Munich Cancer Registry

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ICD-10 D06: Ca. i.s. Cervix

Incidence and Mortality

Year of diagnosis	1998-2020
Patients	8,601
Diseases	8,603
Creation date	12/21/2021
Database export	12/20/2021
Population (females)	2.50 m

Munich Cancer Registry
Cancer Registry Bavaria - Upper Bavaria Regional Center
at Klinikum Grosshadern/IBE
Marchioninistr. 15
Munich, 81377
Germany

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

https://www.tumorregister-muenchen.de/en/facts/base/bD06__E-ICD-10-D06-Ca.-i.s.-Cervix-incidence-and-mortality.pdf

Index of figures and tables

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 4.69 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, December 2021

[#] 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 2.65 million to 4.10 in 2002, and to 4.69 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 2016) used for specifying cancer site

Code	Description
D06.-	Carcinoma in situ of cervix uteri
D06.0	Endocervix
D06.1	Exocervix
D06.7	Other parts of cervix
D06.9	Cervix, unspecified

INCIDENCE

Table 1

Cases by year of diagnosis, proportions of further malignancies, deaths, and active follow-up

Year of diagnosis	All cases n	Prop. at least 1 further malign. prior + synchron. %	Prop. at least 1 further malign. after %	Prop. deaths %	Prop. actively followed %
1998	33	3.0	5.1	12.1	81.8
1999	31	1.6	5.0	9.7	83.9
2000	50	5.3	5.0	20.0	86.0
2001	54	4.8	4.9	13.0	83.3
2002	74	6.2	4.9	5.4	87.8 #
2003	129	4.9	4.8	8.5	87.6
2004	213	4.8	4.7	8.9	87.8
2005	250	4.2	4.5	6.0	89.2
2006	274	4.4	4.3	7.7	79.6
2007	399	4.2	4.1	4.0	74.4 #
2008	449	3.8	3.9	2.4	94.9
2009	521	3.7	3.6	2.9	94.2
2010	558	3.2	3.6	1.8	94.6
2011	676	3.0	3.6	2.1	95.1
2012	588	3.3	3.5	2.2	96.1
2013	861	3.2	3.3	0.7	93.6
2014	694	3.2	3.0	0.9	83.3
2015	491	3.2	2.8	1.4	80.2
2016	433	3.2	2.4	1.2	98.8
2017	431	3.2	1.7	1.9	99.5
2018	422	3.2	1.4	0.9	99.8
2019	434	3.4	1.0	0.7	99.5
2020	538	3.4	0.4	0.2	99.6 ##
1998–2020	8603	3.4	5.1	2.5	92.1

8,603 cases diagnosed 1998-2020 are related to a total of 8,601 patients. Currently, in 740 (8.6 %) of these 8,601 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 624 / 94 / 22 (7.3 % / 1.1 % / 0.3 %) patients exist having 2 / 3 / 4+ malignancies.

\# 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 retreived from the respective headings.

How to interpret:
In 2018, a subgroup of 422 cases has been diagnosed, of which 3.2 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 1.4 % of cases, at least one new malignancy has occurred during the follow-up period (all numbers refer to the date of the database export, see cover sheet).

Table 2

Incidence measures by year of diagnosis
(with respect to registry area expansion from 2.65 to 4.10 m as of 2002,
and from 4.10 to 4.94 m as of 2007, respectively)

Year of diagnosis	Cases n	Incidence raw	Incidence WS	Incidence ES	Incidence BRD-S
1998	33	2.8	2.2	2.5	2.6
1999	31	2.6	2.1	2.3	2.4
2000	50	4.2	3.2	3.6	3.7
2001	54	4.4	3.6	4.0	4.2
2002	74	3.8	3.1	3.5	3.6
2003	129	6.5	5.5	6.1	6.4
2004	213	10.8	9.0	10.1	10.4
2005	250	12.6	10.6	11.9	12.3
2006	274	13.6	12.1	13.2	13.9
2007	399	17.3	16.1	17.1	18.1
2008	449	19.3	18.5	19.5	20.7
2009	521	22.4	21.6	22.7	24.0
2010	558	23.8	23.5	24.5	26.0
2011	676	28.9	27.8	29.6	31.2
2012	588	24.9	23.3	24.9	26.4
2013	861	36.1	35.0	36.9	38.9
2014	694	28.8	27.5	29.3	30.7
2015	491	20.2	18.4	20.2	21.0
2016	433	17.6	16.5	17.8	18.7
2017	431	17.5	16.5	17.8	18.6
2018	422	17.0	16.0	17.3	18.1
2019	434	17.5	15.9	17.6	18.3
2020	538	21.7	19.4	21.9	22.5
1998–2020	8603	17.8	16.4	17.6	18.5

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

Table 3

Age distribution parameters by year of diagnosis

Year of diagnosis	Cases n	Mean	Std. dev.	Min.	Max.	10%	25%	Median 50%	75%	90%
1998	33	39.3	12.6	21.3	77.3	28.3	31.2	35.2	45.4	50.4
1999	31	37.0	9.4	24.0	66.5	29.7	30.7	34.1	42.4	49.5
2000	50	40.8	12.9	26.8	87.1	29.2	33.8	37.0	43.7	60.6
2001	54	40.0	10.4	26.6	68.4	29.1	31.9	37.0	47.4	56.7
2002	74	39.2	10.5	22.3	82.4	29.2	31.5	37.5	43.0	52.7
2003	129	38.3	11.0	20.9	77.7	26.6	32.2	36.4	41.4	51.3
2004	213	39.8	12.3	18.8	91.7	28.1	31.8	36.6	44.2	56.8
2005	250	39.4	11.4	21.6	88.9	28.3	31.8	37.0	43.9	52.8
2006	274	38.5	11.6	18.4	94.0	26.4	30.1	37.3	43.7	52.8
2007	399	36.6	10.7	17.7	85.5	26.0	28.9	34.8	41.2	48.3
2008	449	35.6	10.1	17.7	82.5	25.3	28.7	33.8	40.7	46.6
2009	521	35.7	10.0	19.0	94.2	25.2	28.5	33.9	41.1	46.6
2010	558	34.7	9.0	18.1	85.1	25.4	28.0	32.9	39.7	46.0
2011	676	36.0	10.2	18.8	77.1	25.6	29.1	33.8	41.0	49.3
2012	588	37.6	12.3	17.6	85.5	25.9	29.3	34.2	43.1	51.4
2013	861	35.7	9.7	18.3	78.2	26.0	29.0	33.2	40.6	48.5
2014	694	36.0	9.4	18.9	87.6	26.6	29.4	33.8	40.1	48.2
2015	491	38.1	11.1	19.3	86.2	27.2	30.5	35.3	43.8	52.8
2016	433	37.6	11.4	17.7	87.1	26.8	29.7	34.9	43.2	51.4
2017	431	37.4	11.1	18.7	84.1	26.4	29.7	35.0	42.6	51.5
2018	422	37.6	11.5	18.6	94.0	26.5	29.7	34.7	42.8	52.7
2019	434	39.0	11.4	20.4	87.9	27.4	30.8	36.1	45.2	53.4
2020	538	39.7	10.8	19.5	89.1	28.1	32.2	37.4	45.6	53.3
1998–2020	8603	37.1	10.8	17.6	94.2	26.3	29.7	34.8	42.0	50.7

Table 4

Age distribution by 5-year age group for period 2007-2020

Age at diagnosis Years	Cases n	%	Cum.%
0-4			
5-9			
10-14			
15-19	29	0.4	0.4
20-24	456	6.1	6.5
25-29	1625	21.7	28.2
30-34	1836	24.5	52.6
35-39	1303	17.4	70.0
40-44	923	12.3	82.3
45-49	554	7.4	89.7
50-54	312	4.2	93.9
55-59	156	2.1	96.0
60-64	97	1.3	97.3
65-69	73	1.0	98.3
70-74	61	0.8	99.1
75-79	40	0.5	99.6
80-84	18	0.2	99.8
85+	12	0.2	100.0
All ages	7495	100.0	

Table 5

Age-specific incidence
for period 2007-2020

Age at diagnosis Years	Cases n	Age-spec. incidence
0- 4		0.0
5- 9		0.0
10-14		0.0
15-19	29	1.8
20-24	456	24.0
25-29	1625	72.5
30-34	1836	80.5
35-39	1303	57.3
40-44	923	38.1
45-49	554	21.3
50-54	312	12.4
55-59	156	7.2
60-64	97	5.1
65-69	73	4.0
70-74	61	3.5
75-79	40	2.7
80-84	18	1.7
85+	12	1.2
All ages	7495	
Incidence		
Raw		22.3
WS		21.1
ES		22.6
BRD-S		23.7

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).

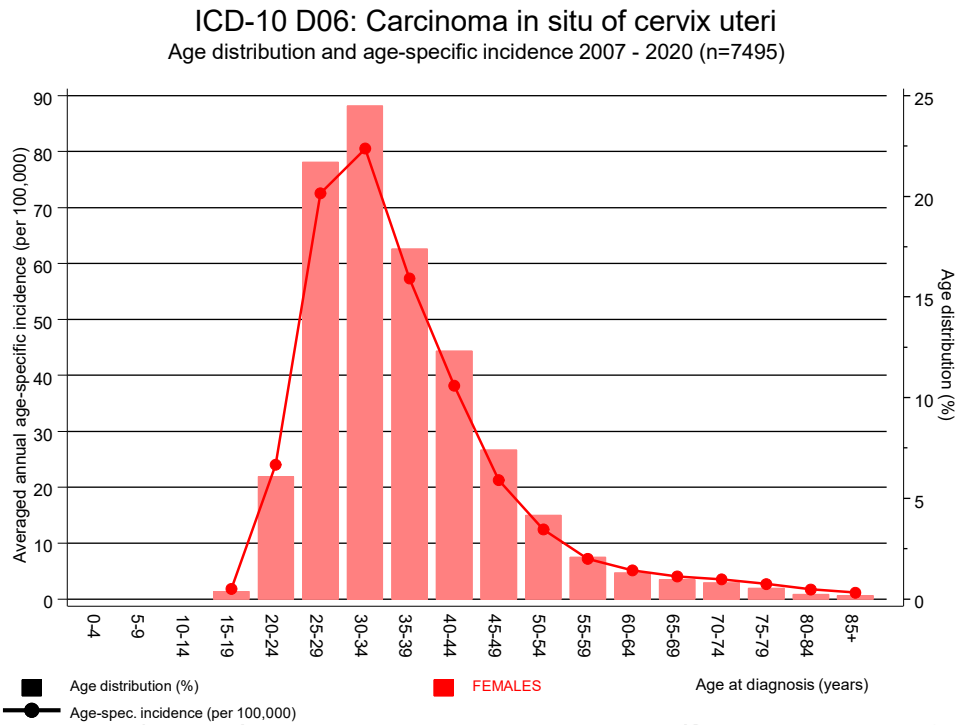

Figure 6. Age distribution (mean=36.8 yrs, median=34.4 yrs) and age-specific incidence.

Table 7

Standardized incidence ratio (SIR, with 95% confidence limits), excess absolute risk (EAR) and DCO rate of further malignancies for period 1998–2020

Diagnosis		Observed n	Expected n	SIR	CI 95%	CI 95%		EAR	DCO %
C03–C06	Oral cavity	1	0.4	2.5	0.1	13.8		0.2	
C11	Nasopharynx	1	0.0	23.1	0.6	128.8		0.3	
C12–C13	Hypopharynx	2	0.1	25.2	3.0	90.9	#	0.7	
C15	Oesophagus	3	0.3	9.7	2.0	28.2	#	1.0	
C16	Stomach	5	1.3	3.7	1.2	8.7	#	1.3	
C17	Small intestine	3	0.4	8.6	1.8	25.0	#	1.0	
C18	Colon	15	3.6	4.2	2.3	6.9	#	4.1	
C19–C20	Rectum	15	1.9	8.0	4.5	13.3	#	4.7	
C21	Anus/canal	8	0.4	19.6	8.5	38.6	#	2.7	
C22	Liver	4	0.5	8.2	2.2	21.0	#	1.3	25.0
C23–C24	Bile	2	0.4	4.9	0.6	17.9		0.6	
C25	Pancreas	6	1.5	3.9	1.4	8.6	#	1.6	16.7
C32	Larynx	1	0.1	9.8	0.2	54.5		0.3	
C33–C34	Lung	22	3.7	6.0	3.8	9.1	#	6.6	
C40–C41	Bone	1	0.1	6.9	0.2	38.7		0.3	
C43	Malign. melanoma	16	5.3	3.0	1.7	4.9	#	3.8	
C46,C49	Soft tissue	2	0.5	4.1	0.5	14.8		0.5	
C50	Breast	116	29.4	3.9	3.3	4.7	#	31.1	0.9
C51	Vulva	16	0.6	28.4	16.2	46.1	#	5.6	
C52	Vagina	12	0.1	139.4	72.0	243.5	#	4.3	
C53	Cervix uteri	52	3.7	14.1	10.5	18.5	#	17.4	
C54	Corpus uteri	28	2.9	9.7	6.5	14.0	#	9.0	
C56	Ovary	16	2.5	6.3	3.6	10.3	#	4.8	6.3
C64	Kidney	5	1.0	4.9	1.6	11.5	#	1.4	
C65	Renal pelvis	1	0.1	11.5	0.3	64.3		0.3	
C67	Bladder	1	0.6	1.7	0.0	9.2		0.1	
C70–C72	CNS cancer	3	1.1	2.6	0.5	7.6		0.7	
C73	Thyroid	7	4.6	1.5	0.6	3.1		0.9	
C76–C79	CUP	4	0.6	6.2	1.7	15.9	#	1.2	
C81	Hodgkin lymphoma	1	0.6	1.7	0.0	9.5		0.1	
C82–C85	NHL	8	2.0	4.0	1.7	8.0	#	2.2	
C90	Mult. myeloma	2	0.4	4.7	0.6	16.9		0.6	
C91–C96	Leukaemia	5	1.0	4.9	1.6	11.5	#	1.4	
C96	Systemic	1	0.0	127.3	3.2	709.4	#	0.4	
Not observed		0	1.4	0.0	0.0	2.6		−0.5	
All further malignancies		385	73.2	5.3	4.7	5.8	#	112.1	1.0

Patients	8309
Median age at next malignancy (years)	49.6
Person-years	27806
Mean observation time (years)	3.3
Median observation time (years)	1.4

The occurrence of further specified malignancy is statistically significant.

Average incidence (Germany 1987 standard population) 2007 - 2020

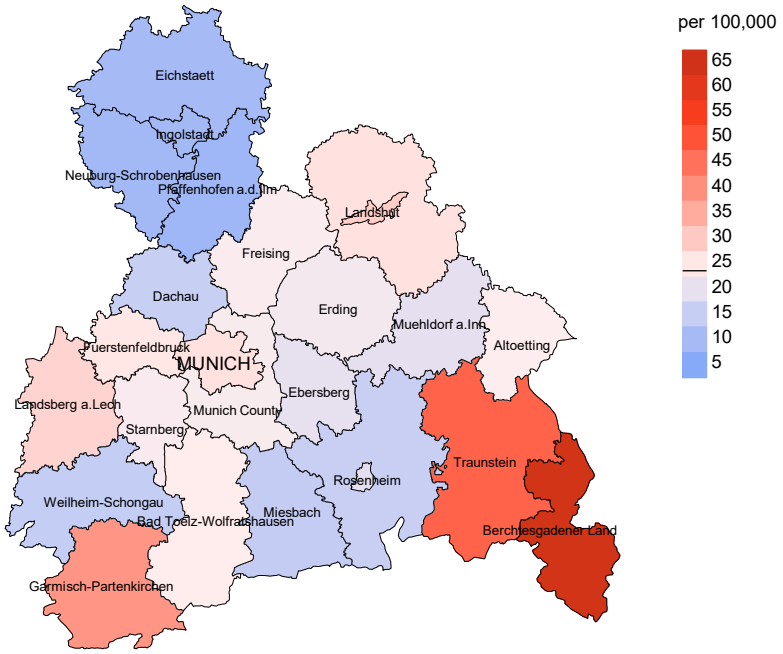

Figure 8a. Map of cancer incidence (german standard population) by county averaged for period 2007 to 2020. According to their individual incidence rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (23.7/100,000 WS N=7,495).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 67,727 female residents (averaged) in the period from 2007 to 2020 a total of 162 women were identified with newly diagnosed ca. i.s. Cervix. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 20.0/100,000 (german standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 16.1 and 24.5/100,000.

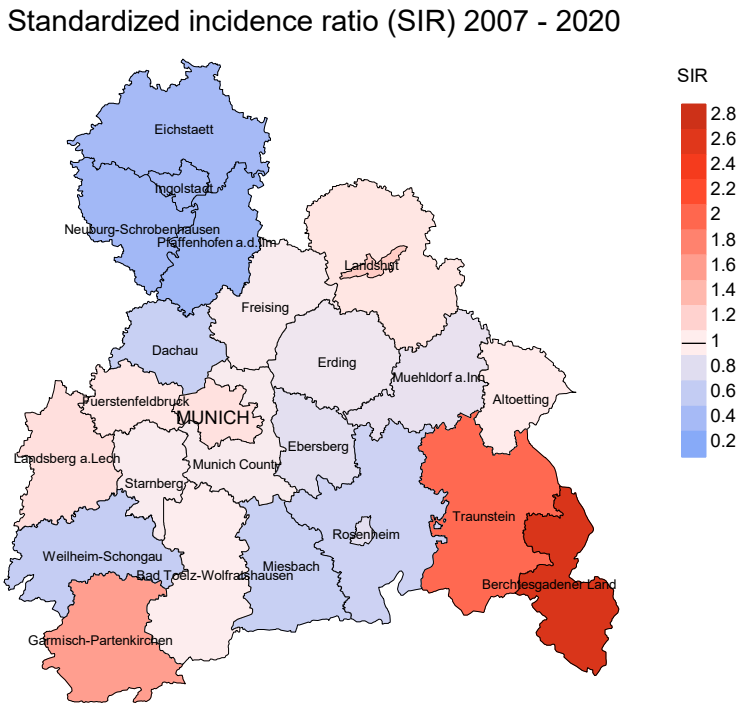

Figure 8b. Map of standardized incidence ratio (SIR) by county averaged for period 2007 to 2020. According to their individual SIR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (N=7,495).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 67,153 female residents (averaged) in the period from 2007 to 2020 a total of 162 women were identified with newly diagnosed ca. i.s. Cervix. Therefore, the mean standardized incidence ratio (SIR) for this cancer type in this area can be calculated at 0.82. Though, the value of this parameter may vary with an underlying probability of 99% between 0.66 and 1.00, and is therefore not statistically striking.

MORTALITY

Table 9a

Annual cohorts: Incident cancers, follow-up status,
and deaths among the annual cohorts

(with respect to registry area expansion from 2.65 to 4.10 m as of 2002,
and from 4.10 to 4.94 m as of 2007, respectively)

Year of diagnosis	Incident cases n	Prop. actively followed %	Deaths n	Prop. deaths %	Prop. deaths with death certific. %
1998	33	81.8	4	12.1	100.0
1999	31	83.9	3	9.7	100.0
2000	50	86.0	10	20.0	90.0
2001	54	83.3	7	13.0	100.0
2002	74	87.8	4	5.4	100.0
2003	129	87.6	11	8.5	100.0
2004	213	87.8	19	8.9	84.2
2005	250	89.2	15	6.0	93.3
2006	274	79.6	21	7.7	90.5
2007	399	74.4	16	4.0	100.0
2008	449	94.9	11	2.4	81.8
2009	521	94.2	15	2.9	93.3
2010	558	94.6	10	1.8	90.0
2011	676	95.1	14	2.1	92.9
2012	588	96.1	13	2.2	76.9
2013	861	93.6	6	0.7	83.3
2014	694	83.3	6	0.9	66.7
2015	491	80.2	7	1.4	100.0
2016	433	98.8	5	1.2	100.0
2017	431	99.5	8	1.9	62.5
2018	422	99.8	4	0.9	50.0
2019	434	99.5	3	0.7	66.7
2020	538	99.6	1	0.2	
1998-2020	8603	92.1	213	2.5	88.3

Table 9b

Annual cohorts of incident cancers and deaths,
and cases deceased within the same year of being diagnosed with cancer

(with respect to registry area expansion from 2.65 to 4.10 m as of 2002,
and from 4.10 to 4.94 m as of 2007, respectively)

Year of diagnosis/ death	Incident cases n	Deaths n	Deaths in same year n	Prop. deaths in same year %
1998	33	3		
1999	31	2		
2000	50	1	1	2.0
2001	54	2		
2002	74	3		
2003	129	5		
2004	213	7	1	0.5
2005	250	7	1	0.4
2006	274	5		
2007	399	8	1	0.3
2008	449	8		
2009	521	12		
2010	558	12		
2011	676	9		
2012	588	14		
2013	861	20		
2014	694	25	1	0.1
2015	491	14	1	0.2
2016	433	21		
2017	431	24		
2018	422	23	1	0.2
2019	434	23	1	0.2
2020	538	19	1	0.2
1998–2020	8603	267	9	0.1

Table 9c

Annual cohorts of deaths, and proportion of cancer-related and non-cancer-related deaths

(with respect to registry area expansion from 2.65 to 4.10 m as of 2002, and from 4.10 to 4.94 m as of 2007, respectively)

Year of death	Deaths n	Prop. cancer-related %	Prop. non-cancer-related %	Prop. cancer recorded on death certificate %
1998	3	66.7	33.3	100.0
1999	2	50.0	50.0	50.0
2000	1	100.0		100.0
2001	2	100.0		100.0
2002	3	66.7	33.3	100.0
2003	5	40.0	60.0	40.0
2004	7	100.0		100.0
2005	7	71.4	28.6	71.4
2006	5	80.0	20.0	80.0
2007	8	100.0		100.0
2008	8	62.5	37.5	87.5
2009	12	83.3	16.7	83.3
2010	12	75.0	25.0	66.7
2011	9	66.7	33.3	62.5
2012	14	57.1	42.9	53.8
2013	20	60.0	40.0	68.4
2014	25	64.0	36.0	68.0
2015	14	57.1	42.9	64.3
2016	21	66.7	33.3	71.4
2017	24	58.3	41.7	70.0
2018	23	47.8	52.2	86.7
2019	23	17.4	82.6	58.3
2020	19	15.8	84.2	62.5
1998-2020	267	57.7	42.3	71.7

Table 10

Medians of age at death according to the grouping in Table 9

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	3	83.4	80.2	83.4	80.1
1999	2	71.9	62.6	81.2	62.6
2000	1	87.2	87.2		87.2
2001	2	62.4	62.4		62.4
2002	3	50.0	55.9	50.0	50.0
2003	5	76.6	74.7	76.6	74.7
2004	7	64.3	64.3		64.3
2005	7	73.5	68.4	85.1	68.4
2006	5	63.1	57.7	81.5	57.7
2007	8	75.7	75.7		75.7
2008	8	63.7	58.4	81.0	58.4
2009	12	59.2	57.9	91.1	57.9
2010	12	70.8	68.9	85.6	70.8
2011	9	59.4	58.5	64.7	59.4
2012	14	62.6	61.4	72.0	66.0
2013	20	59.4	58.7	62.8	59.1
2014	25	64.6	56.3	80.8	57.1
2015	14	76.1	66.5	86.0	72.2
2016	21	63.9	63.7	75.0	63.9
2017	24	58.9	57.8	75.5	58.9
2018	23	56.8	52.2	60.3	54.0
2019	23	58.7	63.4	53.8	59.7
2020	19	62.4	57.6	68.9	58.6
1998–2020	267	62.8	60.0	72.6	61.1

By 2018, Bavarians' life expectancy at birth is estimated at 79.3 years for boys and 83.8 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 11

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	2	0.2	0.06	0.0	0.02	0.1	0.03	0.2	0.06
1999	1	0.1	0.03	0.1	0.02	0.1	0.03	0.1	0.03
2000	1	0.1	0.02	0.0	0.00	0.0	0.01	0.0	0.01
2001	2	0.2	0.04	0.1	0.03	0.1	0.03	0.1	0.03
2002	2	0.1	0.03	0.1	0.02	0.1	0.03	0.1	0.03
2003	2	0.1	0.02	0.0	0.01	0.1	0.01	0.1	0.01
2004	7	0.4	0.03	0.2	0.02	0.2	0.02	0.3	0.03
2005	5	0.3	0.02	0.1	0.01	0.2	0.01	0.2	0.02
2006	4	0.2	0.01	0.1	0.01	0.2	0.01	0.2	0.01
2007	8	0.3	0.02	0.1	0.01	0.2	0.01	0.3	0.02
2008	5	0.2	0.01	0.1	0.01	0.2	0.01	0.2	0.01
2009	10	0.4	0.02	0.3	0.01	0.4	0.02	0.4	0.02
2010	9	0.4	0.02	0.2	0.01	0.3	0.01	0.3	0.01
2011	6	0.3	0.01	0.1	0.01	0.2	0.01	0.2	0.01
2012	8	0.3	0.01	0.2	0.01	0.3	0.01	0.3	0.01
2013	12	0.5	0.01	0.3	0.01	0.4	0.01	0.4	0.01
2014	16	0.7	0.02	0.4	0.02	0.5	0.02	0.6	0.02
2015	8	0.3	0.02	0.1	0.01	0.2	0.01	0.3	0.01
2016	14	0.6	0.03	0.3	0.02	0.4	0.02	0.5	0.03
2017	14	0.6	0.03	0.3	0.02	0.4	0.02	0.5	0.03
2018	11	0.4	0.03	0.3	0.02	0.4	0.02	0.4	0.02
2019	4	0.2	0.01	0.1	0.01	0.1	0.01	0.1	0.01
2020	3	0.1	0.01	0.1	0.00	0.1	0.00	0.1	0.00
1998-2020	154	0.3	0.02	0.2	0.01	0.2	0.01	0.3	0.02

Table 12

Age distribution of age at death (cancer-related) for period 2007-2020
(**incl. multiple malignancies**)

Age at death Years	Cases n	%	Cum.%
0-4			
5-9			
10-14			
15-19			
20-24			
25-29	2	1.6	1.6
30-34	2	1.6	3.1
35-39	3	2.3	5.5
40-44	5	3.9	9.4
45-49	15	11.7	21.1
50-54	17	13.3	34.4
55-59	27	21.1	55.5
60-64	11	8.6	64.1
65-69	12	9.4	73.4
70-74	8	6.3	79.7
75-79	8	6.3	85.9
80-84	14	10.9	96.9
85+	4	3.1	100.0
All ages	128	100.0	

Table 13

Age-specific mortality (cancer-related) and proportion of all cancers
for period 2007-2020
(**incl. multiple malignancies**)

Age at death Years	Cases n	Age-spec. mortality	MI-index
0- 4		0.0	
5- 9		0.0	
10-14		0.0	
15-19		0.0	
20-24		0.0	
25-29	2	0.1	0.00
30-34	2	0.1	0.00
35-39	3	0.1	0.00
40-44	5	0.2	0.01
45-49	15	0.6	0.03
50-54	17	0.7	0.05
55-59	27	1.2	0.17
60-64	11	0.6	0.11
65-69	12	0.7	0.16
70-74	8	0.5	0.13
75-79	8	0.5	0.20
80-84	14	1.3	0.78
85+	4	0.4	0.33
All ages	128		
Mortality			
Raw		0.4	0.02
WS		0.2	0.01
ES		0.3	0.01
BRD-S		0.3	0.01
PYLL-70			
per 100,000		5.2	
ES		4.5	
AYLL-70		15.7	

Table 14

Further malignancies in deaths in period 1998-2020

Diagnosis		Total n	Total %↓	Pre n	Pre ←%	Syn-chron ±30d n	Syn-chron ±30d ←%	Post n	Post ←%
C03-C06	Oral cavity	1	0.6					1	100.0
C11	Nasopharynx	1	0.6					1	100.0
C15	Oesophagus	2	1.2					2	100.0
C16	Stomach	3	1.7	1	33.3			2	66.7
C18	Colon	11	6.4	1	9.1	4	36.4	6	54.5
C19-C20	Rectum	7	4.1			1	14.3	6	85.7
C21	Anus/canal	3	1.7	1	33.3			2	66.7
C22	Liver	2	1.2					2	100.0
C25	Pancreas	6	3.5	1	16.7			5	83.3
C33-C34	Lung	15	8.7			2	13.3	13	86.7
C43	Malign. melanoma	2	1.2			1	50.0	1	50.0
C44	Skin others	1	0.6	1	100.0				
C46,C49	Soft tissue	1	0.6	1	100.0				
C48	Peritoneal	1	0.6					1	100.0
C50	Breast	57	33.1	24	42.1	5	8.8	28	49.1
C51	Vulva	6	3.5			1	16.7	5	83.3
C52	Vagina	7	4.1	1	14.3			6	85.7
C53	Cervix uteri	10	5.8					10	100.0
C54	Corpus uteri	3	1.7			2	66.7	1	33.3
C56	Ovary	11	6.4	1	9.1	4	36.4	6	54.5
C65	Renal pelvis	1	0.6					1	100.0
C67	Bladder	3	1.7	1	33.3			2	66.7
C70-C72	CNS cancer	2	1.2	1	50.0			1	50.0
C73	Thyroid	1	0.6					1	100.0
C76-C79	CUP	4	2.3			1	25.0	3	75.0
C82-C85	NHL	3	1.7					3	100.0
C90	Mult. myeloma	3	1.7					3	100.0
C91-C96	Leukaemia	4	2.3	1	25.0			3	75.0
C96	Systemic	1	0.6					1	100.0
All further malignancies		172	100.0	35	20.3	21	12.2	116	67.4

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 further malignancy.

Table 15

Age-specific mortality (cancer-related) and proportion of all cancers
for period 2007-2020
(**First primaries only** *)

Age at death Years	Cases n	Age-spec. mortality	MI-index
0- 4		0.0	
5- 9		0.0	
10-14		0.0	
15-19		0.0	
20-24		0.0	
25-29		0.0	
30-34	1	0.0	0.00
35-39	2	0.1	0.00
40-44	4	0.2	0.00
45-49	10	0.4	0.02
50-54	11	0.4	0.04
55-59	20	0.9	0.16
60-64	8	0.4	0.11
65-69	7	0.4	0.13
70-74	4	0.2	0.11
75-79	5	0.3	0.24
80-84	8	0.8	0.80
85+	2	0.2	0.22
All ages	82		
Mortality			
Raw		0.2	0.01
WS		0.1	0.01
ES		0.2	0.01
BRD-S		0.2	0.01
PYLL-70			
per 100,000		3.4	
ES		2.9	
AYLL-70		15.2	

* See corresponding tables with multiple malignancies.

Table 16

Age-specific mortality (cancer-related) and proportion of all cancers
for period 2017-2020
(**Single primaries only** *)

Age at death Years	Cases n	Age-spec. mortality	MI-index
0- 4		0.0	
5- 9		0.0	
10-14		0.0	
15-19		0.0	
20-24		0.0	
25-29		0.0	
30-34		0.0	
35-39		0.0	
40-44		0.0	
45-49		0.0	
50-54		0.0	
55-59	2	0.3	0.06
60-64	2	0.4	0.10
65-69		0.0	
70-74		0.0	
75-79		0.0	
80-84	1	0.3	0.43
85+		0.0	
All ages	5		
Mortality			
Raw		0.1	0.00
WS		0.0	0.00
ES		0.0	0.00
BRD-S		0.0	0.00
PYLL-70			
per 100,000		0.5	
ES		0.4	
AYLL-70		10.0	

* See corresponding tables with multiple malignancies.

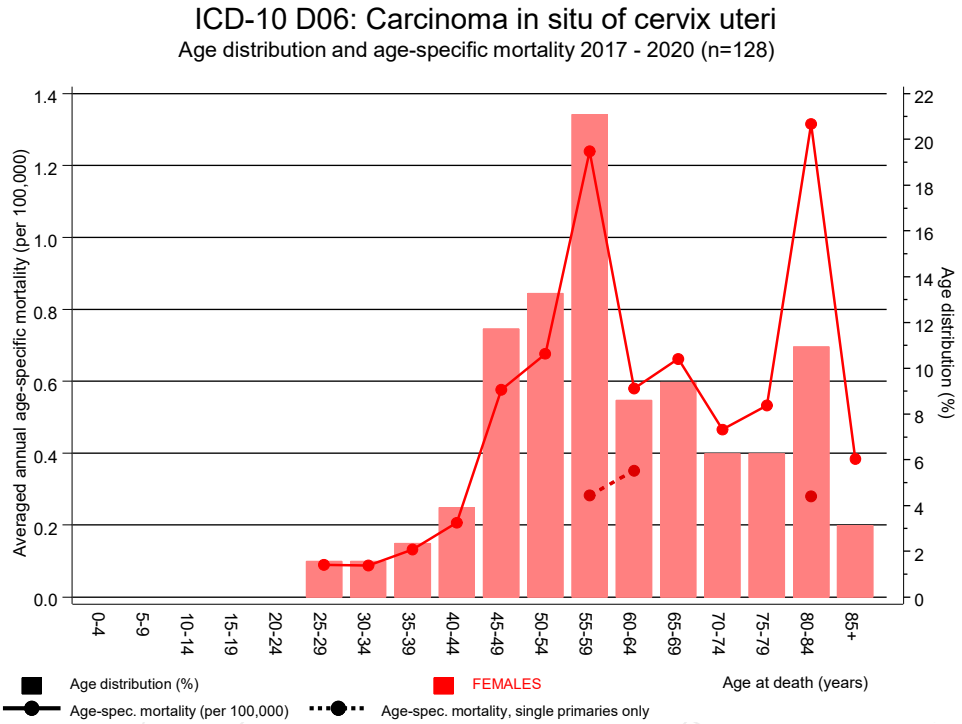

Figure 17. Distribution of age at death (bars; n=mean=50.6 yrs, median=50.5 yrs) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line).

The difference between age at diagnosis (Table 3) and age at ca. i.s. Cervix-related death (see Table 10) should be considered.

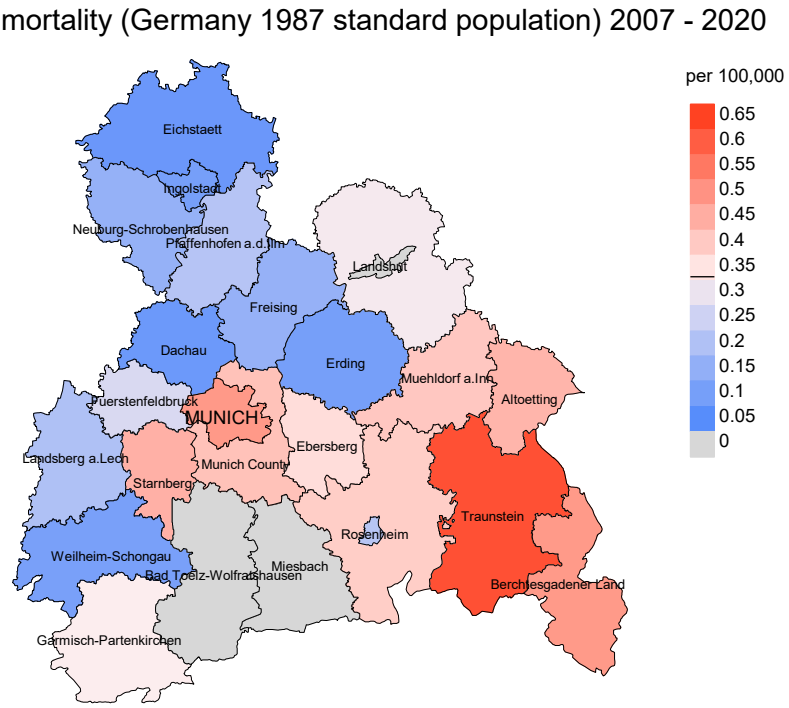

Figure 18a. Map of cancer mortality (german standard population) by county averaged for period 2007 to 2020. According to their individual mortality rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (0.3/100,000 WS N=128).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 67,727 female residents (averaged) in the period from 2007 to 2020 a total of 4 women died from ca. i.s. Cervix. Therefore, the mean mortality rate for this cancer type in this area can be calculated at 0.4/100,000 (german standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 0.1 and 1.2/100,000.

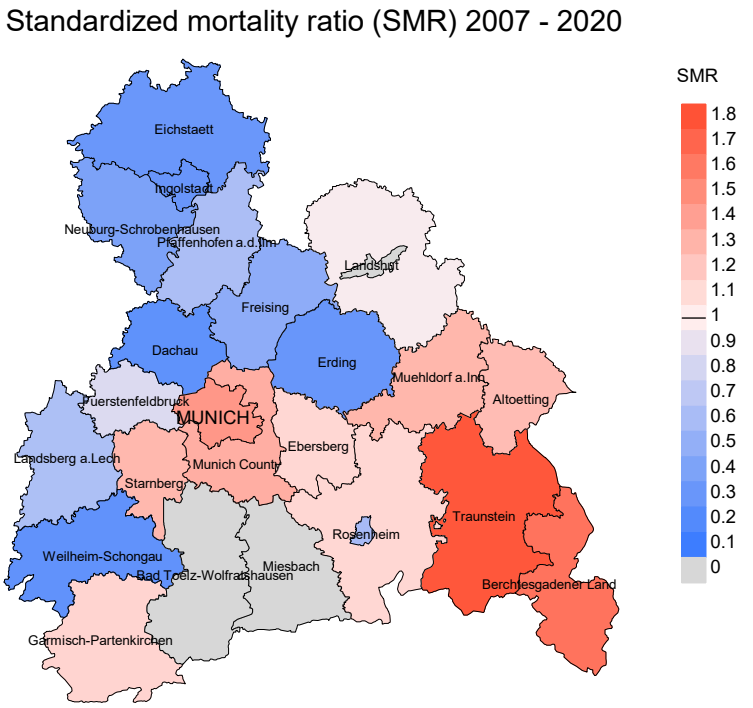

Figure 18b. Map of standardized mortality ratio (SMR) by county averaged for period 2007 to 2020. According to their individual SMR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (N=128).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 67,153 female residents (averaged) in the period from 2007 to 2020 a total of 4 women died from ca. i.s. Cervix. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 1.11. Though, the value of this parameter may vary with an underlying probability of 99% between 0.19 and 3.50, 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 ratio of mortality and incidence (mortality-to-incidence ratio, **MIR**, **MI-Index**) is a statistical index 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 MIR. 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

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

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