

# Munich Cancer Registry



- ▶ Survival
- ▶ Selection Matrix
- ▶ Homepage
- ▶ *Deutsch*

## Mammarian Paget disease

### Incidence and Mortality

Year of diagnosis	1998-2019
Patients	296
Diseases	296
Creation date	01/26/2021
Database export	01/07/2021
Population (females)	2.48 m



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

[https://www.tumorregister-muenchen.de/en/facts/base/bMPDf\\_E-Mammarian-Paget-disease-incidence-and-mortality.pdf](https://www.tumorregister-muenchen.de/en/facts/base/bMPDf_E-Mammarian-Paget-disease-incidence-and-mortality.pdf)

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**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<sup>#</sup>, with a total of 4.69 million inhabitants, account for the frequency of cancer diseases<sup>##</sup> 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<sup>###</sup> 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](mailto:tumor@ibe.med.uni-muenchen.de).

Munich Cancer Registry, January 2021

- <sup>#</sup> 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).
- <sup>##</sup> 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.
- <sup>###</sup> DCO (death certificate only) identifies a cancer case that first becomes available to the MCR through the death certificate.

## Specifications of cancer site

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### 1. Paget disease without underlying carcinoma (PD)

**ICD-10 code (ICD-10 2015)**

D05.- Carcinoma in situ of breast

**Topography codes (ICD-O-3 2011)**

C50.0 Nipple

C50.9 Breast, NOS

**Morphology code (ICD-O-3 2011)**

8540/3 Paget disease, mammary

### 2. Paget disease linked to ductal carcinoma in situ (PD-DCIS)

**ICD-10 code (ICD-10 2015)**

D05.- Carcinoma in situ of breast

**Topography code (ICD-O-3 2011)**

C50.- Breast

**Morphology code (ICD-O-3 2011)**

8543/3 Paget disease and intraductal carcinoma of breast

### 3. Paget disease linked to infiltrating ductal carcinoma (PD-IDC)

**ICD-10 code (ICD-10 2015)**

C50.- Malignant neoplasm of breast

**Morphology code (ICD-O-3 2011)**

8541/3 Paget disease and infiltrating duct carcinoma of breast

**Sex: Female**

## INCIDENCE

Table 1

Cases with invasive cancer 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	11	18.2	13.0	63.6	100.0
1999	7	16.7	13.5	85.7	100.0
2000	8	15.4	13.5	75.0	100.0
2001	9	17.1	12.4	55.6	100.0
2002	18	11.3	12.0	61.1	83.3 #
2003	17	11.4	12.1	29.4	88.2
2004	7	11.7	10.8	42.9	85.7
2005	16	11.8	10.6	37.5	93.8
2006	10	14.6	10.9	30.0	100.0
2007	16	16.0	9.9	56.3	93.8 #
2008	17	15.4	9.1	23.5	94.1
2009	7	15.4	7.6	57.1	85.7
2010	10	14.4	7.9	40.0	100.0
2011	4	14.0	7.1	50.0	100.0
2012	18	14.3	7.3	38.9	94.4
2013	16	13.6	5.9	18.8	93.8
2014	11	13.4	4.9	9.1	100.0
2015	23	12.9	4.3	21.7	91.3
2016	17	12.8	2.9	23.5	100.0
2017	16	13.2	0.0	6.3	100.0
2018	20	14.0	0.0	5.0	100.0
2019	18	15.2	0.0	5.6	72.2 ##
1998-2019	296	15.2	13.0	33.1	93.6

296 cases diagnosed 1998-2019 are related to a total of 296 patients. Currently, in 82 (27.7 %) of these 296 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 68 / 12 / 2 (23.0 % / 4.1 % / 0.7 %) 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 retrieved from the respective headings.

How to interpret:

In 2017, a subgroup of 16 cases has been diagnosed, of which 13.2 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 0.0 % 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 4.92 m as of 2007, respectively)

Year of diagnosis	Cases n	Incidence raw	Incidence WS	Incidence ES	Incidence BRD-S
1998	11	0.9	0.5	0.8	0.9
1999	7	0.6	0.3	0.4	0.5
2000	8	0.7	0.3	0.5	0.6
2001	9	0.7	0.3	0.5	0.6
2002	18	0.9	0.5	0.7	0.8
2003	17	0.9	0.5	0.7	0.8
2004	7	0.4	0.2	0.3	0.3
2005	16	0.8	0.4	0.5	0.7
2006	10	0.5	0.3	0.4	0.4
2007	16	0.7	0.3	0.4	0.5
2008	17	0.7	0.4	0.6	0.6
2009	7	0.3	0.1	0.2	0.2
2010	10	0.4	0.2	0.3	0.3
2011	4	0.2	0.1	0.1	0.2
2012	18	0.8	0.3	0.4	0.5
2013	16	0.7	0.4	0.5	0.6
2014	11	0.5	0.2	0.3	0.4
2015	23	0.9	0.4	0.6	0.7
2016	17	0.7	0.3	0.5	0.6
2017	16	0.6	0.3	0.4	0.5
2018	20	0.8	0.4	0.6	0.7
2019	18	0.7	0.3	0.4	0.5
1998-2019	296	0.6	0.3	0.4	0.5

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	Std.		Min.	Max.	10%	25%	Median		
		Mean	dev.					50%	75%	90%
1998	11	64.6	10.5	49.2	79.3	50.4	54.1	66.6	74.9	75.2
1999	7	70.4	9.5	59.3	83.7	59.3	59.8	69.0	81.1	83.7
2000	8	69.1	13.6	48.0	87.0	48.0	58.0	72.0	79.0	87.0
2001	9	68.6	12.6	51.9	88.2	51.9	58.0	67.4	76.4	88.2
2002	18	66.1	12.1	50.6	88.1	53.9	56.4	61.4	76.8	87.7
2003	17	62.2	14.8	33.3	89.7	44.6	56.0	59.3	70.5	83.5
2004	7	57.8	13.6	37.5	72.6	37.5	41.2	60.6	68.5	72.6
2005	16	67.7	12.7	43.8	89.2	52.2	58.2	67.3	79.3	83.1
2006	10	66.9	8.5	53.0	83.7	54.9	63.6	66.4	71.0	77.8
2007	16	70.5	16.2	39.0	90.8	43.8	59.9	72.4	84.7	88.6
2008	17	60.6	14.8	34.0	86.5	41.2	54.1	59.1	67.7	83.7
2009	7	76.5	10.2	64.9	90.2	64.9	67.3	72.6	89.3	90.2
2010	10	73.6	16.0	49.1	97.4	49.8	65.2	75.3	86.8	93.8
2011	4	66.7	21.4	35.8	83.3	35.8	52.7	74.0	80.8	83.3
2012	18	72.3	13.0	44.5	91.9	53.8	65.6	72.5	82.0	91.5
2013	16	61.7	17.7	23.4	84.7	37.8	48.8	66.8	77.8	78.8
2014	11	66.3	15.9	42.4	91.4	49.2	52.7	68.0	79.2	83.9
2015	23	70.9	13.6	43.5	92.8	50.4	62.0	71.7	80.2	88.9
2016	17	64.8	16.4	32.0	96.9	41.1	55.2	65.5	77.1	82.3
2017	16	69.0	9.2	52.8	80.1	54.8	61.9	71.1	76.2	79.8
2018	20	63.1	16.3	32.6	83.6	42.2	47.9	65.1	78.3	82.9
2019	18	71.1	17.3	31.6	98.5	54.0	56.8	67.6	85.1	94.4
1998-2019	296	67.1	14.4	23.4	98.5	47.9	57.0	67.7	78.4	86.2

Table 4

Age distribution by 5-year age group for period 2007-2019

Age at diagnosis Years	Cases		Cum.%
	n	%	
0-4			
5-9			
10-14			
15-19			
20-24	1	0.5	0.5
25-29	0	0.0	0.5
30-34	4	2.1	2.6
35-39	3	1.6	4.1
40-44	9	4.7	8.8
45-49	10	5.2	14.0
50-54	17	8.8	22.8
55-59	16	8.3	31.1
60-64	15	7.8	38.9
65-69	25	13.0	51.8
70-74	23	11.9	63.7
75-79	26	13.5	77.2
80-84	19	9.8	87.0
85+	25	13.0	100.0
All ages	193	100.0	

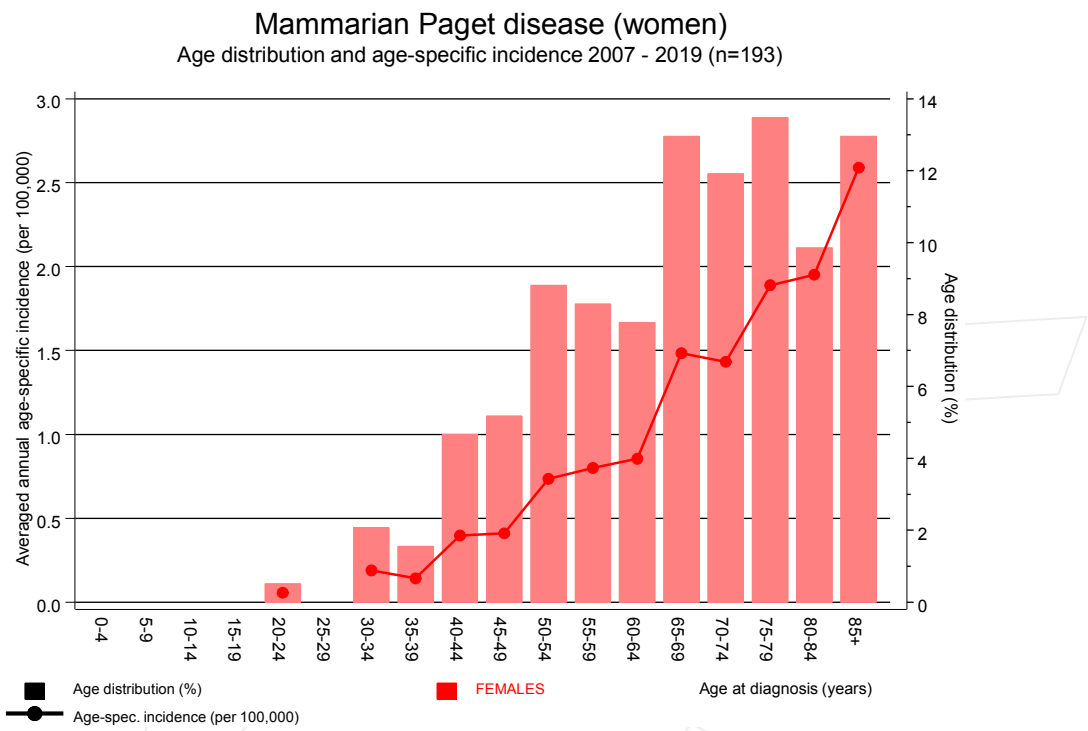


Table 5

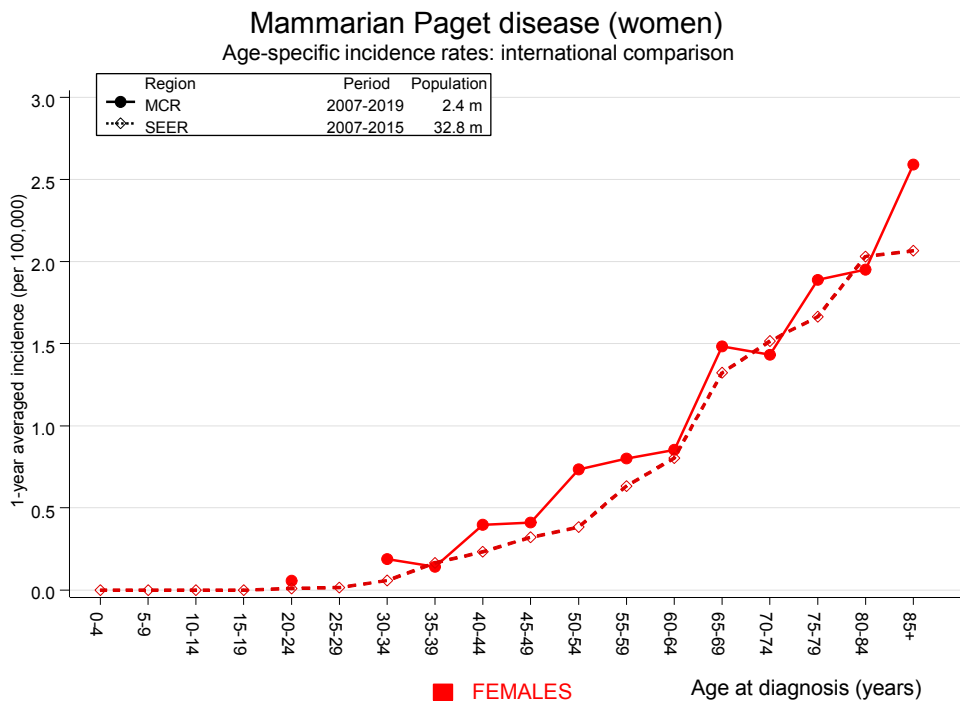
Age-specific incidence and proportion of all cancers for period 2007-2019

Age at diagnosis Years	Cases n	Age-spec. incidence	Prop. all cancers n=144724 %
0- 4		0.0	
5- 9		0.0	
10-14		0.0	
15-19		0.0	
20-24	1	0.1	0.2
25-29		0.0	
30-34	4	0.2	0.2
35-39	3	0.1	0.1
40-44	9	0.4	0.2
45-49	10	0.4	0.1
50-54	17	0.7	0.1
55-59	16	0.8	0.1
60-64	15	0.9	0.1
65-69	25	1.5	0.1
70-74	23	1.4	0.1
75-79	26	1.9	0.1
80-84	19	2.0	0.1
85+	25	2.6	0.2
All ages	193		0.1
Incidence			
Raw		0.6	
WS		0.3	
ES		0.4	
BRD-S		0.5	

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



**Figure 6.** Age distribution (mean=67.8 yrs, median=68.6 yrs) and age-specific incidence.



**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 2019, based on the November 2018 submission. <http://www.seer.cancer.gov>.

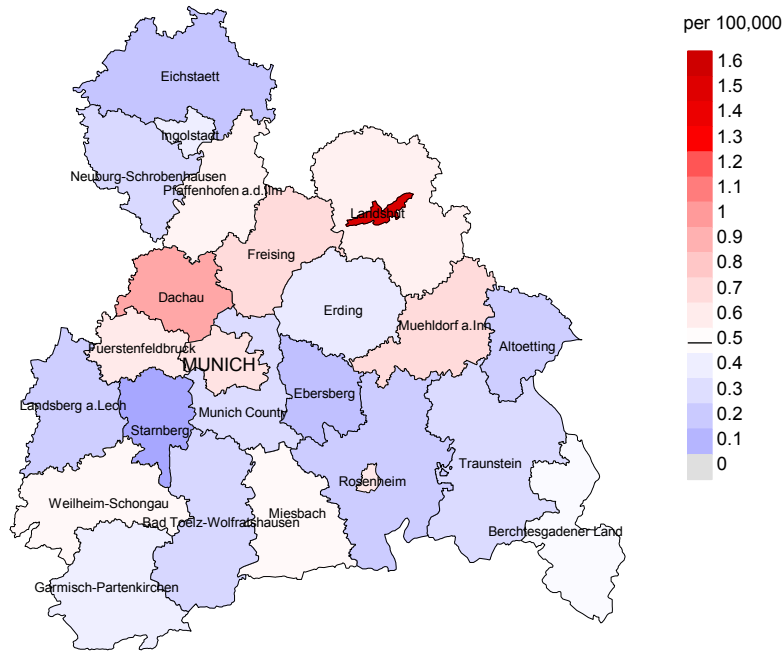
Table 7

Standardized incidence ratio (SIR, with 95% confidence limits), excess absolute risk (EAR) and DCO rate of further malignancies for period 1998–2019

Diagnosis	Observed n	Expected n	SIR	CI 95%	CI 95%	EAR	DCO %
C16 Stomach	2	0.6	3.5	0.4	12.8	11.4	
C19–C20 Rectum	2	0.6	3.2	0.4	11.6	10.9	
C23–C24 Bile	1	0.2	4.4	0.1	24.4	6.1	
C25 Pancreas	4	0.7	5.4	1.5	13.8 #	25.9	25.0
C30–C31 Sinuses	1	0.0	47.0	1.2	262.1 #	7.8	
C33–C34 Lung	1	1.1	0.9	0.0	5.2	-0.6	
C43 Malign. melanoma	1	0.5	1.9	0.0	10.5	3.7	
C50 Breast	16	4.4	3.6	2.1	5.9 #	92.0	
C54 Corpus uteri	1	0.8	1.3	0.0	7.1	1.7	
C56 Ovary	1	0.6	1.7	0.0	9.5	3.3	
C64 Kidney	1	0.3	2.9	0.1	16.3	5.2	
C82–C85 NHL	3	0.6	5.0	1.0	14.6 #	19.0	
C91–C96 Leukaemia	1	0.2	4.4	0.1	24.6	6.1	
Not observed	0	4.3	0.0	0.0	0.9 #	-34.5	
All further malignancies	35	15.1	2.3	1.6	3.2 #	158.2	2.9
Patients		283					
Median age at next malignancy (years)		69.5					
Person-years		1259					
Mean observation time (years)		4.4					
Median observation time (years)		2.8					

# The occurrence of further specified malignancy is statistically significant.

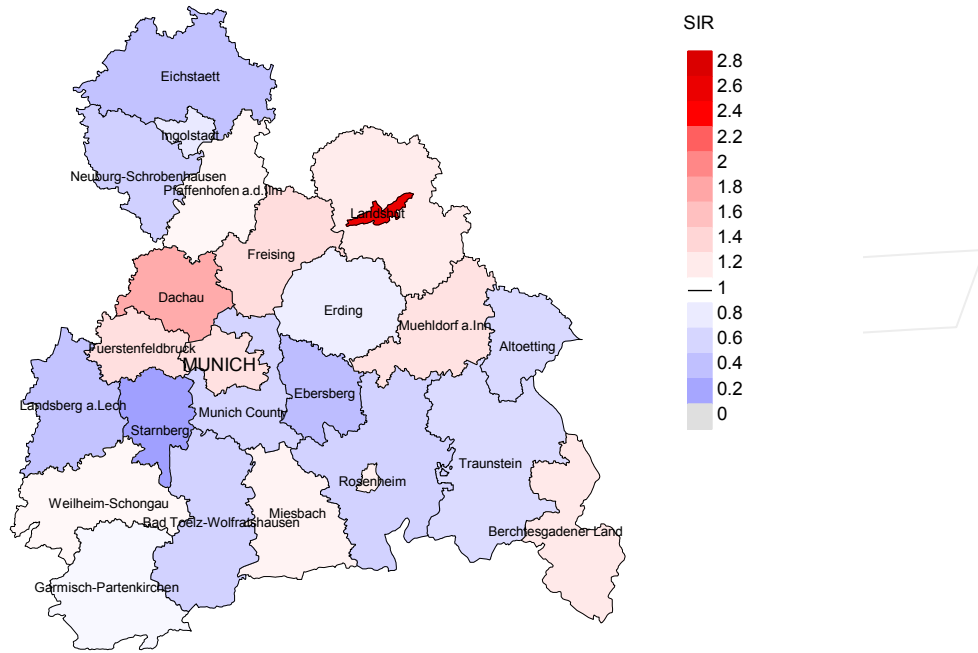
Average incidence (Germany 1987 standard population) 2007 - 2019



**Figure 8a.** Map of cancer incidence (german standard population) by county averaged for period 2007 to 2019. 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 (0.5/100,000 WS N=193).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 67,462 female residents (averaged) in the period from 2007 to 2019 a total of 2 women were identified with newly diagnosed mammarian Paget disease. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 0.1/100,000 (german standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 0.0 and 0.9/100,000.

Standardized incidence ratio (SIR) 2007 - 2019



**Figure 8b.** Map of standardized incidence ratio (SIR) by county averaged for period 2007 to 2019. 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=193).

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 2019 a total of 2 women were identified with newly diagnosed mammary Paget disease. Therefore, the mean standardized incidence ratio (SIR) for this cancer type in this area can be calculated at 0.38. Though, the value of this parameter may vary with an underlying probability of 99% between 0.02 and 1.75, 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 4.92 m as of 2007, respectively)

Year of diagnosis	Incident cases n	Prop. actively followed %	Deaths n	Prop. deaths %	Prop. deaths with death certific. %
1998	11	100.0	7	63.6	100.0
1999	7	100.0	6	85.7	83.3
2000	8	100.0	6	75.0	83.3
2001	9	100.0	5	55.6	100.0
2002	18	83.3	11	61.1	90.9
2003	17	88.2	5	29.4	100.0
2004	7	85.7	3	42.9	100.0
2005	16	93.8	6	37.5	50.0
2006	10	100.0	3	30.0	100.0
2007	16	93.8	9	56.3	66.7
2008	17	94.1	4	23.5	100.0
2009	7	85.7	4	57.1	100.0
2010	10	100.0	4	40.0	100.0
2011	4	100.0	2	50.0	100.0
2012	18	94.4	7	38.9	85.7
2013	16	93.8	3	18.8	100.0
2014	11	100.0	1	9.1	100.0
2015	23	91.3	5	21.7	100.0
2016	17	100.0	4	23.5	50.0
2017	16	100.0	1	6.3	
2018	20	100.0	1	5.0	100.0
2019	18	72.2	1	5.6	100.0
1998-2019	296	93.6	98	33.1	86.7

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 4.92 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	11	2		
1999	7	2		
2000	8	5		
2001	9	2		
2002	18	5		
2003	17	2		
2004	7	10		
2005	16	10	2	12.5
2006	10	8		
2007	16	11		
2008	17	5		
2009	7	8	1	14.3
2010	10	3	1	10.0
2011	4	5		
2012	18	10	2	11.1
2013	16	5		
2014	11	4		
2015	23	6		
2016	17	6	1	5.9
2017	16	13		
2018	20	7		
2019	18	8		
1998-2019	296	137	7	2.4



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 4.92 m as of 2007, respectively)

Year of death	Deaths n	Prop. cancer- related %	Prop. non-cancer- related %	Prop. cancer recorded on death certificate %
1998	2		100.0	50.0
1999	2	100.0		100.0
2000	5	80.0	20.0	100.0
2001	2	50.0	50.0	100.0
2002	5	80.0	20.0	100.0
2003	2		100.0	
2004	10	70.0	30.0	70.0
2005	10	80.0	20.0	90.0
2006	8	62.5	37.5	83.3
2007	11	81.8	18.2	90.9
2008	5	40.0	60.0	60.0
2009	8	37.5	62.5	62.5
2010	3	33.3	66.7	33.3
2011	5	60.0	40.0	60.0
2012	10	70.0	30.0	90.0
2013	5	40.0	60.0	40.0
2014	4	50.0	50.0	50.0
2015	6	16.7	83.3	16.7
2016	6	66.7	33.3	66.7
2017	13	30.8	69.2	41.7
2018	7		100.0	
2019	8	25.0	75.0	100.0
1998–2019	137	51.8	48.2	67.2

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	2	72.3		72.3	55.0
1999	2	66.7	66.7		66.7
2000	5	64.6	62.8	93.9	60.8
2001	2	77.3	68.8	85.7	85.7
2002	5	81.9	78.4	93.2	81.9
2003	2	90.7		90.7	
2004	10	81.4	81.8	81.1	81.8
2005	10	65.7	60.5	82.8	60.7
2006	8	85.2	83.1	92.5	83.1
2007	11	72.1	72.1	79.1	71.8
2008	5	65.6	64.2	89.5	64.6
2009	8	84.9	75.3	86.2	86.2
2010	3	80.1	75.4	88.8	75.4
2011	5	89.1	87.9	95.1	87.9
2012	10	78.6	71.1	91.4	74.7
2013	5	92.8	83.8	93.4	83.8
2014	4	89.4	79.7	91.0	79.7
2015	6	85.2	90.1	80.9	90.1
2016	6	70.8	69.9	80.9	69.9
2017	13	85.8	71.3	89.3	78.1
2018	7	84.1		84.1	
2019	8	89.0	81.9	89.0	88.8
1998–2019	137	82.6	72.2	89.1	75.7

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
1999	2	0.2	0.29	0.1	0.31	0.1	0.27	0.1	0.20
2000	4	0.3	0.50	0.2	0.59	0.3	0.55	0.3	0.47
2001	1	0.1	0.11	0.1	0.15	0.1	0.13	0.1	0.12
2002	4	0.2	0.22	0.1	0.16	0.1	0.17	0.2	0.20
2003									
2004	7	0.4	1.00	0.1	0.48	0.2	0.60	0.3	0.90
2005	8	0.4	0.50	0.2	0.56	0.3	0.56	0.3	0.50
2006	5	0.2	0.50	0.1	0.38	0.1	0.39	0.2	0.43
2007	9	0.4	0.56	0.2	0.56	0.2	0.57	0.3	0.61
2008	2	0.1	0.12	0.1	0.15	0.1	0.13	0.1	0.13
2009	3	0.1	0.43	0.0	0.33	0.1	0.39	0.1	0.45
2010	1	0.0	0.10	0.0	0.07	0.0	0.09	0.0	0.13
2011	3	0.1	0.75	0.0	0.24	0.0	0.35	0.1	0.33
2012	7	0.3	0.39	0.1	0.33	0.2	0.35	0.2	0.35
2013	2	0.1	0.13	0.0	0.04	0.0	0.06	0.1	0.11
2014	2	0.1	0.18	0.0	0.14	0.0	0.15	0.1	0.14
2015	1	0.0	0.04	0.0	0.02	0.0	0.02	0.0	0.02
2016	4	0.2	0.24	0.1	0.22	0.1	0.23	0.1	0.24
2017	4	0.2	0.25	0.1	0.29	0.1	0.26	0.1	0.24
2018									
2019	2	0.1	0.11	0.0	0.10	0.0	0.10	0.1	0.10
1999-2019	71	0.2	0.25	0.1	0.20	0.1	0.21	0.1	0.22

Table 12

Age distribution of age at death (cancer-related) for period 2007-2019  
(incl. multiple malignancies)

Age at death Years	Cases		Cum.%
	n	%	
0-4			
5-9			
10-14			
15-19			
20-24			
25-29			
30-34			
35-39			
40-44	1	2.5	2.5
45-49	0	0.0	2.5
50-54	2	5.0	7.5
55-59	0	0.0	7.5
60-64	5	12.5	20.0
65-69	5	12.5	32.5
70-74	8	20.0	52.5
75-79	5	12.5	65.0
80-84	4	10.0	75.0
85+	10	25.0	100.0
All ages	40	100.0	

Table 13

Age-specific mortality (cancer-related) and proportion of all cancers  
for period 2007-2019  
(incl. multiple malignancies)

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		0.0		
25-29		0.0		
30-34		0.0		
35-39		0.0		
40-44	1	0.0	0.11	0.1
45-49		0.0		
50-54	2	0.1	0.12	0.1
55-59		0.0		
60-64	5	0.3	0.33	0.1
65-69	5	0.3	0.20	0.1
70-74	8	0.5	0.35	0.1
75-79	5	0.4	0.19	0.1
80-84	4	0.4	0.21	0.0
85+	10	1.0	0.40	0.1
All ages	40			0.1
Mortality				
Raw		0.1	0.21	
WS		0.0	0.17	
ES		0.1	0.17	
BRD-S		0.1	0.19	
PYLL-70				
per 100,000		0.4		
ES		0.4		
AYLL-70		8.7		

Table 14

Further malignancies in deaths in period 1999-2019

Diagnosis	Total n	Total %↓	Pre n	Pre ←%	Syn- chron ±30d n	Syn- chron ±30d ←%	Post n	Post ←%
C03-C06 Oral cavity	1	2.3					1	100.0
C16 Stomach	3	7.0	1	33.3			2	66.7
C18 Colon	2	4.7	1	50.0			1	50.0
C23-C24 Bile	1	2.3					1	100.0
C25 Pancreas	4	9.3					4	100.0
C33-C34 Lung	4	9.3					4	100.0
C43 Malign. melanoma	1	2.3					1	100.0
C44 Skin others	3	7.0	1	33.3			2	66.7
C46,C49 Soft tissue	1	2.3					1	100.0
C50 Breast	13	30.2			3	23.1	10	76.9
C54 Corpus uteri	2	4.7	1	50.0			1	50.0
C56 Ovary	1	2.3					1	100.0
C64 Kidney	2	4.7					2	100.0
C82-C85 NHL	3	7.0	2	66.7			1	33.3
C90 Mult. myeloma	2	4.7					2	100.0
All further malignancies	43	100.0	6	14.0	3	7.0	34	79.1

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 2007-2019 (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		0.0		
25-29		0.0		
30-34		0.0		
35-39		0.0		
40-44	1	0.0	0.13	0.1
45-49		0.0		
50-54	2	0.1	0.14	0.1
55-59		0.0		
60-64	5	0.3	0.36	0.1
65-69	5	0.3	0.24	0.1
70-74	6	0.4	0.30	0.1
75-79	4	0.3	0.21	0.1
80-84	4	0.4	0.27	0.1
85+	7	0.7	0.33	0.1
All ages	34			0.1
Mortality				
Raw		0.1	0.21	
WS		0.0	0.17	
ES		0.1	0.18	
BRD-S		0.1	0.19	
PYLL-70				
per 100,000		0.4		
ES		0.4		
AYLL-70		8.7		

\* See corresponding tables with multiple malignancies.

Table 16

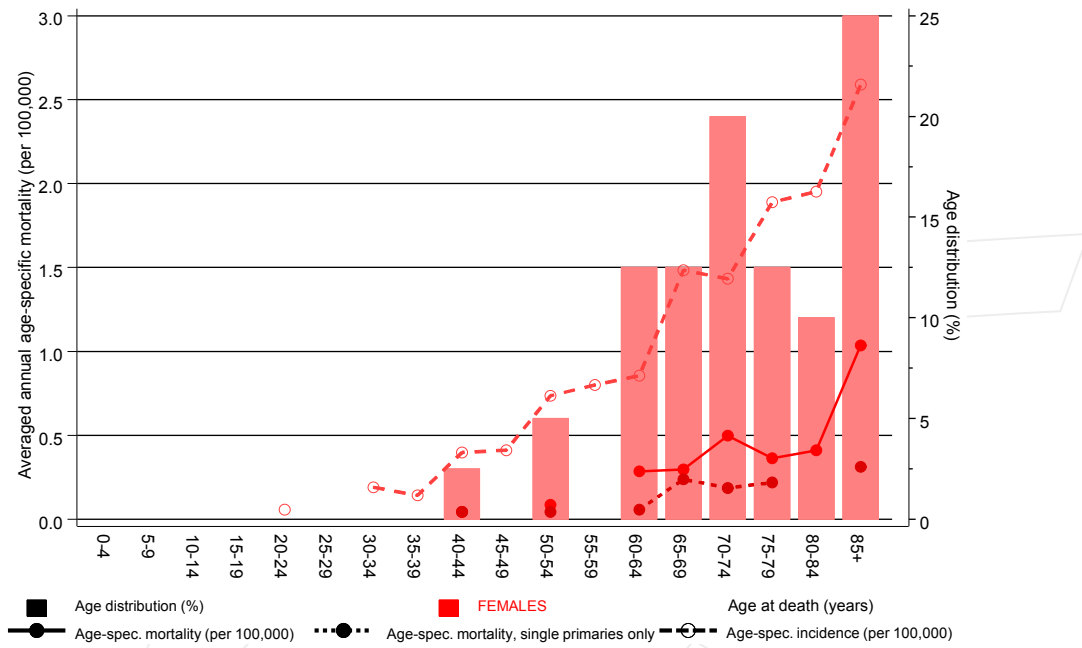
Age-specific mortality (cancer-related) and proportion of all cancers  
for period 2007-2019  
(**Single primaries only \***)

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		0.0		
25-29		0.0		
30-34		0.0		
35-39		0.0		
40-44	1	0.0	0.14	0.1
45-49		0.0		
50-54	1	0.0	0.08	0.0
55-59		0.0		
60-64	1	0.1	0.08	0.0
65-69	4	0.2	0.24	0.1
70-74	3	0.2	0.16	0.0
75-79	3	0.2	0.18	0.0
80-84		0.0		
85+	3	0.3	0.16	0.0
All ages	16			0.0
Mortality				
Raw		0.1	0.11	
WS		0.0	0.10	
ES		0.0	0.10	
BRD-S		0.0	0.10	
PYLL-70				
per 100,000		0.2		
ES		0.2		
AYLL-70		8.9		

\* See corresponding tables with multiple malignancies.



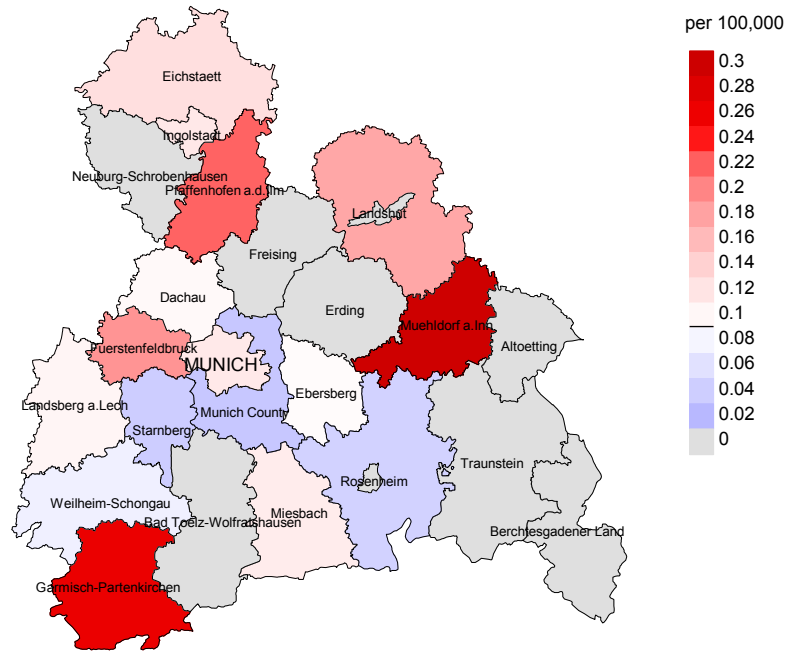
Mammalian Paget disease (women)  
Age distribution and age-specific mortality 2007 - 2019 (n=40)



**Figure 17.** Distribution of age at death (bars; n=mean=65.6 yrs, median=67.0 yrs) 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 mammalian Paget disease-related death (see Table 10) should be considered.

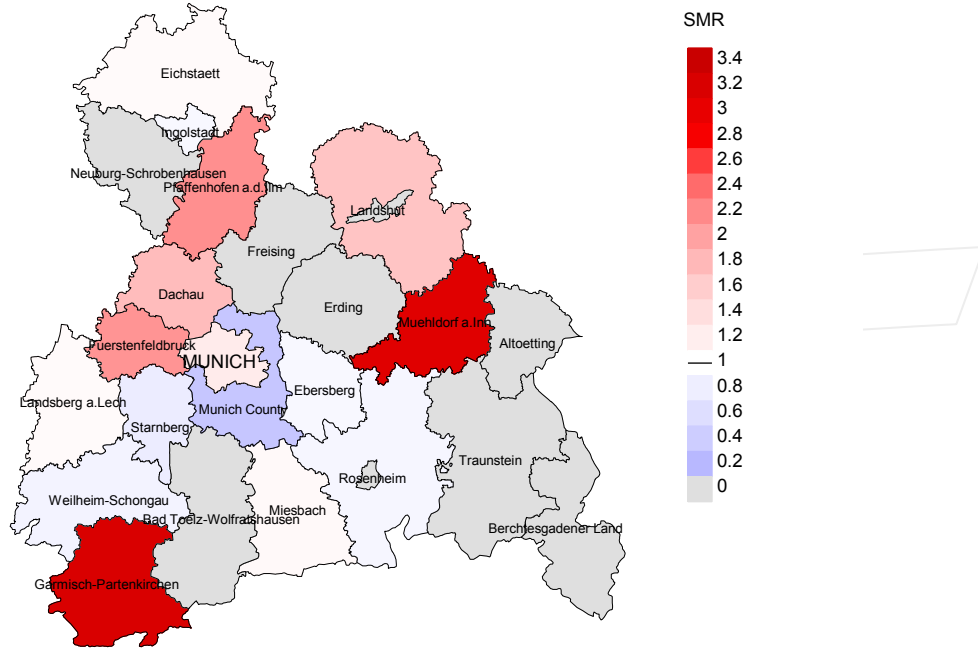
Average mortality (Germany 1987 standard population) 2007 - 2019



**Figure 18a.** Map of cancer mortality (german standard population) by county averaged for period 2007 to 2019. 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 (0.1/100,000 WS N=40).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 67,462 female residents (averaged) in the period from 2007 to 2019 a total of 1 women died from mammarian Paget disease. Therefore, the mean mortality rate for this cancer type in this area can be calculated at 0.1/100,000 (german standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 0.0 and 0.8/100,000.

Standardized mortality ratio (SMR) 2007 - 2019



**Figure 18b.** Map of standardized mortality ratio (SMR) by county averaged for period 2007 to 2019. 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=40).

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 2019 a total of 1 women died from mammary Paget disease. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 0.93. Though, the value of this parameter may vary with an underlying probability of 99% between 0.00 and 6.94, 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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