

Munich Cancer Registry



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

ICD-10 C60: Penile cancer

Incidence and Mortality

Year of diagnosis	1998-2016
Patients	457
Diseases	457
Creation date	08/21/2018
Export date	08/09/2018
Population (males)	2.38 m



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

https://www.tumorregister-muenchen.de/en/facts/base/bC60__E-ICD-10-C60-Penile-cancer-incidence-and-mortality.pdf

Index of figures and tables

Fig./Tbl.		Page
1	Annual cases, DCO, mult. malignancies, follow-up / yr	4
2	Incidence by year of diagnosis	5
3	Age distribution parameters by year of diagnosis	6
4	Age distribution by 5-year age group	6
5	Age-specific incidence, DCO rate, proportion malignancies	7
6	Age distribution and age-specific incidence (chart)	8
6a	Age-specific incidence internationally (chart)	9
7	Standardized incidence ratio of further malignancies	10
8a	Map of cancer incidence (WS) by county (chart)	11
8b	Standardized incidence ratio (SIR) by county (chart)	12
9a	Pts incident cohorts and mortality / yr	13
9b	Incidence and mortality by year of diagnosis	14
9c	Cancer-related deaths, death certification available / yr	15
10	Medians of age at death / yr	16
11	Mortality by year of death	17
12	Distribution of age at death	17
13	Age-specific mortality	18
14	Further malignancies in deaths	19
15	Age-specific mortality (first primaries)	20
16	Age-specific mortality (single primaries)	21
17	Age distribution and age-specific mortality (chart)	22
18a	Map of cancer mortality (WS) by county (chart)	23
18b	Standardized mortality ratio (SMR) by county (chart)	24

**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, August 2018

[#] 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 2015) used for specifying cancer site

Code	Description
C60.-	Malignant neoplasm of penis
C60.0	Prepuce
C60.1	Glans penis
C60.2	Body of penis
C60.8	Overlapping lesion of penis
C60.9	Penis, unspecified

INCIDENCE

Table 1

Cases with invasive cancer by year of diagnosis, proportions of DCO, further malignancies, deaths, and active follow-up (incl. DCO)

Year of diagnosis	All cases n	DCO cases n	Prop. DCO %	Prop. at least 1 further malign. prior + synchron. %	Prop. at least 1 further malign. after %	Prop. deaths %	Prop. actively followed %
1998	11	1	9.1	27.3	12.4	90.9	100.0
1999	13			12.5	12.0	69.2	100.0
2000	9			12.1	11.7	55.6	77.8
2001	11	1	9.1	18.2	11.9	72.7	100.0
2002	27	1	3.7	14.1	11.7	63.0	88.9 #
2003	30	1	3.3	12.9	10.5	70.0	100.0
2004	19			15.8	10.8	73.7	89.5
2005	18	2	11.1	15.9	10.2	72.2	88.9
2006	21	1	4.8	15.7	10.1	61.9	81.0
2007	35	1	2.9	16.0	10.8	54.3	68.6 #
2008	28			17.1	10.0	57.1	67.9
2009	25	1	4.0	16.2	9.0	40.0	68.0
2010	43			16.9	9.1	39.5	58.1
2011	25	2	8.0	17.5	9.0	32.0	64.0
2012	39	3	7.7	18.1	9.2	38.5	71.8
2013	24			17.5	8.8	45.8	79.2
2014	29	1	3.4	18.4	7.7	31.0	79.3
2015	30	3	10.0	18.3	4.1	30.0	96.7
2016	20			18.8	5.0		55.0 ##
1998-2016	457	18	3.9	18.8	12.4	49.0	78.1

457 cases diagnosed 1998-2016 are related to a total of 457 patients. Currently, in 135 (29.5 %) of these 457 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 101 / 26 / 8 (22.1 % / 5.7 % / 1.8 %) 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 2014, a subgroup of 29 cases has been diagnosed, of which 18.4 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 7.7 % 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 including DCO cases
(with respect to registry area expansion from 2.65 to 4.10 m as of 2002,
and from 4.10 to 4.81 m as of 2007, respectively)

Year of diagnosis	Cases n	Incidence raw	Incidence WS	Incidence ES	Incidence BRD-S
1998	11	1.0	0.6	0.9	1.5
1999	13	1.2	0.7	1.0	1.3
2000	9	0.8	0.4	0.7	0.9
2001	11	0.9	0.5	0.8	1.2
2002	27	1.4	0.8	1.2	1.6
2003	30	1.6	0.9	1.3	1.7
2004	19	1.0	0.5	0.8	1.1
2005	18	1.0	0.5	0.7	1.0
2006	21	1.1	0.6	0.8	1.1
2007	35	1.6	0.9	1.3	1.6
2008	28	1.3	0.6	0.9	1.3
2009	25	1.1	0.6	0.9	1.0
2010	43	1.9	1.0	1.5	1.8
2011	25	1.1	0.5	0.8	1.0
2012	39	1.7	0.8	1.2	1.6
2013	24	1.0	0.6	0.8	1.0
2014	29	1.2	0.6	0.9	1.1
2015	30	1.3	0.6	0.9	1.1
2016	20	0.8	0.4	0.6	0.7
1998-2016	457	1.2	0.6	1.0	1.2

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

Table 3

Age distribution parameters by year of diagnosis
(incl. DCO)

Year of diagnosis	Cases n	Std.		Min.	Max.	Median				
		Mean	dev.			10%	25%	50%	75%	90%
1998	11	71.4	10.3	51.9	82.9	58.6	65.5	70.6	81.5	82.7
1999	13	65.7	13.7	44.7	92.4	49.0	59.2	61.2	74.8	83.9
2000	9	69.9	12.3	57.3	89.0	57.3	60.7	63.7	83.0	89.0
2001	11	67.3	15.6	35.6	85.5	48.6	58.7	70.3	82.0	82.1
2002	27	68.1	11.9	42.6	90.1	49.9	61.2	70.5	76.8	82.4
2003	30	68.1	12.6	43.2	93.1	52.8	60.4	67.0	79.5	82.5
2004	19	73.2	10.3	59.3	91.0	59.7	64.4	72.0	84.0	89.1
2005	18	70.4	10.9	44.2	85.0	46.0	65.6	71.7	77.6	83.3
2006	21	65.6	12.6	42.2	81.6	46.2	59.8	66.4	78.1	80.6
2007	35	67.3	14.5	41.4	94.3	48.3	58.2	65.3	81.0	88.7
2008	28	69.5	12.5	42.8	94.4	46.9	63.3	71.0	79.7	83.0
2009	25	64.2	12.5	42.1	89.4	46.8	56.0	63.8	72.6	81.1
2010	43	69.7	11.2	48.7	92.7	56.2	63.0	69.9	75.2	86.0
2011	25	67.5	11.2	40.8	89.9	54.3	59.2	70.7	73.9	81.9
2012	39	71.7	11.0	45.5	86.9	57.1	62.7	73.5	79.6	84.4
2013	24	67.6	13.0	40.4	92.3	51.5	59.9	66.5	76.5	87.3
2014	29	71.4	10.2	56.3	99.5	57.2	66.0	70.7	76.6	83.9
2015	30	70.4	12.8	44.5	90.9	50.6	61.8	73.7	78.1	85.5
2016	20	66.6	14.4	24.9	90.9	52.5	58.5	67.0	75.1	82.6
1998-2016	457	68.8	12.2	24.9	99.5	51.3	60.7	69.7	77.6	83.8

Table 4

Age distribution by 5-year age group for period 2007-2016
(incl. DCO)

Age at diagnosis Years	Cases n	%	Cum.%
0-4			
5-9			
10-14			
15-19			
20-24	1	0.3	0.3
25-29	0	0.0	0.3
30-34	0	0.0	0.3
35-39	0	0.0	0.3
40-44	9	3.0	3.4
45-49	12	4.0	7.4
50-54	18	6.0	13.4
55-59	29	9.7	23.2
60-64	40	13.4	36.6
65-69	39	13.1	49.7
70-74	59	19.8	69.5
75-79	31	10.4	79.9
80-84	35	11.7	91.6
85+	25	8.4	100.0
All ages	298	100.0	

Table 5

Age-specific incidence, DCO rate and proportion of all cancers for period 2007-2016

Age at diagnosis Years	Cases n	Age-spec. incidence	DCO rate n=11 %	Prop. all cancers n=113978 %
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		0.0		
35-39		0.0		
40-44	9	0.5		0.4
45-49	12	0.6		0.3
50-54	18	1.0	5.6	0.3
55-59	29	2.0	3.4	0.3
60-64	40	3.3	2.5	0.3
65-69	39	3.3		0.2
70-74	59	5.3	1.7	0.3
75-79	31	3.9	6.5	0.2
80-84	35	7.6	5.7	0.3
85+	25	8.2	12.0	0.3
All ages	298		3.7	0.3
Incidence				
Raw		1.3		
WS		0.7		
ES		1.0		
BRD-S		1.2		

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).

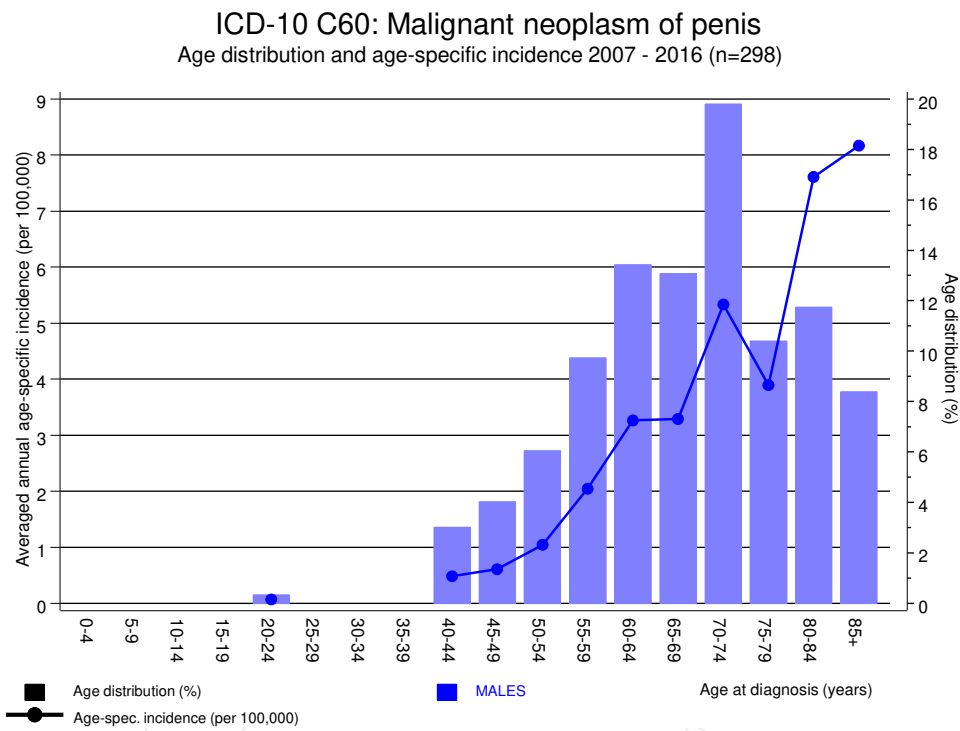


Figure 6. Age distribution (mean=68.9 yrs, median=70.1 yrs) and age-specific incidence.

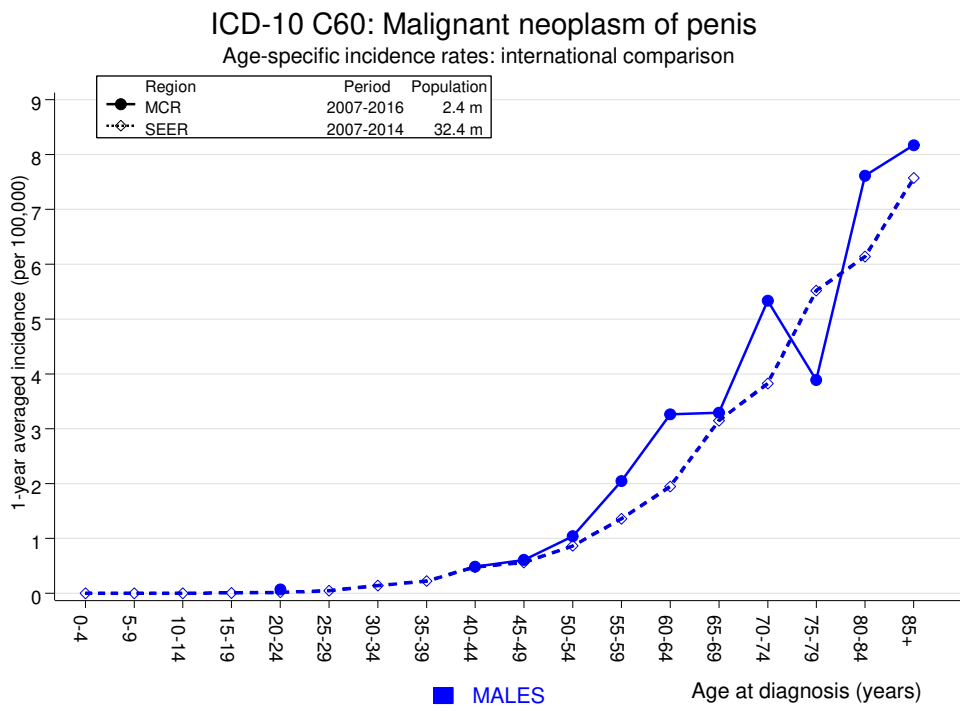


Figure 6a. Age-specific incidence in MCR registry areas compared to SEER (Surveillance, Epidemiology, and End Results, USA).

Reference:
 Surveillance, Epidemiology, and End Results (SEER) Program SEER*Stat Database: Incidence - SEER 18 Regs Research Data, released April 2014, based on the November 2013 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 1998–2016

Diagnosis	Observed n	Expected n	SIR	CI 95%	CI 95%	EAR	DCO %
C16 Stomach	2	1.0	2.0	0.2	7.1	7.5	
C18 Colon	7	2.4	2.9	1.2	6.0 #	35.2	
C19–C20 Rectum	3	1.3	2.4	0.5	6.9	13.3	
C25 Pancreas	2	0.9	2.2	0.3	8.0	8.4	
C33–C34 Lung	8	2.8	2.9	1.2	5.7 #	40.1	12.5
C61 Prostate	13	7.0	1.9	1.0	3.2	46.1	15.4
C64 Kidney	3	0.8	3.7	0.8	10.9	16.8	33.3
C67 Bladder	2	1.2	1.7	0.2	6.3	6.5	50.0
Others, specified	9	3.9	2.3	1.1	4.4 #	39.3	
Not observed	0	3.0	0.0	0.0	1.2	-23.0	
All further malignancies	49	24.2	2.0	1.5	2.7 #	190.2	10.2
Patients		418					
Median age at next malignancy (years)		72.0					
Person-years		1306					
Mean observation time (years)		3.1					
Median observation time (years)		1.5					

The occurrence of further malignancy listed is statistically significant.

Observed further malignancies with count 1 are pooled in category “Others, specified”.

Standardized incidence ratio (SIR) 2007 - 2016

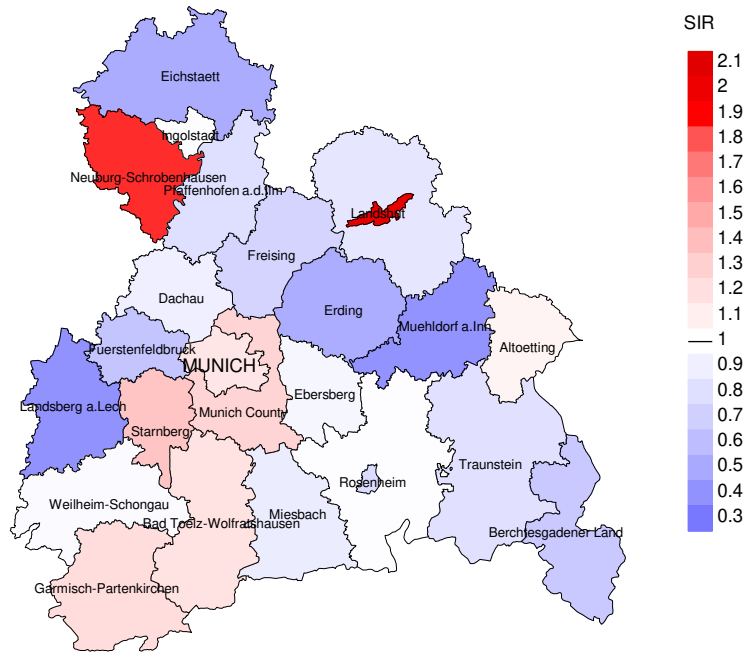


Figure 8b. Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2007 to 2016. According to their individual SIR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (N=298).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 65,063 male residents (averaged) in the period from 2007 to 2016 a total of 8 men were identified with newly diagnosed penile cancer. Therefore, the mean standardized incidence ratio (SIR) for this cancer type in this area can be calculated at 0.94. Though, the value of this parameter may vary with an underlying probability of 99% between 0.30 and 2.18, and is therefore not statistically striking.

MORTALITY

Table 9a

Annual cohorts: Incident cancers, follow-up status, proportion of DCO, deaths among the annual cohorts and proportion of available death certificates (with respect to registry area expansion from 2.65 to 4.10 m as of 2002, and from 4.10 to 4.81 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	11	100.0	9.1	10	90.9	90.0
1999	13	100.0		9	69.2	100.0
2000	9	77.8		5	55.6	100.0
2001	11	100.0	9.1	8	72.7	100.0
2002	27	88.9	3.7	17	63.0	94.1
2003	30	100.0	3.3	21	70.0	100.0
2004	19	89.5		14	73.7	92.9
2005	18	88.9	11.1	13	72.2	100.0
2006	21	81.0	4.8	13	61.9	84.6
2007	35	68.6	2.9	19	54.3	100.0
2008	28	67.9		16	57.1	100.0
2009	25	68.0	4.0	10	40.0	100.0
2010	43	58.1		17	39.5	100.0
2011	25	64.0	8.0	8	32.0	100.0
2012	39	71.8	7.7	15	38.5	100.0
2013	24	79.2		11	45.8	100.0
2014	29	79.3	3.4	9	31.0	100.0
2015	30	96.7	10.0	9	30.0	100.0
2016	20	55.0				
1998-2016	457	78.1	3.9	224	49.0	97.8

Table 9b

Annual cohorts of incident cancers and deaths, proportion of death certificates and cases deceased within the same year of being diagnosed with cancer (incl. DCO)

(with respect to registry area expansion from 2.65 to 4.10 m as of 2002, and from 4.10 to 4.81 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	11	8	100.0	2	18.2
1999	13	8	87.5	1	7.7
2000	9	3	100.0		
2001	11	9	100.0	1	9.1
2002	27	8	87.5	3	11.1
2003	30	11	90.9	5	16.7
2004	19	17	100.0	2	10.5
2005	18	16	100.0	3	16.7
2006	21	12	83.3	1	4.8
2007	35	21	95.2	6	17.1
2008	28	17	94.1	4	14.3
2009	25	15	100.0	2	8.0
2010	43	19	100.0	2	4.7
2011	25	24	100.0	4	16.0
2012	39	20	100.0	5	12.8
2013	24	15	100.0	3	12.5
2014	29	16	93.8	5	17.2
2015	30	18	100.0	5	16.7
2016	20	18	100.0		
1998-2016	457	275	97.1	54	11.8

Table 9c

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 2.65 to 4.10 m as of 2002,
and from 4.10 to 4.81 m as of 2007, respectively)

Year of death	Deaths n	Prop. cancer- related %	Prop. non-cancer- related %	Prop. cancer recorded on death certificate %
1998	8	50.0	50.0	75.0
1999	8	75.0	25.0	85.7
2000	3	66.7	33.3	100.0
2001	9	44.4	55.6	66.7
2002	8	37.5	62.5	71.4
2003	11	54.5	45.5	70.0
2004	17	47.1	52.9	70.6
2005	16	50.0	50.0	75.0
2006	12	50.0	50.0	70.0
2007	21	81.0	19.0	85.0
2008	17	58.8	41.2	81.3
2009	15	60.0	40.0	80.0
2010	19	68.4	31.6	73.7
2011	24	62.5	37.5	75.0
2012	20	45.0	55.0	70.0
2013	15	66.7	33.3	73.3
2014	16	50.0	50.0	80.0
2015	18	61.1	38.9	83.3
2016	18	66.7	33.3	72.2
1998-2016	275	58.5	41.5	76.0

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	8	78.4	76.2	81.2	76.2
1999	8	75.0	75.0	67.8	80.6
2000	3	49.9	51.8	46.9	49.9
2001	9	81.8	77.5	82.1	79.8
2002	8	74.7	75.5	73.8	75.5
2003	11	77.5	73.5	77.5	77.5
2004	17	80.9	73.0	83.9	81.1
2005	16	76.5	76.5	78.9	75.1
2006	12	77.7	69.6	81.5	72.3
2007	21	71.9	71.2	86.7	71.2
2008	17	80.6	79.3	82.5	75.8
2009	15	76.6	71.3	77.5	71.4
2010	19	73.9	73.0	80.8	73.4
2011	24	74.5	74.2	75.3	74.5
2012	20	75.6	74.6	79.3	75.6
2013	15	75.7	73.9	77.0	73.7
2014	16	72.5	69.1	81.0	72.5
2015	18	82.8	81.7	86.9	83.9
2016	18	78.0	74.8	80.7	75.3
1998-2016	275	76.6	73.8	79.6	74.8

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 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	4	0.4	0.36	0.2	0.33	0.3	0.36	0.6	0.40
1999	6	0.5	0.46	0.3	0.42	0.5	0.49	0.6	0.50
2000	2	0.2	0.22	0.1	0.34	0.2	0.28	0.2	0.22
2001	4	0.3	0.36	0.2	0.35	0.3	0.40	0.5	0.41
2002	3	0.2	0.11	0.1	0.09	0.1	0.11	0.2	0.13
2003	6	0.3	0.20	0.2	0.17	0.2	0.18	0.4	0.21
2004	8	0.4	0.42	0.2	0.42	0.3	0.43	0.5	0.43
2005	8	0.4	0.44	0.2	0.45	0.3	0.48	0.5	0.51
2006	6	0.3	0.29	0.2	0.28	0.3	0.30	0.3	0.29
2007	17	0.8	0.49	0.4	0.42	0.6	0.44	0.8	0.50
2008	10	0.4	0.36	0.2	0.31	0.3	0.35	0.5	0.39
2009	9	0.4	0.36	0.2	0.29	0.3	0.33	0.4	0.37
2010	13	0.6	0.30	0.3	0.27	0.4	0.27	0.5	0.29
2011	15	0.7	0.60	0.3	0.62	0.5	0.64	0.6	0.66
2012	9	0.4	0.23	0.2	0.22	0.3	0.23	0.4	0.22
2013	10	0.4	0.42	0.2	0.33	0.3	0.35	0.4	0.41
2014	8	0.3	0.28	0.2	0.29	0.3	0.29	0.3	0.28
2015	11	0.5	0.37	0.2	0.34	0.3	0.36	0.4	0.36
2016	12	0.5	0.60	0.2	0.45	0.3	0.51	0.4	0.60
1998-2016	161	0.4	0.35	0.2	0.32	0.3	0.34	0.4	0.36

Table 12

Age distribution of age at death (cancer-related) for period 2007-2016
(incl. multiple malignancies)

Age at death Years	Cases n	%	Cum.%
0-4			
5-9			
10-14			
15-19			
20-24			
25-29			
30-34			
35-39			
40-44	1	0.9	0.9
45-49	5	4.4	5.3
50-54	4	3.5	8.8
55-59	7	6.1	14.9
60-64	10	8.8	23.7
65-69	17	14.9	38.6
70-74	20	17.5	56.1
75-79	15	13.2	69.3
80-84	17	14.9	84.2
85+	18	15.8	100.0
All ages	114	100.0	

Table 13

Age-specific mortality (cancer-related) and proportion of all cancers
for period 2007-2016
(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	0.1	0.11	0.2
45-49	5	0.3	0.42	0.4
50-54	4	0.2	0.22	0.2
55-59	7	0.5	0.24	0.2
60-64	10	0.8	0.25	0.2
65-69	17	1.4	0.44	0.2
70-74	20	1.8	0.34	0.2
75-79	15	1.9	0.48	0.2
80-84	17	3.7	0.49	0.2
85+	18	5.9	0.72	0.3
All ages	114			0.2
Mortality				
Raw		0.5	0.38	
WS		0.2	0.35	
ES		0.4	0.37	
BRD-S		0.5	0.39	
PYLL-70				
per 100,000		2.1		
ES		1.7		
AYLL-70		9.4		

Table 14

Further malignancies in deaths in period 1998-2016

Diagnosis	Total n	Total %↓	Pre n	Pre ←%	Syn- chron ±30d n	Syn- chron ±30d ←%	Post n	Post ←%
	1	1.3	1	100.0				
C11 Nasopharynx	1	1.3					1	100.0
C15 Oesophagus	1	1.3					1	100.0
C16 Stomach	2	2.6					2	100.0
C18 Colon	6	7.8	5	83.3			1	16.7
C19-C20 Rectum	4	5.2	3	75.0			1	25.0
C21 Anus/canal	2	2.6	1	50.0			1	50.0
C22 Liver	1	1.3					1	100.0
C25 Pancreas	2	2.6					2	100.0
C33-C34 Lung	8	10.4	2	25.0	2	25.0	4	50.0
C43 Malign. melanoma	2	2.6	1	50.0	1	50.0		
C44 Skin others	6	7.8	4	66.7			2	33.3
C61 Prostate	21	27.3	16	76.2	2	9.5	3	14.3
C64 Kidney	4	5.2	2	50.0	1	25.0	1	25.0
C65 Renal pelvis	1	1.3	1	100.0				
C67 Bladder	6	7.8	3	50.0			3	50.0
C70-C72 CNS cancer	2	2.6					2	100.0
C73 Thyroid	1	1.3	1	100.0				
C76-C79 CUP	1	1.3	1	100.0				
C81 Hodgkin lymphoma	1	1.3	1	100.0				
C82-C85 NHL	4	5.2	2	50.0			2	50.0
All further malignancies	77	100.0	44	57.1	6	7.8	27	35.1

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 2007-2016
(**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	0.1	0.11	0.2
45-49	5	0.3	0.45	0.5
50-54	3	0.2	0.20	0.2
55-59	5	0.4	0.20	0.2
60-64	9	0.7	0.27	0.2
65-69	9	0.8	0.26	0.2
70-74	14	1.3	0.30	0.2
75-79	15	1.9	0.60	0.2
80-84	8	1.7	0.38	0.1
85+	8	2.6	0.53	0.2
All ages	77			0.2
Mortality				
Raw		0.3	0.33	
WS		0.2	0.30	
ES		0.2	0.31	
BRD-S		0.3	0.33	
PYLL-70				
per 100,000		1.7		
ES		1.4		
AYLL-70		10.8		

* See corresponding tables with multiple malignancies.

Table 16

Age-specific mortality (cancer-related) and proportion of all cancers
for period 2007-2016
(**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	0.1	0.11	0.2
45-49	4	0.2	0.44	0.4
50-54	3	0.2	0.21	0.2
55-59	5	0.4	0.22	0.2
60-64	5	0.4	0.18	0.1
65-69	9	0.8	0.30	0.2
70-74	12	1.1	0.28	0.2
75-79	11	1.4	0.50	0.2
80-84	8	1.7	0.47	0.2
85+	6	2.0	0.43	0.1
All ages	64			0.2
Mortality				
Raw		0.3	0.30	
WS		0.1	0.27	
ES		0.2	0.29	
BRD-S		0.3	0.31	
PYLL-70				
per 100,000		1.4		
ES		1.2		
AYLL-70		10.8		

* See corresponding tables with multiple malignancies.

ICD-10 C60: Malignant neoplasm of penis
Age distribution and age-specific mortality 2007 - 2016 (n=114)

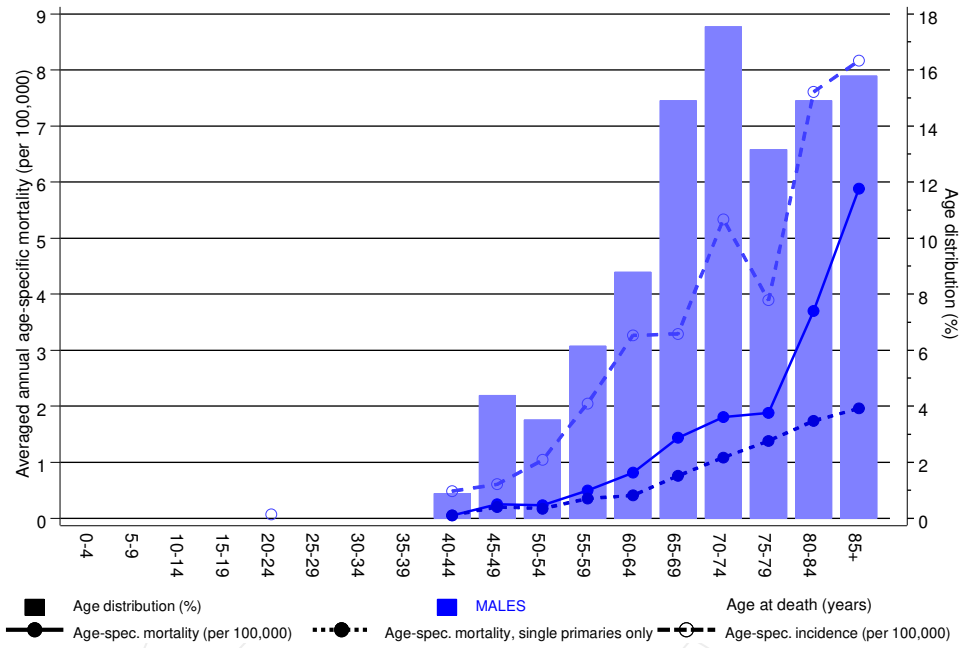


Figure 17. Distribution of age at death (bars; mean=69.3 yrs, median=69.1 yrs) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

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

Average mortality (world standard population) 2007 - 2016

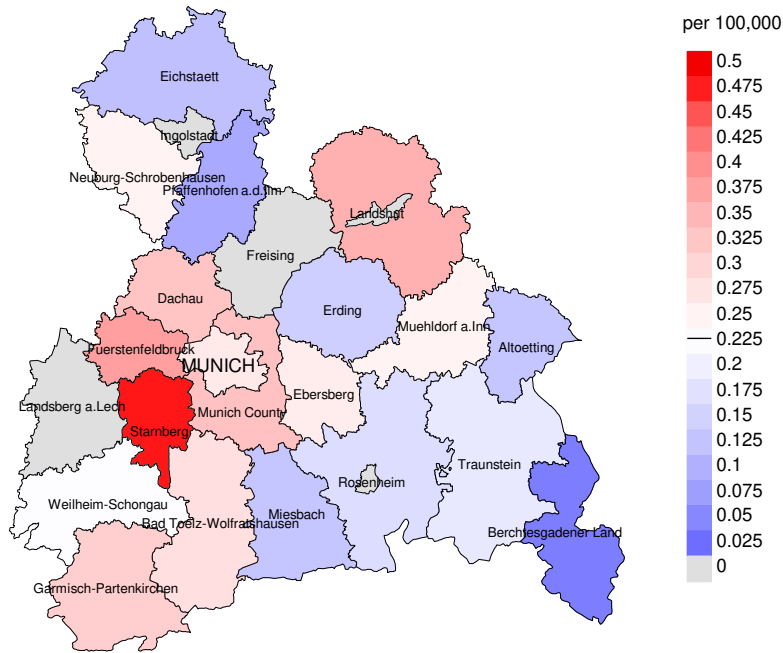


Figure 18a. Map of cancer mortality (world standard population) by county averaged for period 2007 to 2016. According to their individual mortality rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (0.2/100,000 WS N=114).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 65,063 male residents (averaged) in the period from 2007 to 2016 a total of 4 men died from penile cancer. Therefore, the mean mortality rate for this cancer type in this area can be calculated at 0.3/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 0.0 and 1.2/100,000.

Standardized mortality ratio (SMR) 2007 - 2016

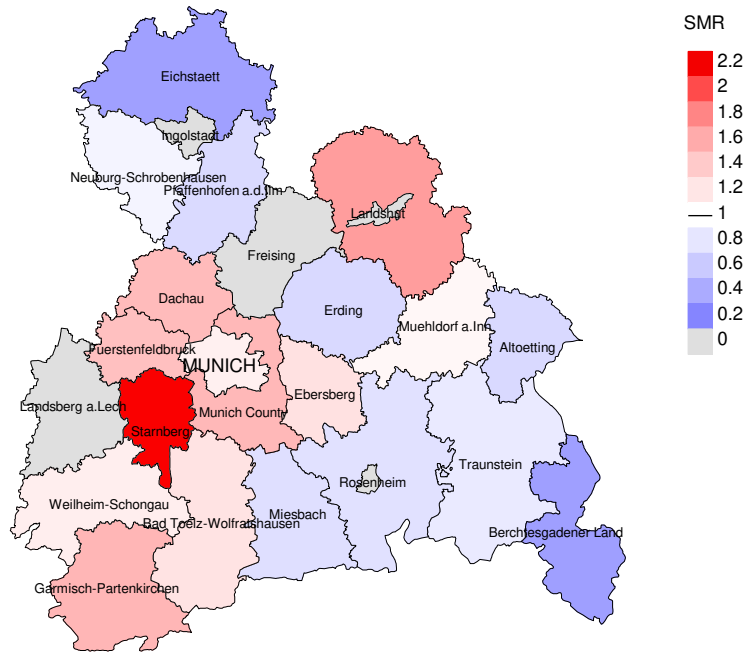


Figure 18b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2007 to 2016. According to their individual SMR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (N=114).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 65,063 male residents (averaged) in the period from 2007 to 2016 a total of 4 men died from penile cancer. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 1.24. Though, the value of this parameter may vary with an underlying probability of 99% between 0.21 and 3.89, 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

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 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 between mortality and incidence
FRG	Federal Republic of Germany

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