100.0		
C16 Stomach	1	1.1	1	100.0				
C17 Small intestine	1	1.1					1	100.0
C18 Colon	7	7.6	4	57.1	1	14.3	2	28.6
C19–C20 Rectum	6	6.5	3	50.0			3	50.0
C21 Anus/canal	1	1.1					1	100.0
C22 Liver	1	1.1					1	100.0
C23–C24 Bile	1	1.1					1	100.0
C33–C34 Lung	5	5.4	1	20.0	1	20.0	3	60.0
C44 Skin others	3	3.3	1	33.3			2	66.7
C50 Breast	10	10.9	6	60.0			4	40.0
C51 Vulva	4	4.3	1	25.0	1	25.0	2	50.0
C52 Vagina	4	4.3					4	100.0
C53 Cervix uteri	17	18.5	12	70.6	3	17.6	2	11.8
C54 Corpus uteri	11	12.0	7	63.6	3	27.3	1	9.1
C55,C57 Fem. genitals un	4	4.3	1	25.0	1	25.0	2	50.0
C56 Ovary	3	3.3					3	100.0
C64 Kidney	1	1.1					1	100.0
C65 Renal pelvis	1	1.1	1	100.0				
C67 Bladder	3	3.3	2	66.7			1	33.3
C69 Eye carcinoma	1	1.1	1	100.0				
C70–C72 CNS cancer	1	1.1					1	100.0
C73 Thyroid	1	1.1	1	100.0				
C91–C96 Leukaemia	3	3.3					3	100.0
All mult. primaries	92	100.0	42	45.7	11	12.0	39	42.4

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 2007–2014
(**First primaries only** *)

Age at death Years	Cases n	Age-spec. mortality	MI-index	Prop. all cancers %
0– 4		0.0		
5– 9	1	0.1	1.00	5.6
10–14		0.0		
15–19		0.0		
20–24		0.0		
25–29		0.0		
30–34	1	0.1	1.00	1.1
35–39		0.0		
40–44		0.0		
45–49	2	0.1	0.25	0.2
50–54	5	0.4	1.25	0.3
55–59	2	0.2	0.29	0.1
60–64	3	0.3	0.38	0.1
65–69	5	0.5	0.33	0.1
70–74	8	0.8	0.42	0.2
75–79	11	1.5	0.92	0.2
80–84	12	2.1	0.52	0.2
85+	16	2.8	0.80	0.2
All ages	66			0.2
Mortality				
Raw		0.4	0.55	
WS		0.1	0.49	
ES		0.2	0.52	
BRD–S		0.3	0.53	
PYLL–70				
per 100,000		1.8		
ES		1.8		
AYLL–70		15.4		

* See corresponding tables with multiple primaries.

Table 17

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

Age at death Years	Cases n	Age-spec. mortality	MI-index	Prop. all cancers %
0- 4		0.0		
5- 9	1	0.1	1.00	5.6
10-14		0.0		
15-19		0.0		
20-24		0.0		
25-29		0.0		
30-34	1	0.1	1.00	1.2
35-39		0.0		
40-44		0.0		
45-49	1	0.1	0.14	0.1
50-54	3	0.2	1.50	0.2
55-59	2	0.2	0.29	0.1
60-64	2	0.2	0.29	0.1
65-69	4	0.4	0.29	0.1
70-74	6	0.6	0.33	0.1
75-79	8	1.1	0.80	0.2
80-84	11	2.0	0.50	0.3
85+	14	2.4	0.78	0.2
All ages	53			0.2
Mortality				
Raw		0.3	0.49	
WS		0.1	0.43	
ES		0.2	0.46	
BRD-S		0.2	0.47	
PYLL-70				
per 100,000		1.4		
ES		1.5		
AYLL-70		16.1		

* See corresponding tables with multiple primaries.

ICD-10 C52: Malignant neoplasm of vagina
Age distribution and age-specific mortality 2007 - 2014 (n=93)
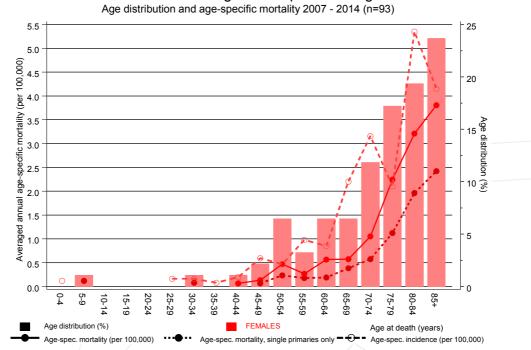
Figure 18. Distribution of age at death (bars) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

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 - 2014
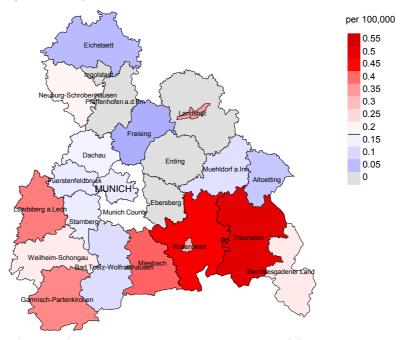
Figure 19a. Map of cancer mortality (world standard population) by county averaged for period 2007 to 2014. According to their individual mortality rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (0.2/100,000 WS N=88).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 65,347 female residents (averaged) in the period from 2007 to 2014 a total of 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 1.0/100,000.

Standardized mortality ratio (SMR) 2007 - 2014
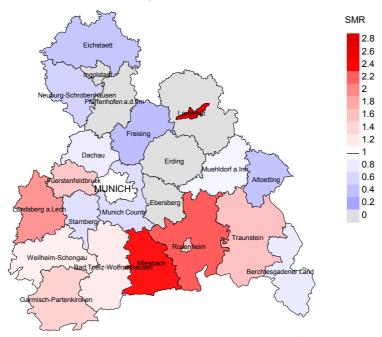
Figure 19b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2007 to 2014. According to their individual SMR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (N=88).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 64,924 female residents (averaged) in the period from 2007 to 2014 a total of 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 2.32, and is therefore not statistically striking.

Statistical Notes

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

1. **All multiple primaries included**

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

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

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

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

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

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

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

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

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

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

Shortcuts

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

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