Munich Cancer Registry

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ICD-10 C53: Cervical cancer

Incidence and Mortality

Year of diagnosis	1998-2014
Patients	3,716
Diseases	3,719
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/bC53__E-ICD-10-C53-Cervical-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
C53.-	Malignant neoplasm of cervix uteri
C53.0	Endocervix
C53.1	Exocervix
C53.8	Overlapping lesion of cervix uteri
C53.9	Cervix uteri, unspecified

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	145	8	5.5	17.2	46.9	91.7	
1999	162	2	1.2	18.5	40.1	93.2	
2000	148	8	5.4	24.3	40.5	95.3	
2001	153	6	3.9	21.6	43.8	92.8	
2002	238	23	9.7	20.2	45.8	95.8	#
2003	219	10	4.6	19.6	51.6	93.6	
2004	216	14	6.5	19.4	47.2	95.8	
2005	235	12	5.1	14.9	41.3	91.9	
2006	244	8	3.3	14.8	39.8	84.4	
2007	246	8	3.3	13.4	37.8	73.2	#
2008	272	7	2.6	16.5	37.1	60.7	
2009	270	10	3.7	14.4	39.6	58.9	
2010	250	12	4.8	22.4	34.0	62.8	
2011	247	8	3.2	11.7	29.1	60.3	
2012	247	18	7.3	21.5	34.0	69.6	
2013	235	11	4.7	14.9	21.7	98.7	
2014	192	4	2.1	10.4	9.4	96.9	##
1998-2014	3719	169	4.5	17.2	37.3	81.4	

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	145	12.3	8.1	10.3	11.3
1999	162	13.7	9.3	11.6	12.4
2000	148	12.3	8.2	10.3	11.2
2001	153	12.6	8.1	10.3	11.1
2002	238	12.2	7.7	9.8	10.8
2003	219	11.1	7.1	9.1	9.9
2004	216	10.9	6.9	8.9	9.6
2005	235	11.8	7.5	9.5	10.3
2006	244	12.1	7.9	10.0	10.7
2007	246	10.7	7.0	8.8	9.3
2008	272	11.7	7.7	9.8	10.4
2009	270	11.6	7.6	9.7	10.4
2010	250	10.7	6.9	8.9	9.5
2011	247	10.5	7.1	8.9	9.4
2012	247	10.5	6.6	8.4	9.2
2013	235	10.0	6.8	8.5	9.1
2014	192	8.1	5.7	7.1	7.6
1998-2014	3719	11.1	7.3	9.2	9.9

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	145	53.2	16.1	23.8	89.4	34.0	41.0	49.6	64.1	79.7
1999	162	51.3	16.5	24.4	90.0	33.8	37.7	47.9	63.8	77.7
2000	148	53.1	16.8	23.9	90.7	33.6	39.2	49.3	64.0	79.9
2001	153	54.1	17.0	28.8	96.0	34.4	40.0	48.9	63.5	80.9
2002	238	55.3	18.0	25.9	96.1	34.9	39.4	51.6	70.3	81.7
2003	219	56.1	17.0	27.3	93.4	35.7	42.7	53.4	67.5	82.0
2004	216	55.4	17.1	21.0	95.2	35.9	42.1	52.7	66.9	82.7
2005	235	55.5	17.4	24.0	100	35.1	40.3	54.5	68.7	80.8
2006	244	54.5	16.7	22.9	99.4	35.6	41.4	50.4	65.1	81.3
2007	246	53.2	17.0	22.0	96.6	34.4	41.0	48.8	66.8	79.9
2008	272	54.1	15.6	24.0	92.8	36.5	42.4	50.7	67.2	75.3
2009	270	55.3	17.1	23.1	95.1	36.0	41.1	52.3	67.1	82.2
2010	250	55.1	16.4	25.1	93.2	35.5	42.3	52.6	67.5	80.7
2011	247	52.8	16.2	25.7	95.6	32.9	40.7	50.1	63.0	77.8
2012	247	56.7	17.0	25.4	95.7	34.7	42.3	55.9	70.3	81.0
2013	235	53.1	15.7	22.1	96.0	34.5	42.8	49.9	63.6	77.1
2014	192	52.6	16.6	25.8	94.6	32.1	38.4	51.1	63.0	77.4
1998-2014	3719	54.3	16.8	21.0	100	34.8	41.1	51.3	66.6	80.1

Table 4

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

Age at diagnosis Years	Cases n	%	Cum.%
20-24	6	0.3	0.3
25-29	64	3.3	3.6
30-34	143	7.3	10.9
35-39	200	10.2	21.1
40-44	281	14.3	35.4
45-49	227	11.6	47.0
50-54	192	9.8	56.8
55-59	183	9.3	66.2
60-64	142	7.2	73.4
65-69	137	7.0	80.4
70-74	125	6.4	86.8
75-79	82	4.2	91.0
80-84	76	3.9	94.8
85+	101	5.2	100.0
All ages	1959	100.0	

Included in the statistics are 18.5% 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=78 %	Prop. all cancers n=89596 %
0- 4		0.0		
5- 9		0.0		
10-14		0.0		
15-19		0.0		
20-24	6	0.6		1.9
25-29	63	5.1		9.5
30-34	143	11.5		12.4
35-39	200	15.9	0.5	10.1
40-44	280	18.3		7.5
45-49	227	15.0	0.4	4.2
50-54	192	15.0	1.0	2.8
55-59	183	16.3	1.6	2.5
60-64	142	13.4	2.1	1.5
65-69	137	13.1	3.6	1.2
70-74	125	12.0	6.4	1.1
75-79	82	11.5	6.1	0.8
80-84	76	13.6	18.4	0.9
85+	101	17.5	35.6	1.0
All ages	1957		4.0	2.2
Incidence				
Raw		10.4		
WS		6.9		
ES		8.8		
BRD-S		9.4		

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

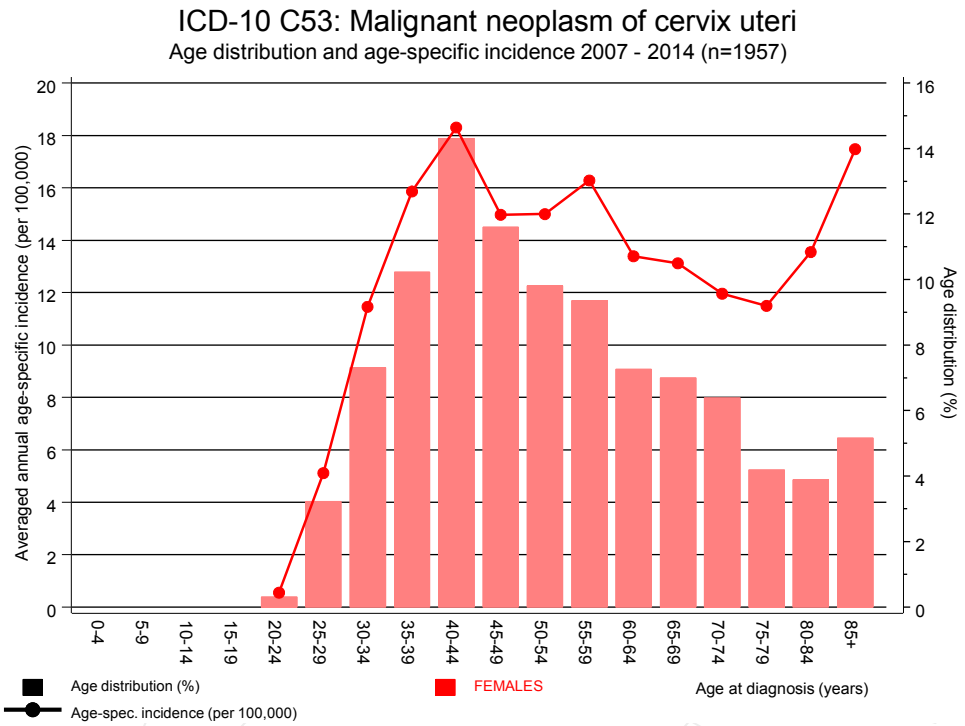

Figure 6. Age distribution and age-specific incidence

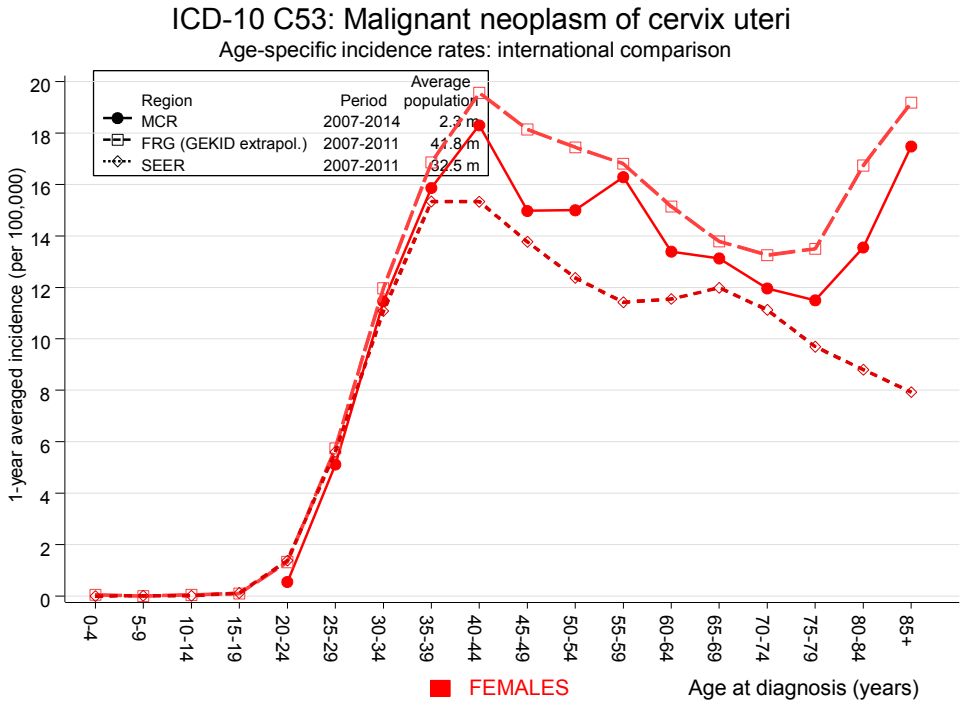

Figure 6a. Age-specific incidence in MCR registry areas compared to Germany (FRG, GEKID extrapolation) and SEER (Surveillance, Epidemiology, and End Results, USA).

Reference:

Extrapolated age-specific patient population of Germany, data status middle of 2010. Association of Population-based Cancer Registries in Germany (GEKID e.V.). Berlin, 2014. http://www.gekid.de. Last access: 02/11/2015

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

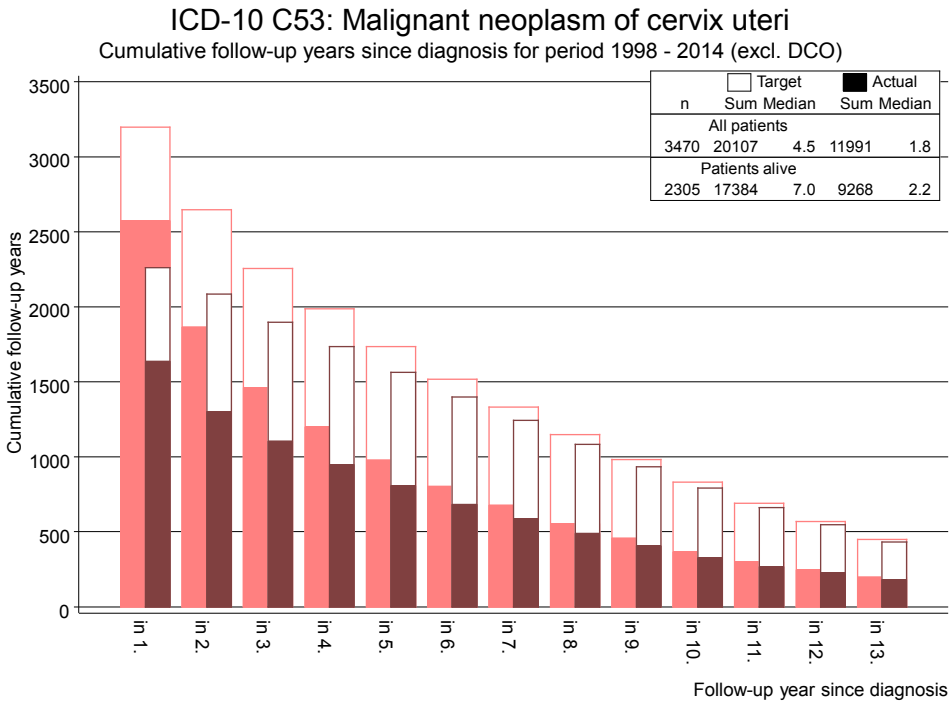

Figure 7. Cumulative follow-up years depending on time since diagnosis

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 %
C03-C06	Oral cavity	2	0.5	4.0	0.5	14.5		1.3	
C09-C10	Oropharynx	3	0.4	7.5	1.5	21.9	#	2.2	
C15	Oesophagus	2	0.4	4.7	0.6	16.9		1.3	
C16	Stomach	3	2.2	1.4	0.3	4.0		0.7	33.3
C18	Colon	17	6.1	2.8	1.6	4.5	#	9.1	5.9
C19-C20	Rectum	15	2.9	5.2	2.9	8.6	#	10.1	13.3
C21	Anus/canal	6	0.4	13.8	5.1	30.1	#	4.6	16.7
C22	Liver	3	0.7	4.2	0.9	12.4		1.9	
C25	Pancreas	9	2.5	3.6	1.6	6.7	#	5.4	33.3
C30-C31	Sinuses	2	0.1	21.5	2.6	77.7	#	1.6	
C33-C34	Lung	38	5.3	7.2	5.1	9.9	#	27.3	5.3
C43	Malign. melanoma	7	3.7	1.9	0.8	3.9		2.7	
C46,C49	Soft tissue	3	0.5	6.6	1.4	19.4	#	2.1	
C50	Breast	59	27.9	2.1	1.6	2.7	#	26.0	1.7
C51	Vulva	7	0.6	10.8	4.4	22.3	#	5.3	
C52	Vagina	8	0.1	61.7	26.7	121.6	#	6.6	
C53	Cervix uteri	3	1.9	1.6	0.3	4.6		0.9	
C54	Corpus uteri	32	4.0	8.0	5.5	11.3	#	23.3	31.3
C56	Ovary	32	3.1	10.3	7.0	14.5	#	24.1	34.4
C64	Kidney	3	1.6	1.9	0.4	5.4		1.2	
C65	Renal pelvis	2	0.2	11.3	1.4	40.8	#	1.5	
C67	Bladder	12	1.1	11.1	5.7	19.4	#	9.1	8.3
C73	Thyroid	6	2.4	2.6	0.9	5.6		3.0	
C76-C79	CUP	5	1.1	4.6	1.5	10.7	#	3.3	
C82-C85	NHL	6	2.6	2.3	0.8	5.0		2.8	
C91-C96	Leukaemia	6	1.1	5.5	2.0	11.9	#	4.1	33.3
Other primaries		8	1.7	4.6	2.0	9.1	#	5.2	
Not observed		0	3.3	0.0	0.0	1.1		-2.7	
All mult. primaries		299	78.3	3.8	3.4	4.3	#	184.0	11.7

Patients	3504
Median age at second malignancy (years)	63.1
Person-years	11994
Mean observation time (years)	3.4
Median observation time (years)	1.7

The occurrence of second malignancy is statistically significant.

Observed second primaries with count 1 are pooled in category “Other primaries”

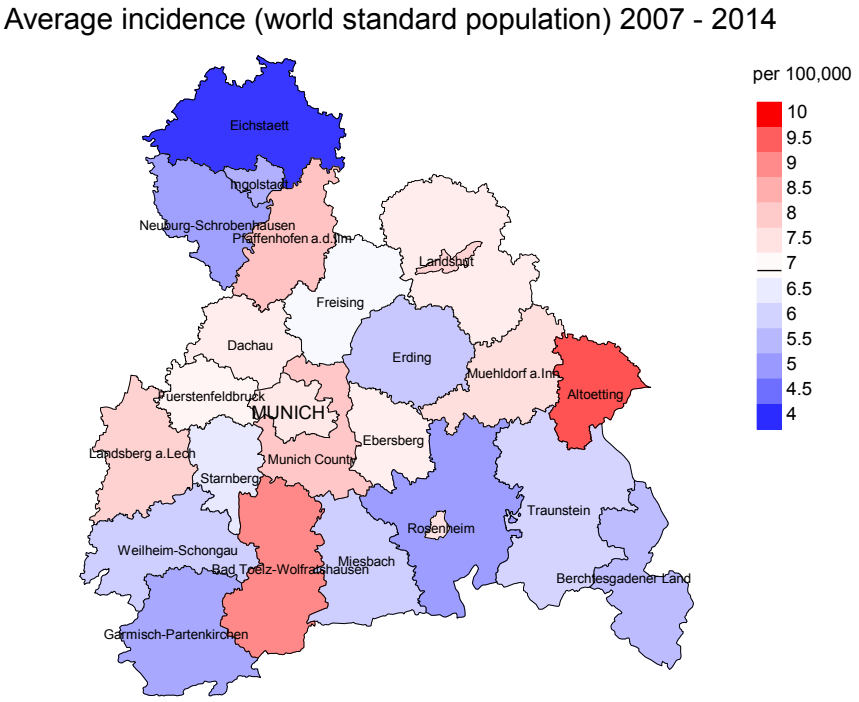

Figure 9a. Map of cancer incidence (world standard population, incl. DCO cases) by county averaged for period 2007 to 2014. According to their individual incidence rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (6.9/100,000 WS N=1,957).

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 60 women were identified with newly diagnosed cervical cancer. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 7.2/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 5.0 and 10.3/100,000.

Standardized incidence ratio (SIR) 2007 - 2014

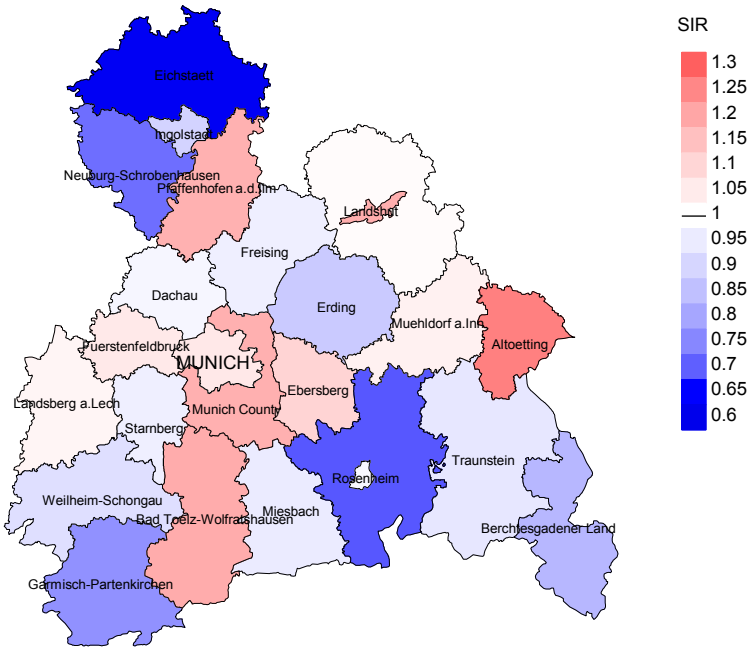

Figure 9b. Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2007 to 2014. According to their individual SIR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (N=1,957).

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 60 women were identified with newly diagnosed cervical cancer. Therefore, the mean standardized incidence ratio (SIR) for this cancer type in this area can be calculated at 1.10. Though, the value of this parameter may vary with an underlying probability of 99% between 0.77 and 1.53, 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	145	91.7	5.5	68	46.9	85.3
1999	162	93.2	1.2	65	40.1	92.3
2000	148	95.3	5.4	60	40.5	98.3
2001	153	92.8	3.9	67	43.8	89.6
2002	238	95.8	9.7	109	45.8	95.4
2003	219	93.6	4.6	113	51.6	97.3
2004	216	95.8	6.5	102	47.2	96.1
2005	235	91.9	5.1	97	41.3	94.8
2006	244	84.4	3.3	97	39.8	99.0
2007	246	73.2	3.3	93	37.8	96.8
2008	272	60.7	2.6	101	37.1	100.0
2009	270	58.9	3.7	107	39.6	97.2
2010	250	62.8	4.8	85	34.0	100.0
2011	247	60.3	3.2	72	29.1	95.8
2012	247	69.6	7.3	84	34.0	100.0
2013	235	98.7	4.7	51	21.7	94.1
2014	192	96.9	2.1	18	9.4	88.9
1998-2014	3719	81.4	4.5	1389	37.3	96.0

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	145	92	85.9	14	9.7
1999	162	93	87.1	14	8.6
2000	148	91	92.3	15	10.1
2001	153	68	89.7	13	8.5
2002	238	132	93.9	36	15.1
2003	219	152	94.7	27	12.3
2004	216	153	96.7	26	12.0
2005	235	151	96.0	25	10.6
2006	244	143	95.1	19	7.8
2007	246	146	94.5	28	11.4
2008	272	165	98.8	24	8.8
2009	270	169	98.8	26	9.6
2010	250	175	98.9	29	11.6
2011	247	173	98.8	28	11.3
2012	247	151	96.7	39	15.8
2013	235	170	98.2	28	11.9
2014	192	145	97.9	16	8.3
1998-2014	3719	2369	95.8	407	10.9

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	92	58.7	41.3	83.5
1999	93	68.8	31.2	82.7
2000	91	67.0	33.0	83.3
2001	68	64.7	35.3	86.9
2002	132	71.2	28.8	83.1
2003	152	75.0	25.0	85.4
2004	153	67.3	32.7	76.4
2005	151	72.8	27.2	83.4
2006	143	64.3	35.7	79.4
2007	146	74.0	26.0	78.3
2008	165	70.3	29.7	76.1
2009	169	65.7	34.3	76.0
2010	175	74.3	25.7	81.5
2011	173	69.9	30.1	74.9
2012	151	66.9	33.1	79.5
2013	170	70.0	30.0	77.8
2014	145	68.3	31.7	79.6
1998-2014	2369	69.3	30.7	79.8

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	92	74.8	70.4	80.8	74.6
1999	93	74.8	71.5	79.6	75.1
2000	91	78.4	74.9	83.8	77.0
2001	68	74.6	69.7	81.4	71.5
2002	132	74.6	65.2	87.6	69.4
2003	152	73.1	66.6	81.9	72.3
2004	153	74.9	64.6	85.0	69.9
2005	151	76.9	68.4	84.0	70.0
2006	143	74.6	68.9	84.0	72.6
2007	146	71.8	68.5	83.4	69.5
2008	165	70.2	65.8	85.7	67.0
2009	169	75.1	66.0	86.0	68.0
2010	175	69.6	63.5	80.9	65.7
2011	173	74.1	68.4	84.9	69.6
2012	151	73.3	69.0	85.5	69.3
2013	170	71.0	62.4	82.3	65.3
2014	145	73.2	68.0	79.3	70.1
1998-2014	2369	73.2	67.6	83.9	70.0

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	54	4.6	0.37	2.2	0.28	3.2	0.31	4.0	0.36
1999	64	5.4	0.40	2.5	0.27	3.7	0.32	4.7	0.38
2000	61	5.1	0.41	2.3	0.28	3.3	0.32	4.2	0.37
2001	44	3.6	0.29	1.7	0.21	2.4	0.24	3.0	0.27
2002	94	4.8	0.39	2.5	0.32	3.5	0.36	4.2	0.39
2003	114	5.8	0.52	2.9	0.41	4.1	0.45	4.9	0.50
2004	103	5.2	0.48	2.7	0.39	3.8	0.43	4.6	0.48
2005	110	5.5	0.47	2.6	0.34	3.7	0.39	4.5	0.43
2006	92	4.6	0.38	2.1	0.27	3.0	0.30	3.7	0.34
2007	108	4.7	0.44	2.3	0.33	3.2	0.37	3.8	0.41
2008	116	5.0	0.43	2.5	0.33	3.5	0.36	4.0	0.39
2009	111	4.8	0.41	2.4	0.32	3.3	0.34	3.9	0.38
2010	130	5.6	0.52	2.9	0.42	4.0	0.45	4.6	0.48
2011	121	5.1	0.49	2.4	0.34	3.5	0.39	4.1	0.43
2012	101	4.3	0.41	2.0	0.31	2.9	0.35	3.5	0.39
2013	119	5.0	0.51	2.7	0.40	3.7	0.44	4.3	0.48
2014	99	4.2	0.52	2.1	0.36	2.9	0.41	3.4	0.45
1998-2014	1641	4.9	0.44	2.4	0.33	3.4	0.37	4.1	0.41

Table 13

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

Age at death Years	Cases n	%	Cum.%
20-24	1	0.1	0.1
25-29	4	0.4	0.6
30-34	8	0.9	1.4
35-39	30	3.3	4.7
40-44	61	6.7	11.5
45-49	70	7.7	19.2
50-54	69	7.6	26.8
55-59	101	11.1	38.0
60-64	77	8.5	46.5
65-69	108	11.9	58.4
70-74	100	11.0	69.4
75-79	81	8.9	78.4
80-84	91	10.0	88.4
85+	105	11.6	100.0
All ages	906	100.0	

Included in the statistics are 18.5% 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		0.0		
10-14		0.0		
15-19		0.0		
20-24	1	0.1	0.17	3.6
25-29	4	0.3	0.06	6.3
30-34	8	0.6	0.06	7.3
35-39	30	2.4	0.15	11.6
40-44	61	4.0	0.22	9.7
45-49	70	4.6	0.31	5.7
50-54	69	5.4	0.36	3.9
55-59	101	9.0	0.55	3.9
60-64	77	7.3	0.54	2.2
65-69	108	10.3	0.79	2.1
70-74	100	9.6	0.80	1.5
75-79	81	11.4	0.99	1.3
80-84	91	16.2	1.20	1.4
85+	105	18.2	1.04	1.2
All ages	906			2.1
Mortality				
Raw		4.8	0.46	
WS		2.4	0.35	
ES		3.4	0.39	
BRD-S		4.0	0.42	
PYLL-70				
per 100,000		50.9		
ES		43.5		
AYLL-70		15.2		

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	9	1.2	1	11.1			8	88.9
C09–C10 Oropharynx	8	1.0	3	37.5			5	62.5
C16 Stomach	16	2.0	1	6.3	1	6.3	14	87.5
C18 Colon	57	7.3	10	17.5	5	8.8	42	73.7
C19–C20 Rectum	46	5.9	9	19.6	1	2.2	36	78.3
C21 Anus/canal	16	2.0	2	12.5			14	87.5
C23–C24 Bile	9	1.2	2	22.2			7	77.8
C25 Pancreas	24	3.1	1	4.2	1	4.2	22	91.7
C33–C34 Lung	98	12.5	9	9.2	7	7.1	82	83.7
C43 Malign. melanoma	20	2.6	7	35.0	1	5.0	12	60.0
C44 Skin others	9	1.2	2	22.2			7	77.8
C50 Breast	128	16.4	37	28.9	10	7.8	81	63.3
C51 Vulva	19	2.4	4	21.1	5	26.3	10	52.6
C52 Vagina	18	2.3			5	27.8	13	72.2
C53 Cervix uteri	10	1.3			1	10.0	9	90.0
C54 Corpus uteri	35	4.5	6	17.1	5	14.3	24	68.6
C56 Ovary	65	8.3	6	9.2	13	20.0	46	70.8
C64 Kidney	16	2.0	6	37.5	1	6.3	9	56.3
C65 Renal pelvis	8	1.0	2	25.0			6	75.0
C67 Bladder	62	7.9	6	9.7	6	9.7	50	80.6
C70–C72 CNS cancer	13	1.7	2	15.4	2	15.4	9	69.2
C76–C79 CUP	13	1.7	2	15.4	2	15.4	9	69.2
C82–C85 NHL	15	1.9	4	26.7	1	6.7	10	66.7
C91–C96 Leukaemia	13	1.7			2	15.4	11	84.6
Other primaries	55	7.0	9	16.4	1	1.8	45	81.8
All mult. primaries	782	100.0	131	16.8	70	9.0	581	74.3

Multiple primaries with number of cases 1 to 7 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 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		0.0		
10-14		0.0		
15-19		0.0		
20-24	1	0.1	0.17	3.8
25-29	4	0.3	0.07	6.8
30-34	7	0.6	0.05	7.4
35-39	28	2.2	0.14	12.3
40-44	60	3.9	0.23	10.8
45-49	61	4.0	0.30	6.0
50-54	61	4.8	0.35	4.1
55-59	89	7.9	0.54	4.1
60-64	67	6.3	0.55	2.4
65-69	88	8.4	0.79	2.1
70-74	85	8.1	0.89	1.7
75-79	69	9.7	1.05	1.4
80-84	79	14.1	1.39	1.6
85+	90	15.6	1.20	1.3
All ages	789			2.3
Mortality				
Raw		4.2	0.46	
WS		2.1	0.34	
ES		3.0	0.38	
BRD-S		3.5	0.41	
PYLL-70				
per 100,000		46.2		
ES		39.4		
AYLL-70		15.7		

* 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		0.0		
10-14		0.0		
15-19		0.0		
20-24	1	0.1	0.17	4.2
25-29	4	0.3	0.07	7.1
30-34	7	0.6	0.05	8.4
35-39	27	2.1	0.14	13.2
40-44	54	3.5	0.21	10.6
45-49	51	3.4	0.27	5.6
50-54	48	3.7	0.29	3.6
55-59	72	6.4	0.47	3.8
60-64	43	4.1	0.38	1.8
65-69	61	5.8	0.58	1.8
70-74	43	4.1	0.52	1.0
75-79	37	5.2	0.61	0.9
80-84	43	7.7	0.83	1.1
85+	57	9.9	0.81	1.0
All ages	548			1.9
Mortality				
Raw		2.9	0.33	
WS		1.6	0.27	
ES		2.2	0.29	
BRD-S		2.5	0.31	
PYLL-70				
per 100,000		39.2		
ES		33.6		
AYLL-70		16.9		

* See corresponding tables with multiple primaries.

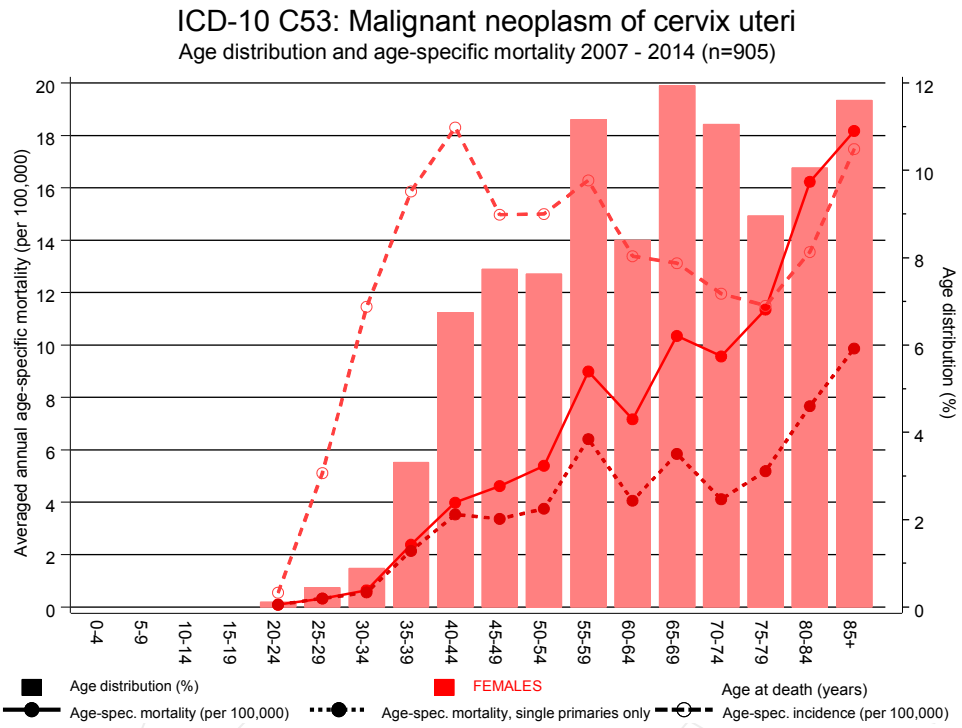

Figure 18. Distribution of age at death (bars) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

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

Average mortality (world standard population) 2007 - 2014

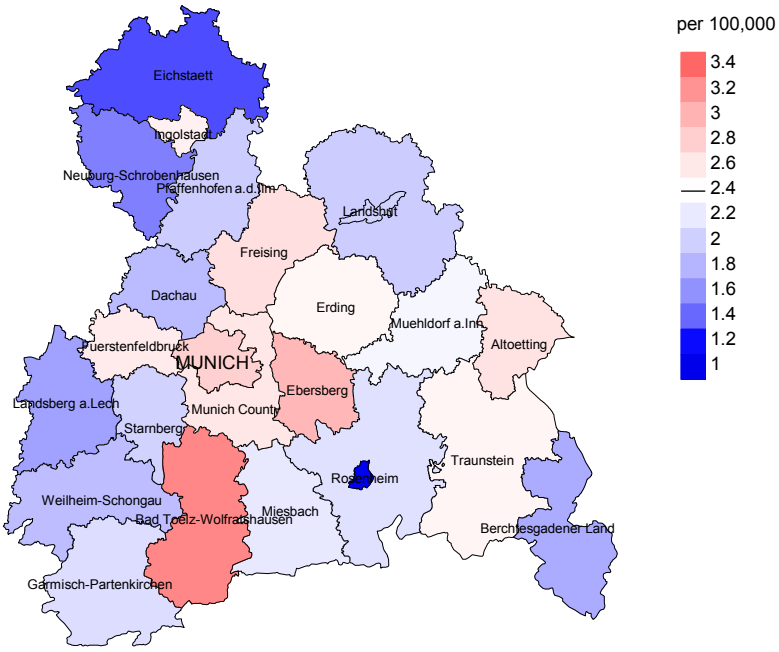

Figure 19a. Map of cancer mortality (world standard population) by county averaged for period 2007 to 2014. According to their individual mortality rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (2.4/100,000 WS N=895).

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 29 women died from cervical cancer. Therefore, the mean mortality rate for this cancer type in this area can be calculated at 3.0/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 1.7 and 4.9/100,000.

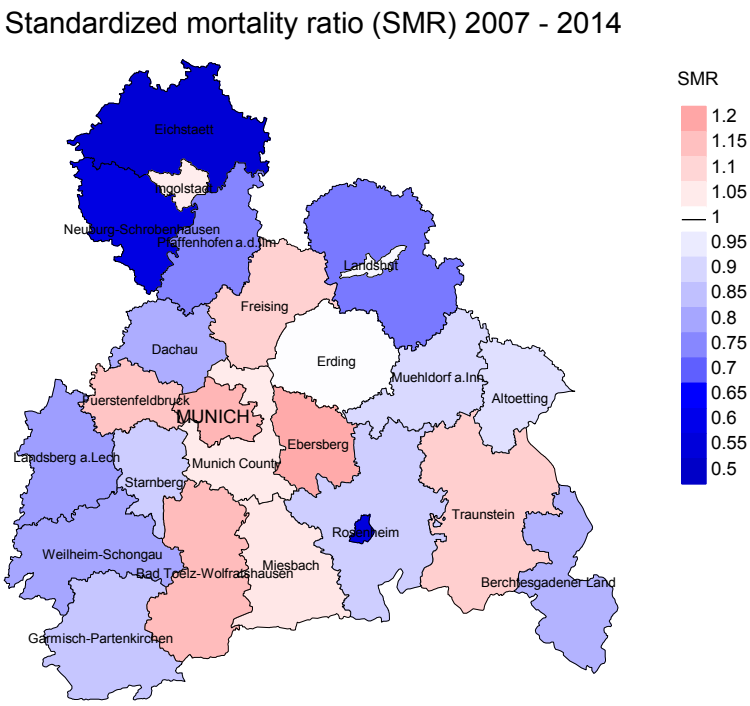

Figure 19b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2007 to 2014. According to their individual SMR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (N=895).

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 29 women died from cervical cancer. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 1.19. Though, the value of this parameter may vary with an underlying probability of 99% between 0.70 and 1.89, 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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