

# Munich Cancer Registry



- ▶ Survival
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- ▶ *Deutsch*

## ICD-10 C01: Base of tongue cancer

### Incidence and Mortality

Year of diagnosis	1998-2016
Patients	800
Diseases	802
Creation date	08/21/2018
Export date	08/09/2018
Population	4.81 m



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

[https://www.tumorregister-muenchen.de/en/facts/base/bC01\\_\\_E-ICD-10-C01-Base-of-tongue-cancer-incidence-and-mortality.pdf](https://www.tumorregister-muenchen.de/en/facts/base/bC01__E-ICD-10-C01-Base-of-tongue-cancer-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, August 2018

<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.

### Some remarks regarding this cancer type

As a general rule, these few results from the TRM form the basis of sophisticated analyses. For head and neck tumors this is not the case. Therefore the results for head and neck tumors should be interpreted with caution. In part this is due to problems of classification because of limited specific details of locality. Additionally, with advanced tumors in a close topographic location it is often not possible to determine the exact ICD localization of a tumor.

### Topography codes (ICD-O-3 2000) used for specifying cancer site

Code	Description
C01.9	Base of tongue, NOS

## INCIDENCE

Table 1

Cases with invasive cancer by year of diagnosis, proportions of DCO, further malignancies, deaths, and active follow-up (ALL PATIENTS) (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	15			20.0	13.2	80.0	100.0
1999	23	1	4.3	15.8	13.3	91.3	95.7
2000	13	1	7.7	17.6	12.9	84.6	100.0
2001	19	2	10.5	18.6	12.9	89.5	100.0
2002	33			14.6	12.8	81.8	93.9 #
2003	42	5	11.9	16.6	12.1	88.1	100.0
2004	49	4	8.2	14.4	10.4	75.5	93.9
2005	53	3	5.7	15.8	10.3	64.2	90.6
2006	50	2	4.0	16.8	9.6	70.0	94.0
2007	56	1	1.8	16.7	9.7	67.9	83.9 #
2008	56	4	7.1	16.9	9.1	71.4	80.4
2009	47			17.5	9.1	55.3	91.5
2010	57	1	1.8	17.7	8.2	61.4	84.2
2011	67	2	3.0	18.1	8.8	50.7	79.1
2012	54	1	1.9	19.1	7.1	44.4	81.5
2013	59	1	1.7	18.8	7.5	44.1	69.5
2014	53	1	1.9	18.9	9.6	45.3	81.1
2015	40	2	5.0	18.8	7.7	40.0	97.5
2016	16			19.1	18.8	18.8	68.8 ##
1998-2016	802	31	3.9	19.1	13.2	62.0	86.9

802 cases diagnosed 1998-2016 are related to a total of 800 patients. Currently, in 257 (32.1 %) of these 800 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 198 / 43 / 16 (24.8 % / 5.4 % / 2.0 %) 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 53 cases has been diagnosed, of which 18.9 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 9.6 % 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 1a

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

Year of diagnosis	Males n	Males %	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	73.3			27.3	14.1	90.9	100.0
1999	18	78.3			17.2	14.2	88.9	94.4
2000	9	69.2	1	11.1	18.4	13.5	88.9	100.0
2001	12	63.2	1	8.3	18.0	13.6	83.3	100.0
2002	26	78.8			14.5	13.5	80.8	92.3 #
2003	37	88.1	3	8.1	17.7	13.0	89.2	100.0
2004	33	67.3	3	9.1	15.8	11.2	69.7	90.9
2005	40	75.5	3	7.5	16.1	11.1	60.0	92.5
2006	37	74.0	2	5.4	17.0	10.3	78.4	97.3
2007	45	80.4			17.5	10.4	73.3	84.4 #
2008	43	76.8	3	7.0	18.3	10.0	76.7	86.0
2009	32	68.1			19.2	10.1	62.5	93.8
2010	41	71.9	1	2.4	19.3	9.3	61.0	82.9
2011	51	76.1	1	2.0	19.3	10.1	54.9	80.4
2012	43	79.6	1	2.3	20.3	7.6	48.8	76.7
2013	46	78.0	1	2.2	19.5	8.5	41.3	73.9
2014	39	73.6	1	2.6	19.7	11.1	43.6	84.6
2015	24	60.0	2	8.3	19.6	8.8	37.5	100.0
2016	12	75.0			20.0	16.7	8.3	66.7 ##
1998-2016	599	74.7	23	3.8	20.0	14.1	63.4	87.6

599 cases diagnosed 1998-2016 are related to a total of 598 patients. Currently, in 198 (33.1 %) of these 598 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 148 / 36 / 14 (24.7 % / 6.0 % / 2.3 %) 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 retrieved from the respective headings.

How to interpret:

In 2014, a subgroup of 39 cases has been diagnosed, of which 19.7 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 11.1 % 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 1b

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

Year of diagnosis	Females n	Females %	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	4	26.7			0.0	10.5	50.0	100.0
1999	5	21.7	1	20.0	11.1	10.7	100.0	100.0
2000	4	30.8			15.4	11.0	75.0	100.0
2001	7	36.8	1	14.3	20.0	10.7	100.0	100.0
2002	7	21.2			14.8	10.5	85.7	100.0 #
2003	5	11.9	2	40.0	12.5	9.1	80.0	100.0
2004	16	32.7	1	6.3	10.4	8.2	87.5	100.0
2005	13	24.5			14.8	7.6	76.9	84.6
2006	13	26.0			16.2	7.6	46.2	84.6
2007	11	19.6	1	9.1	14.1	7.6	45.5	81.8 #
2008	13	23.2	1	7.7	12.2	6.4	53.8	61.5
2009	15	31.9			12.4	6.2	40.0	86.7
2010	16	28.1			13.2	4.8	62.5	87.5
2011	16	23.9	1	6.3	14.5	4.5	37.5	75.0
2012	11	20.4			15.4	5.7	27.3	100.0
2013	13	22.0			16.6	4.7	53.8	53.8
2014	14	26.4			16.4	6.3	50.0	71.4
2015	16	40.0			16.6	5.6	43.8	93.8
2016	4	25.0			16.3	25.0	50.0	75.0 ##
1998-2016	203	25.3	8	3.9	16.3	10.5	57.6	84.7

203 cases diagnosed 1998-2016 are related to a total of 202 patients. Currently, in 59 (29.2 %) of these 202 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 50 / 7 / 2 (24.8 % / 3.5 % / 1.0 %) 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 14 cases has been diagnosed, of which 16.4 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 6.3 % 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	Males n	Females n	Males Inc. raw	Fem. Inc. raw	Males Inc. WS	Fem. Inc. WS	Males Inc. ES	Fem. Inc. ES	Males Inc. BRD-S	Fem. Inc. BRD-S
1998	11	4	1.0	0.3	0.7	0.2	0.9	0.2	1.0	0.3
1999	18	5	1.6	0.4	1.1	0.2	1.4	0.3	1.5	0.4
2000	9	4	0.8	0.3	0.5	0.2	0.7	0.3	0.9	0.3
2001	12	7	1.0	0.6	0.7	0.3	1.0	0.4	1.1	0.5
2002	26	7	1.4	0.4	0.9	0.2	1.3	0.3	1.4	0.3
2003	37	5	2.0	0.3	1.2	0.1	1.7	0.2	2.0	0.2
2004	33	16	1.8	0.8	1.0	0.4	1.4	0.6	1.6	0.7
2005	40	13	2.1	0.7	1.4	0.3	1.9	0.5	2.1	0.6
2006	37	13	1.9	0.6	1.2	0.4	1.7	0.5	1.9	0.6
2007	45	11	2.0	0.5	1.3	0.3	1.8	0.4	1.9	0.5
2008	43	13	1.9	0.6	1.2	0.3	1.7	0.4	1.9	0.5
2009	32	15	1.4	0.6	0.8	0.3	1.2	0.5	1.4	0.5
2010	41	16	1.8	0.7	1.0	0.3	1.5	0.5	1.7	0.6
2011	51	16	2.3	0.7	1.3	0.3	1.8	0.5	2.1	0.6
2012	43	11	1.9	0.5	1.1	0.3	1.5	0.4	1.7	0.4
2013	46	13	2.0	0.5	1.1	0.3	1.6	0.4	1.8	0.5
2014	39	14	1.7	0.6	1.0	0.3	1.4	0.4	1.6	0.5
2015	24	16	1.0	0.7	0.5	0.3	0.7	0.4	0.9	0.5
2016	12	4	0.5	0.2	0.3	0.1	0.4	0.1	0.5	0.1
1998-2016	599	203	1.6	0.5	1.0	0.3	1.4	0.4	1.5	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 (ALL PATIENTS)  
(incl. DCO)

Year of diagnosis	Cases n	Std.		Min.	Max.	10%	25%	Median		
		Mean	dev.					50%	75%	90%
1998	15	56.9	13.1	31.1	78.2	44.9	47.3	57.2	67.5	77.8
1999	23	59.1	9.1	40.4	74.9	48.5	52.2	60.5	64.7	70.5
2000	13	60.3	14.0	35.9	78.3	42.5	47.6	65.5	68.7	78.2
2001	19	63.2	13.6	48.6	92.5	49.0	50.6	61.3	71.2	85.1
2002	33	60.5	9.0	43.8	81.5	50.3	54.8	58.2	65.1	72.1
2003	42	63.1	9.1	45.1	83.3	52.1	56.0	62.7	69.4	76.9
2004	49	63.6	10.0	38.6	93.3	52.0	58.2	62.5	69.5	75.4
2005	53	61.3	13.4	4.1	87.2	50.1	54.8	61.1	65.9	78.5
2006	50	60.9	12.0	19.0	84.8	45.9	53.4	61.4	68.7	76.3
2007	56	58.2	10.2	35.2	86.1	45.0	52.6	58.0	63.7	70.5
2008	56	63.7	10.2	38.3	87.7	50.1	56.2	62.7	71.1	77.4
2009	47	63.6	10.8	36.7	87.3	48.0	57.0	63.0	72.6	76.2
2010	57	64.5	11.1	38.0	92.1	50.0	57.6	65.9	71.1	77.9
2011	67	64.5	10.9	40.0	93.8	49.9	56.5	64.1	72.0	77.5
2012	54	62.5	10.8	39.8	87.9	49.7	53.6	62.1	70.1	76.3
2013	59	63.6	10.3	48.9	91.0	50.6	55.3	63.0	69.5	78.8
2014	53	63.7	10.3	47.4	93.5	50.1	56.3	62.4	70.9	79.6
2015	40	69.8	13.9	28.5	93.2	54.1	59.5	68.7	80.5	88.9
2016	16	64.8	8.8	47.8	79.6	51.6	60.6	64.6	69.9	77.3
1998-2016	802	62.8	11.2	4.1	93.8	49.6	55.6	62.3	70.1	77.4

Table 3a

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

Year of diagnosis	Cases n	Std.		Min.	Max.	10%	25%	Median		
		Mean	dev.					50%	75%	90%
1998	11	56.2	10.8	44.9	78.2	45.7	47.3	52.5	60.4	72.2
1999	18	56.9	8.8	40.4	72.5	43.1	50.5	58.4	63.4	70.5
2000	9	59.7	15.8	35.9	78.3	35.9	47.6	59.2	73.3	78.3
2001	12	61.1	12.1	48.6	85.1	49.0	50.4	59.2	68.2	78.7
2002	26	59.7	8.4	43.8	80.2	48.0	54.6	58.2	64.2	70.8
2003	37	62.3	8.9	45.1	83.3	50.6	56.0	62.4	66.7	76.9
2004	33	62.9	8.8	38.6	80.3	54.8	58.9	62.5	68.3	72.5
2005	40	59.5	14.1	4.1	87.1	46.3	52.9	59.8	65.6	78.2
2006	37	61.8	10.4	38.7	84.8	47.5	55.3	61.3	67.0	77.4
2007	45	59.0	10.2	37.1	86.1	45.6	55.4	58.9	64.5	72.5
2008	43	63.5	9.6	38.3	85.9	52.5	56.5	62.4	71.1	76.3
2009	32	62.4	10.8	36.7	81.1	48.0	56.3	62.4	71.4	76.2
2010	41	63.7	11.9	38.0	92.1	50.0	56.5	64.8	70.7	78.7
2011	51	63.9	10.6	40.0	86.5	49.9	55.0	64.6	71.0	76.5
2012	43	62.9	10.8	39.8	87.9	49.7	53.6	62.1	70.6	76.3
2013	46	63.6	10.2	48.9	91.0	50.6	55.3	61.7	69.7	77.4
2014	39	62.7	10.4	47.4	93.5	49.5	56.0	60.6	69.7	81.8
2015	24	69.7	15.7	28.5	93.2	49.8	56.8	70.4	81.4	88.8
2016	12	64.1	8.8	47.8	77.3	51.6	60.6	64.2	69.2	76.4
1998-2016	599	62.2	11.0	4.1	93.5	49.5	55.1	61.6	69.3	77.1



Table 3b

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

Year of diagnosis	Cases n	Mean	Std. dev.	Min.	Max.	Median				
						10%	25%	50%	75%	90%
1998	4	58.8	20.0	31.1	77.8	31.1	45.0	63.2	72.6	77.8
1999	5	66.9	6.0	59.0	74.9	59.0	64.3	66.3	70.0	74.9
2000	4	61.8	10.6	46.0	68.2	46.0	55.7	66.5	67.9	68.2
2001	7	66.8	16.2	50.2	92.5	50.2	50.6	63.0	83.0	92.5
2002	7	63.3	11.4	50.3	81.5	50.3	55.2	58.3	73.9	81.5
2003	5	68.8	9.6	53.1	77.3	53.1	68.5	69.4	75.7	77.3
2004	16	65.3	12.2	48.0	93.3	50.3	56.4	62.1	74.7	81.4
2005	13	66.9	9.3	57.1	87.2	57.2	60.9	64.4	72.9	79.3
2006	13	58.1	15.9	19.0	76.4	45.9	48.1	65.4	70.1	71.3
2007	11	54.5	9.8	35.2	70.5	45.0	47.5	57.9	61.3	62.0
2008	13	64.2	12.6	45.6	87.7	49.7	53.4	64.5	74.7	77.4
2009	15	66.2	10.6	45.8	87.3	54.2	57.8	66.8	73.7	75.6
2010	16	66.5	8.7	47.1	77.9	53.4	60.6	67.8	73.2	77.8
2011	16	66.3	12.2	48.6	93.8	54.5	56.7	62.3	72.9	84.0
2012	11	60.7	11.0	45.5	83.5	50.0	52.7	57.5	68.4	71.1
2013	13	63.7	10.9	49.4	85.2	50.0	55.0	64.1	69.5	78.9
2014	14	66.3	9.8	48.9	79.9	51.1	63.2	66.1	72.9	79.6
2015	16	69.9	11.2	53.3	89.4	55.8	62.4	68.1	75.8	89.0
2016	4	66.7	9.8	55.7	79.6	55.7	60.2	65.8	73.3	79.6
1998-2016	203	64.5	11.7	19.0	93.8	50.0	57.0	65.2	72.6	78.3

Table 4

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

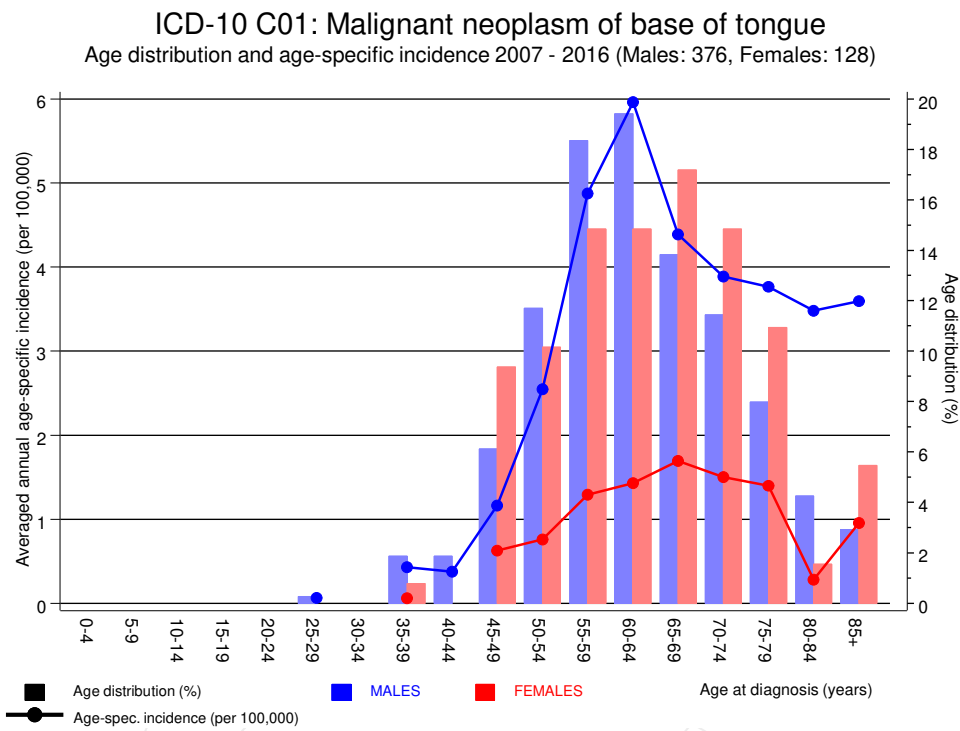
Age at diagnosis Years	Cases n	Males			Females				
		%	Cum.%	n	%	Cum.%	n	%	Cum.%
0-4									
5-9									
10-14									
15-19									
20-24									
25-29	1	0.2	0.2	1	0.3	0.3			0.0
30-34	0	0.0	0.2			0.3			0.0
35-39	8	1.6	1.8	7	1.9	2.1	1	0.8	0.8
40-44	7	1.4	3.2	7	1.9	4.0			0.8
45-49	35	6.9	10.1	23	6.1	10.1	12	9.3	10.1
50-54	57	11.3	21.4	44	11.7	21.8	13	10.1	20.2
55-59	88	17.4	38.8	69	18.4	40.2	19	14.7	34.9
60-64	92	18.2	57.0	73	19.4	59.6	19	14.7	49.6
65-69	75	14.9	71.9	52	13.8	73.4	23	17.8	67.4
70-74	62	12.3	84.2	43	11.4	84.8	19	14.7	82.2
75-79	44	8.7	92.9	30	8.0	92.8	14	10.9	93.0
80-84	18	3.6	96.4	16	4.3	97.1	2	1.6	94.6
85+	18	3.6	100.0	11	2.9	100.0	7	5.4	100.0
All ages	505	100.0		376	100.0		129	100.0	

Table 5

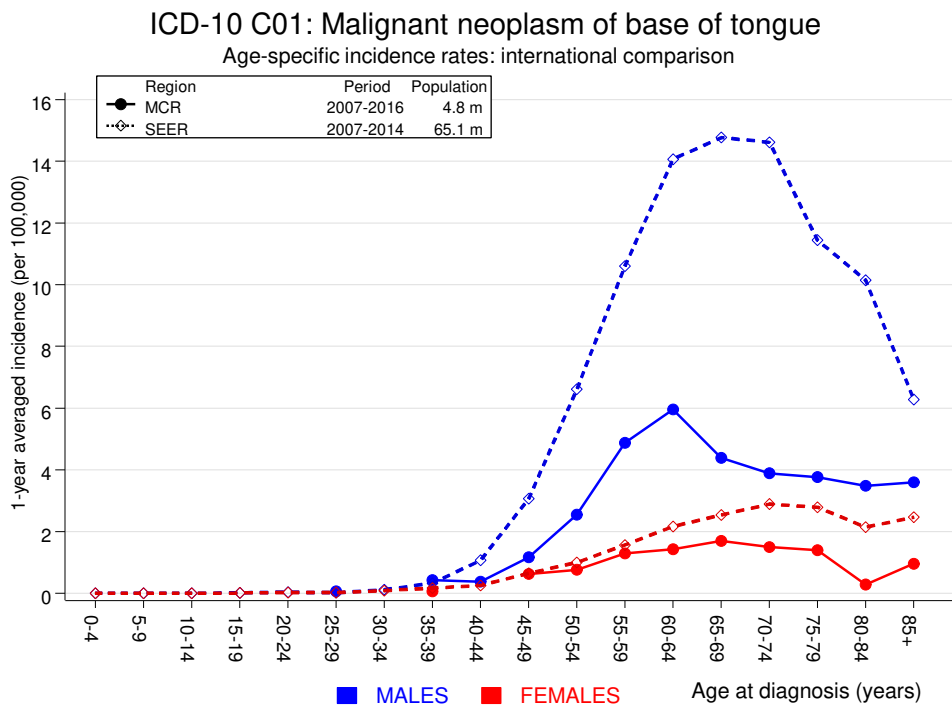
Age-specific incidence, DCO rate and proportion of all cancers for period 2007-2016

Age at diagnosis Years	Males n	Females n	Males Age- spec. incid.	Females Age- spec. incid.	Males DCO rate n=10 %	Females DCO rate n=3 %	Males	Females
							Prop.all cancers n=113978 %	Prop.all cancers n=112253 %
0- 4								
5- 9								
10-14								
15-19								
20-24								
25-29	1		0.1				0.1	
30-34								
35-39	7	1	0.4	0.1			0.5	0.0
40-44	7		0.4				0.3	
45-49	23	12	1.2	0.6			0.6	0.2
50-54	44	13	2.5	0.8			0.7	0.1
55-59	69	19	4.9	1.3	1.4		0.7	0.2
60-64	73	19	6.0	1.4	2.7		0.6	0.2
65-69	52	22	4.4	1.7	3.8		0.3	0.2
70-74	43	19	3.9	1.5	2.3	10.5	0.2	0.1
75-79	30	14	3.8	1.4	6.7		0.2	0.1
80-84	16	2	3.5	0.3	6.3		0.1	0.0
85+	11	7	3.6	1.0	9.1	14.3	0.1	0.1
All ages	376	128			2.7	2.3	0.3	0.1
Incidence								
Raw			1.6	0.5				
WS			1.0	0.3				
ES			1.3	0.4				
BRD-S			1.5	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 (males: mean=63.2 yrs, median=62.3 yrs; females: mean=64.8 yrs, median=64.9 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 7a

Standardized incidence ratio (SIR, with 95% confidence limits),  
excess absolute risk (EAR) and DCO rate of further malignancies  
for period 1998–2016

## MALES

Diagnosis	Observed	Expected	SIR	CI		EAR	DCO %
	n	n		95%	95%		
C03–C06 Oral cavity	8	0.2	34.8	15.0	68.5 #	48.7	
C09–C10 Oropharynx	4	0.3	13.2	3.6	33.7 #	23.2	
C12–C13 Hypopharynx	6	0.2	37.7	13.8	82.0 #	36.6	
C15 Oesophagus	6	0.5	13.3	4.9	29.0 #	34.8	16.7
C18 Colon	4	1.8	2.2	0.6	5.6	13.6	
C19–C20 Rectum	2	1.1	1.7	0.2	6.3	5.4	
C22 Liver	2	0.6	3.3	0.4	11.9	8.7	50.0
C32 Larynx	6	0.2	24.3	8.9	52.9 #	36.1	66.7
C33–C34 Lung	24	2.5	9.6	6.1	14.3 #	134.8	16.7
C43 Malign. melanoma	2	1.0	2.1	0.2	7.4	6.5	
C46,C49 Soft tissue	2	0.1	16.7	2.0	60.4 #	11.8	
C61 Prostate	9	5.7	1.6	0.7	3.0	20.6	
C64 Kidney	5	0.8	6.6	2.1	15.4 #	26.6	
C67 Bladder	4	0.8	4.8	1.3	12.2 #	19.8	
C82–C85 NHL	3	0.8	3.7	0.8	10.8	13.7	
C91–C96 Leukaemia	3	0.3	9.7	2.0	28.5 #	16.9	33.3
Others, specified	8	2.3	3.4	1.5	6.8 #	35.5	12.5
Not observed	0	1.4	0.0	0.0	2.6	–9.0	
All further malignancies	98	20.7	4.7	3.8	5.8 #	484.4	12.2
Patients		569					
Median age at next malignancy (years)		64.8					
Person-years		1595					
Mean observation time (years)		2.8					
Median observation time (years)		1.6					

# The occurrence of further malignancy listed is statistically significant.

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

Table 7b

Standardized incidence ratio (SIR, with 95% confidence limits),  
excess absolute risk (EAR) and DCO rate of further malignancies  
for period 1998–2016

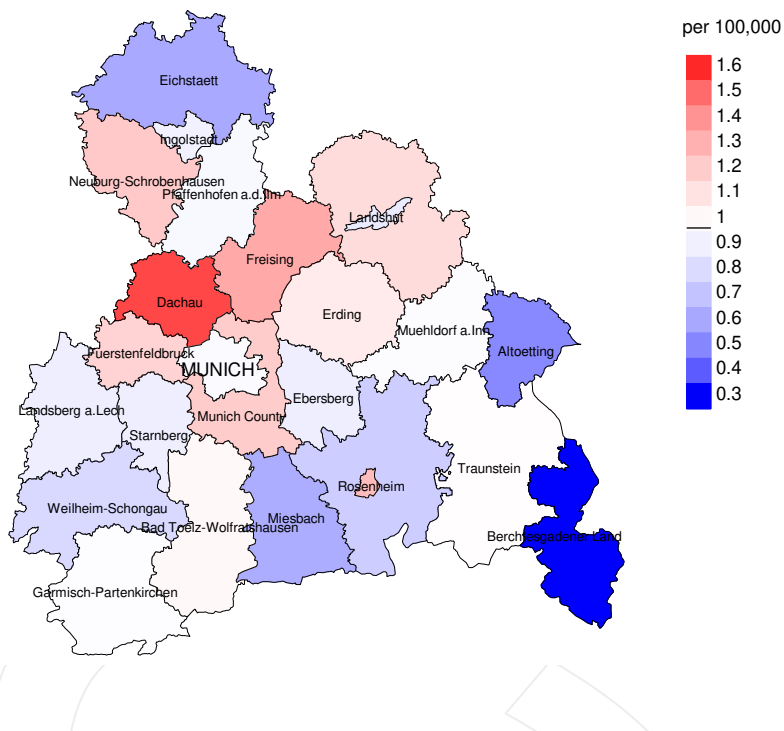
## FEMALES

Diagnosis	Observed n	Expected n	SIR	CI 95%	CI 95%	EAR	DCO %
C03–C06 Oral cavity	3	0.0	73.7	15.2	215.4 #	47.0	
C09–C10 Oropharynx	3	0.0	96.8	20.0	282.9 #	47.1	
C12–C13 Hypopharynx	2	0.0	233.1	28.2	842.1 #	31.6	
C15 Oesophagus	2	0.0	46.7	5.7	168.8 #	31.1	
C19–C20 Rectum	2	0.3	7.7	0.9	27.8	27.6	
C32 Larynx	2	0.0	150.6	18.2	544.0 #	31.5	50.0
C33–C34 Lung	8	0.5	15.6	6.7	30.7 #	118.9	37.5
C50 Breast	3	2.1	1.4	0.3	4.2	14.4	33.3
C53 Cervix uteri	2	0.1	22.3	2.7	80.5 #	30.3	
Others, specified	4	0.7	5.4	1.5	13.8 #	51.7	
Not observed	0	2.8	0.0	0.0	1.3	-44.5	
All further malignancies	31	6.6	4.7	3.2	6.6 #	386.8	16.1
Patients		190					
Median age at next malignancy (years)		65.2					
Person-years		630					
Mean observation time (years)		3.3					
Median observation time (years)		1.7					

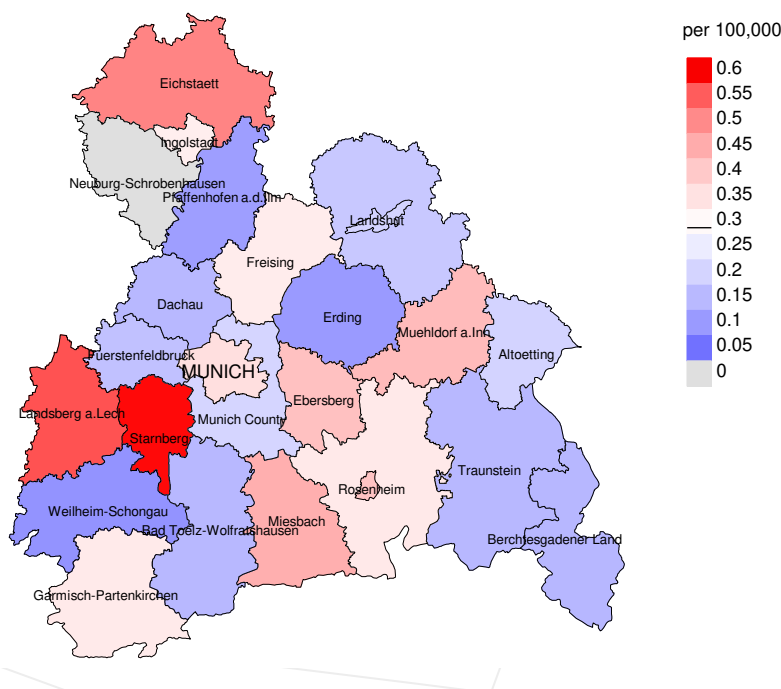
# The occurrence of further malignancy listed is statistically significant.

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

Average incidence (world standard population) 2007 - 2016: Males



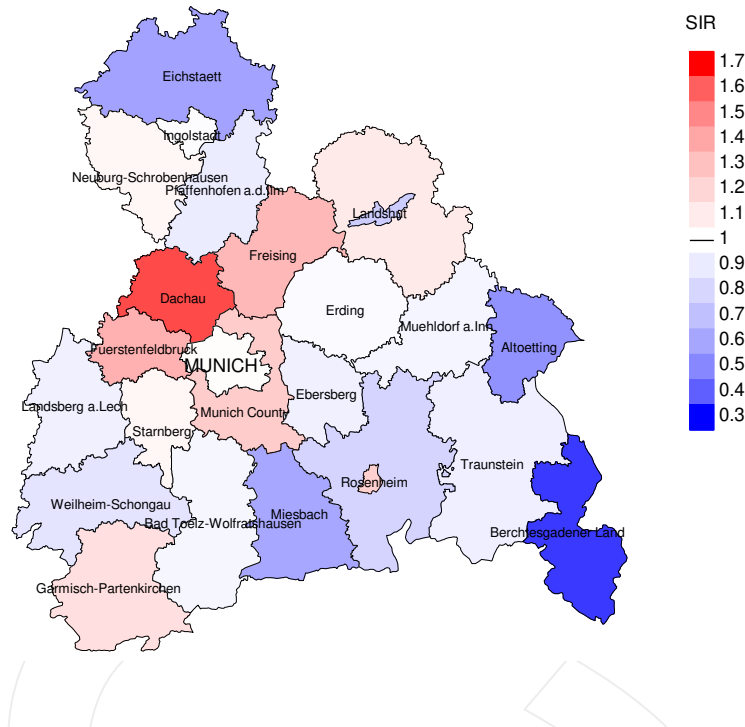
Average incidence (world standard population) 2007 - 2016: Females



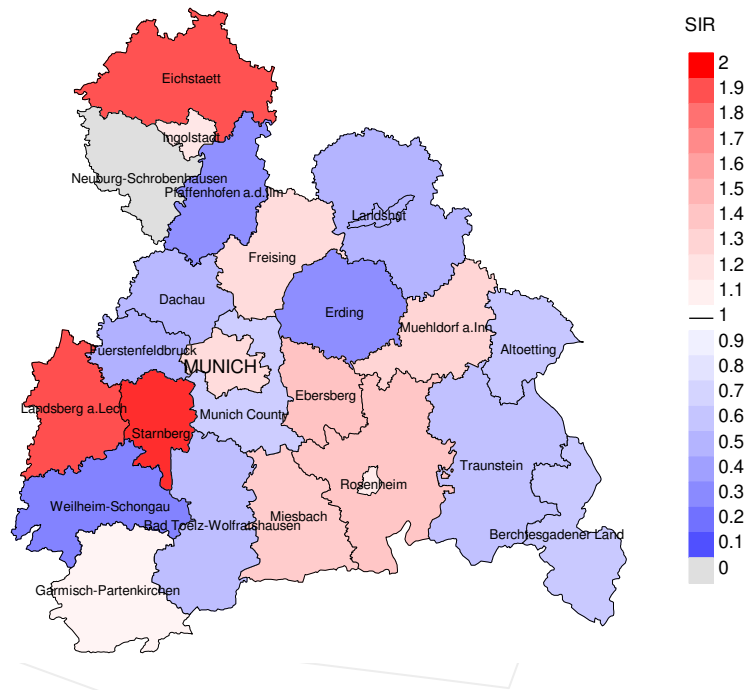
**Figure 8a.** Map of cancer incidence (world standard population, incl. DCO cases) by county averaged for period 2007 to 2016. According to their individual incidence rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (males 1.0/100,000 WS N=376, females 0.3/100,000 WS N=128).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 66,416 female residents (averaged) in the period from 2007 to 2016 a total of 5 women were identified with newly diagnosed base of tongue cancer. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 0.4/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 0.1 and 1.5/100,000.

Standardized incidence ratio (SIR) 2007 - 2016: Males



Standardized incidence ratio (SIR) 2007 - 2016: Females



**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 (males N=376, females N=128).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 66,416 female residents (averaged) in the period from 2007 to 2016 a total of 5 women were identified with newly diagnosed base of tongue cancer. Therefore, the mean standardized incidence ratio (SIR) for this cancer type in this area can be calculated at 1.41. Though, the value of this parameter may vary with an underlying probability of 99% between 0.30 and 3.99, 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	15	100.0		12	80.0	100.0
1999	23	95.7	4.3	21	91.3	90.5
2000	13	100.0	7.7	11	84.6	100.0
2001	19	100.0	10.5	17	89.5	94.1
2002	33	93.9		27	81.8	96.3
2003	42	100.0	11.9	37	88.1	94.6
2004	49	93.9	8.2	37	75.5	100.0
2005	53	90.6	5.7	34	64.2	100.0
2006	50	94.0	4.0	35	70.0	97.1
2007	56	83.9	1.8	38	67.9	100.0
2008	56	80.4	7.1	40	71.4	100.0
2009	47	91.5		26	55.3	100.0
2010	57	84.2	1.8	35	61.4	100.0
2011	67	79.1	3.0	34	50.7	94.1
2012	54	81.5	1.9	24	44.4	100.0
2013	59	69.5	1.7	26	44.1	100.0
2014	53	81.1	1.9	24	45.3	91.7
2015	40	97.5	5.0	16	40.0	93.8
2016	16	68.8		3	18.8	100.0
1998-2016	802	86.9	3.9	497	62.0	97.6

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	15	12	91.7	1	6.7
1999	23	11	90.9	2	8.7
2000	13	18	100.0	3	23.1
2001	19	16	93.8	4	21.1
2002	33	20	100.0		
2003	42	24	91.7	10	23.8
2004	49	29	100.0	10	20.4
2005	53	26	100.0	7	13.2
2006	50	47	97.9	12	24.0
2007	56	32	96.9	7	12.5
2008	56	30	96.7	12	21.4
2009	47	34	100.0	4	8.5
2010	57	39	100.0	10	17.5
2011	67	46	100.0	6	9.0
2012	54	39	97.4	4	7.4
2013	59	37	100.0	8	13.6
2014	53	45	100.0	9	17.0
2015	40	46	100.0	11	27.5
2016	16	32	100.0	3	18.8
1998-2016	802	583	98.5	123	15.3

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	12	75.0	25.0	90.9
1999	11	72.7	27.3	90.0
2000	18	66.7	33.3	72.2
2001	16	75.0	25.0	93.3
2002	20	95.0	5.0	100.0
2003	24	62.5	37.5	90.9
2004	29	93.1	6.9	96.6
2005	26	96.2	3.8	96.2
2006	47	89.4	10.6	95.7
2007	32	78.1	21.9	90.3
2008	30	83.3	16.7	96.6
2009	34	85.3	14.7	91.2
2010	39	87.2	12.8	94.9
2011	46	84.8	15.2	89.1
2012	39	79.5	20.5	92.1
2013	37	86.5	13.5	91.9
2014	45	86.7	13.3	88.9
2015	46	76.1	23.9	84.8
2016	32	68.8	31.3	87.5
1998-2016	583	82.3	17.7	91.3

Table 10a

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

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	63.2	61.8	65.7	62.1
1999	8	62.6	59.6	64.2	59.6
2000	16	65.7	61.8	70.4	61.5
2001	12	61.0	58.6	76.6	60.1
2002	15	60.5	56.3	67.3	60.5
2003	21	62.6	63.2	56.5	63.2
2004	23	63.1	62.7	86.1	62.7
2005	19	64.0	63.5	70.1	63.5
2006	33	66.2	66.1	72.2	66.1
2007	25	62.2	62.2	62.7	64.2
2008	25	61.0	61.2	59.2	60.7
2009	28	63.8	62.5	66.4	63.8
2010	28	65.0	65.6	61.8	65.0
2011	38	66.5	64.4	75.8	65.0
2012	31	70.1	68.2	70.7	66.3
2013	24	67.6	65.7	69.4	66.2
2014	33	67.1	65.6	77.6	66.7
2015	35	69.5	66.7	76.7	67.9
2016	21	76.9	76.5	81.6	76.1
1998–2016	443	65.2	64.6	69.4	64.8

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 10b

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

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	4	63.2	52.8	85.2	63.2
1999	3	58.4	55.9	70.0	58.4
2000	2	71.4	71.4		71.4
2001	4	74.4	59.3	84.7	71.9
2002	5	71.9	71.9		71.9
2003	3	52.1	85.4	51.8	68.4
2004	6	65.2	61.3	81.6	65.2
2005	7	62.1	62.1		62.1
2006	14	65.0	65.0		65.0
2007	7	74.2	72.1	74.2	69.3
2008	5	66.7	58.3	71.9	62.5
2009	6	60.7	61.4	60.0	61.4
2010	11	72.7	67.7	76.0	70.6
2011	8	72.4	70.7	85.4	70.7
2012	8	67.0	65.0	72.3	65.3
2013	13	76.9	73.0	92.1	73.0
2014	12	69.3	68.0	79.1	68.0
2015	11	65.5	65.1	71.3	65.5
2016	11	78.6	74.9	87.4	72.6
1998-2016	140	68.7	66.4	77.0	67.1

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 11a

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

MALES

Year of death	Deaths n	Mort. raw	MI-Index raw	Mort. WS	MI-Index WS	Mort. ES	MI-Index ES	Mort. BRD-S	MI-Index BRD-S
1998	6	0.5	0.55	0.4	0.53	0.4	0.49	0.5	0.48
1999	6	0.5	0.33	0.3	0.32	0.5	0.33	0.5	0.33
2000	10	0.9	1.11	0.5	1.02	0.8	1.08	1.1	1.28
2001	10	0.9	0.83	0.6	0.83	0.8	0.79	0.8	0.72
2002	14	0.8	0.54	0.5	0.55	0.7	0.56	0.9	0.65
2003	14	0.7	0.39	0.5	0.38	0.6	0.38	0.7	0.36
2004	22	1.2	0.67	0.7	0.68	1.0	0.69	1.2	0.76
2005	18	1.0	0.45	0.6	0.39	0.8	0.42	0.9	0.45
2006	28	1.5	0.76	0.8	0.70	1.2	0.70	1.4	0.73
2007	21	0.9	0.47	0.6	0.44	0.8	0.45	0.9	0.47
2008	22	1.0	0.51	0.6	0.49	0.8	0.49	0.9	0.48
2009	24	1.1	0.75	0.6	0.74	0.9	0.74	1.0	0.72
2010	26	1.2	0.63	0.6	0.62	0.9	0.63	1.1	0.66
2011	32	1.4	0.63	0.8	0.63	1.2	0.65	1.4	0.66
2012	26	1.1	0.60	0.6	0.53	0.9	0.57	1.0	0.59
2013	21	0.9	0.46	0.5	0.43	0.7	0.43	0.9	0.47
2014	28	1.2	0.72	0.6	0.64	0.9	0.67	1.1	0.68
2015	27	1.1	1.13	0.6	1.19	0.9	1.19	1.0	1.11
2016	14	0.6	1.17	0.2	0.77	0.4	0.92	0.5	1.11
1998-2016	369	1.0	0.62	0.6	0.58	0.8	0.60	1.0	0.63

Table 11b

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

FEMALES

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	3	0.3	0.75	0.2	1.00	0.2	0.94	0.3	0.90
1999	2	0.2	0.40	0.1	0.47	0.2	0.48	0.2	0.41
2000	2	0.2	0.50	0.1	0.27	0.1	0.31	0.1	0.42
2001	2	0.2	0.29	0.1	0.40	0.2	0.35	0.2	0.37
2002	5	0.3	0.71	0.1	0.60	0.2	0.59	0.2	0.68
2003	1	0.1	0.20	0.0	0.09	0.0	0.11	0.0	0.11
2004	5	0.3	0.31	0.2	0.35	0.2	0.33	0.2	0.33
2005	7	0.4	0.54	0.2	0.64	0.3	0.64	0.3	0.61
2006	14	0.7	1.08	0.4	0.83	0.5	0.95	0.6	0.94
2007	4	0.2	0.36	0.1	0.24	0.1	0.25	0.1	0.28
2008	3	0.1	0.23	0.1	0.25	0.1	0.25	0.1	0.24
2009	5	0.2	0.33	0.1	0.39	0.2	0.36	0.2	0.37
2010	8	0.3	0.50	0.2	0.51	0.3	0.51	0.3	0.50
2011	7	0.3	0.44	0.1	0.37	0.2	0.37	0.2	0.36
2012	5	0.2	0.45	0.1	0.44	0.2	0.42	0.2	0.42
2013	11	0.5	0.92	0.2	0.68	0.3	0.74	0.4	0.91
2014	11	0.5	0.79	0.2	0.73	0.3	0.76	0.3	0.72
2015	8	0.3	0.50	0.2	0.53	0.2	0.53	0.3	0.52
2016	8	0.3	2.00	0.1	1.42	0.2	1.54	0.2	1.72
1998-2016	111	0.3	0.55	0.1	0.51	0.2	0.52	0.2	0.53

Table 12

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

Age at death Years	Cases			Males			Females		
	n	%	Cum.%	n	%	Cum.%	n	%	Cum.%
0-4									
5-9									
10-14									
15-19									
20-24									
25-29									
30-34									
35-39	2	0.6	0.6	2	0.8	0.8			0.0
40-44	5	1.6	2.3	5	2.1	2.9			0.0
45-49	8	2.6	4.8	5	2.1	5.0	3	4.3	4.3
50-54	37	11.9	16.7	28	11.6	16.6	9	12.9	17.1
55-59	43	13.8	30.5	38	15.8	32.4	5	7.1	24.3
60-64	47	15.1	45.7	37	15.4	47.7	10	14.3	38.6
65-69	52	16.7	62.4	41	17.0	64.7	11	15.7	54.3
70-74	44	14.1	76.5	31	12.9	77.6	13	18.6	72.9
75-79	36	11.6	88.1	27	11.2	88.8	9	12.9	85.7
80-84	19	6.1	94.2	16	6.6	95.4	3	4.3	90.0
85+	18	5.8	100.0	11	4.6	100.0	7	10.0	100.0
All ages	311	100.0		241	100.0		70	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	Males		Females		Males		Females	
	n	n	Age- spec. mortal.	MI-index	Age- spec. mortal.	MI-index	Prop.all cancers %	Prop.all cancers %
0- 4								
5- 9								
10-14								
15-19								
20-24								
25-29								
30-34								
35-39	2		0.1	0.29			1.0	
40-44	5		0.3	0.71			1.0	
45-49	5	3	0.3	0.22	0.2	0.25	0.4	0.2
50-54	28	9	1.6	0.64	0.5	0.69	1.4	0.5
55-59	38	5	2.7	0.55	0.3	0.26	1.1	0.2
60-64	37	10	3.0	0.51	0.8	0.53	0.7	0.3
65-69	41	11	3.5	0.79	0.8	0.50	0.6	0.2
70-74	31	13	2.8	0.72	1.0	0.68	0.3	0.2
75-79	27	9	3.4	0.90	0.9	0.64	0.3	0.1
80-84	16	3	3.5	1.00	0.4	1.50	0.2	0.0
85+	11	7	3.6	1.00	1.0	1.00	0.2	0.1
All ages	241	70					0.5	0.2
Mortality								
Raw			1.1	0.64	0.3	0.55		
WS			0.6	0.60	0.1	0.49		
ES			0.8	0.62	0.2	0.50		
BRD-S			1.0	0.64	0.2	0.52		
PYLL-70								
per 100,000			8.2		2.0			
ES			7.2		1.6			
AYLL-70			10.6		10.3			



Table 14a

Further malignancies in deaths in period 1998–2016  
MALES

Diagnosis	Total n	Total %↓	Pre n	Pre ←%	Syn- chron ±30d n	Syn- chron ±30d ←%	Post n	Post ←%
C00 Lip	2	1.0	1	50.0			1	50.0
C03–C06 Oral cavity	5	2.5			1	20.0	4	80.0
C09–C10 Oropharynx	16	8.1			4	25.0	12	75.0
C12–C13 Hypopharynx	11	5.6	5	45.5	4	36.4	2	18.2
C15 Oesophagus	17	8.6	5	29.4	3	17.6	9	52.9
C16 Stomach	4	2.0	2	50.0			2	50.0
C18 Colon	6	3.0	1	16.7	1	16.7	4	66.7
C22 Liver	2	1.0					2	100.0
C25 Pancreas	5	2.5	2	40.0			3	60.0
C32 Larynx	14	7.1	8	57.1	1	7.1	5	35.7
C33–C34 Lung	35	17.7	6	17.1	3	8.6	26	74.3
C43 Malign. melanoma	2	1.0	2	100.0				
C44 Skin others	21	10.6	6	28.6	2	9.5	13	61.9
C46,C49 Soft tissue	3	1.5	2	66.7			1	33.3
C61 Prostate	9	4.5	3	33.3	1	11.1	5	55.6
C62 Testis	4	2.0	4	100.0				
C64 Kidney	7	3.5	2	28.6	1	14.3	4	57.1
C67 Bladder	9	4.5	3	33.3			6	66.7
C73 Thyroid	3	1.5	1	33.3	1	33.3	1	33.3
C76–C79 CUP	12	6.1	9	75.0	2	16.7	1	8.3
C82–C85 NHL	2	1.0			1	50.0	1	50.0
C91–C96 Leukaemia	2	1.0					2	100.0
Others, specified	7	3.5	6	85.7			1	14.3
All further malignancies	198	100.0	68	34.3	25	12.6	105	53.0

Further malignancies with number of cases 1 are pooled in category “Others, specified”.

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 14b

Further malignancies in deaths in period 1998-2016  
FEMALES

Diagnosis	Total n	Total %↓	Pre n	Pre ←%	Syn- chron ±30d n	Syn- chron ±30d ←%	Post n	Post ←%
C03-C06 Oral cavity	3	5.4			1	33.3	2	66.7
C09-C10 Oropharynx	9	16.1			3	33.3	6	66.7
C12-C13 Hypopharynx	4	7.1	1	25.0	2	50.0	1	25.0
C15 Oesophagus	6	10.7	2	33.3			4	66.7
C16 Stomach	1	1.8			1	100.0		
C19-C20 Rectum	1	1.8	1	100.0				
C25 Pancreas	1	1.8					1	100.0
C32 Larynx	4	7.1	1	25.0	2	50.0	1	25.0
C33-C34 Lung	11	19.6	1	9.1	3	27.3	7	63.6
C40-C41 Bone	1	1.8					1	100.0
C44 Skin others	3	5.4	2	66.7			1	33.3
C50 Breast	6	10.7	2	33.3			4	66.7
C53 Cervix uteri	2	3.6	1	50.0			1	50.0
C54 Corpus uteri	1	1.8	1	100.0				
C76-C79 CUP	3	5.4	3	100.0				
All further malignancies	56	100.0	15	26.8	12	21.4	29	51.8

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	Males n	Females n	Males Age- spec. mortal. MI-index	Females Age- spec. mortal. MI-index	Males Prop.all cancers %	Females Prop.all cancers %
0- 4						
5- 9						
10-14						
15-19						
20-24						
25-29						
30-34						
35-39	1		0.1	0.20	0.5	
40-44	4		0.2	0.80	0.9	
45-49	2	3	0.1	0.11	0.2	0.3
50-54	24	6	1.4	0.60	0.4	0.4
55-59	29	4	2.0	0.53	0.3	0.2
60-64	28	8	2.3	0.55	0.6	0.3
65-69	31	6	2.6	0.74	0.5	0.1
70-74	22	9	2.0	0.79	0.7	0.2
75-79	17	5	2.1	0.89	0.5	0.1
80-84	9	3	2.0	0.90	0.4	0.1
85+	8	5	2.6	1.00	0.7	0.1
All ages	175	49			0.4	0.1
Mortality						
Raw			0.8	0.62	0.2	0.49
WS			0.4	0.58	0.1	0.44
ES			0.6	0.60	0.1	0.45
BRD-S			0.7	0.62	0.2	0.47
PYLL-70						
per 100,000			6.2		1.5	
ES			5.5		1.2	
AYLL-70			10.6		11.0	

\* See corresponding tables with multiple malignancies.

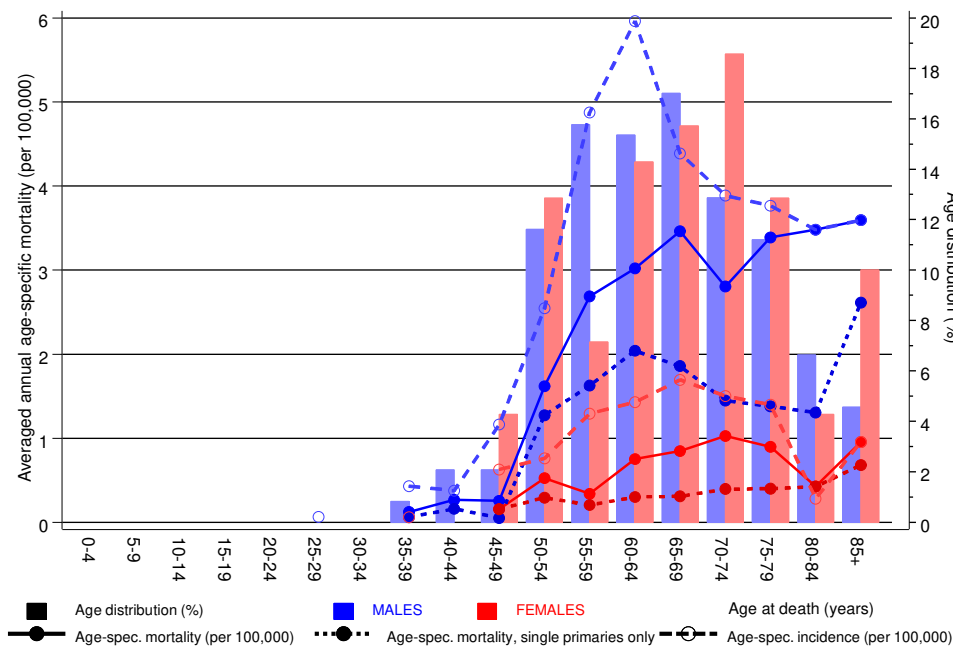
Table 16

Age-specific mortality (cancer-related) and proportion of all cancers  
for period 2007-2016  
(**Single primaries only** \*)

Age at death Years	Males n	Females n	Males Age- spec. mortal. MI-index	Females Age- spec. mortal. MI-index	Males Prop.all cancers %	Females Prop.all cancers %
0- 4						
5- 9						
10-14						
15-19						
20-24						
25-29						
30-34						
35-39	1		0.1	0.20	0.5	
40-44	3		0.2	0.75	0.7	
45-49	1	3	0.1	0.06	0.2	0.33
50-54	22	5	1.3	0.59	0.3	0.50
55-59	23	3	1.6	0.43	0.2	0.23
60-64	25	4	2.0	0.52	0.3	0.29
65-69	22	4	1.9	0.65	0.3	0.27
70-74	16	5	1.4	0.64	0.4	0.36
75-79	11	4	1.4	0.61	0.4	0.40
80-84	6	3	1.3	0.86	0.4	3.00
85+	8	5	2.6	1.14	0.7	1.00
All ages	138	36			0.4	0.1
Mortality						
Raw			0.6	0.54	0.2	0.39
WS			0.3	0.51	0.1	0.34
ES			0.5	0.53	0.1	0.35
BRD-S			0.6	0.54	0.1	0.37
PYLL-70						
per 100,000			5.2		1.2	
ES			4.6		1.0	
AYLL-70			10.9		12.2	

\* See corresponding tables with multiple malignancies.

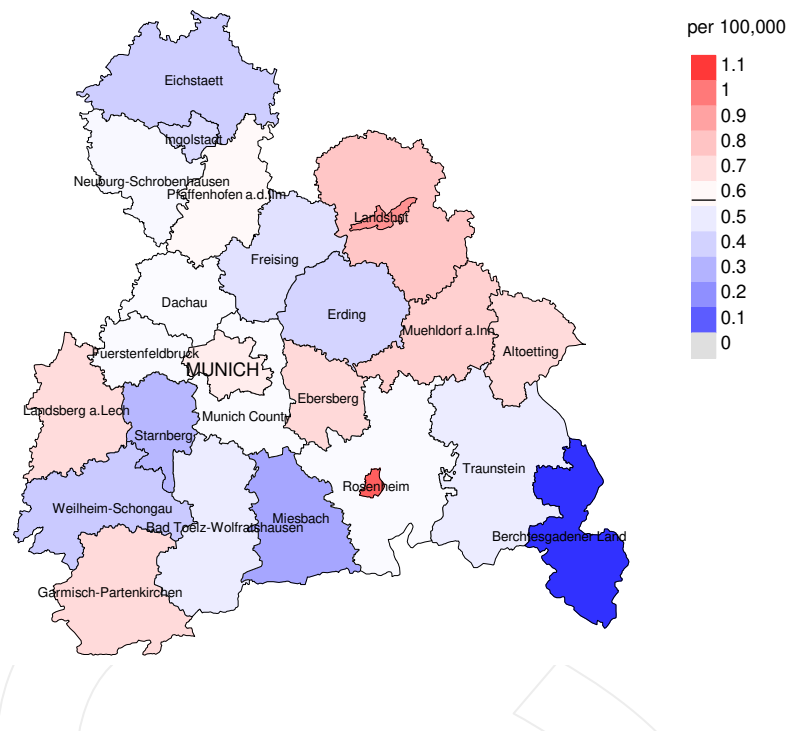
ICD-10 C01: Malignant neoplasm of base of tongue  
 Age distribution and age-specific mortality 2007 - 2016 (Males: 241, Females: 70)



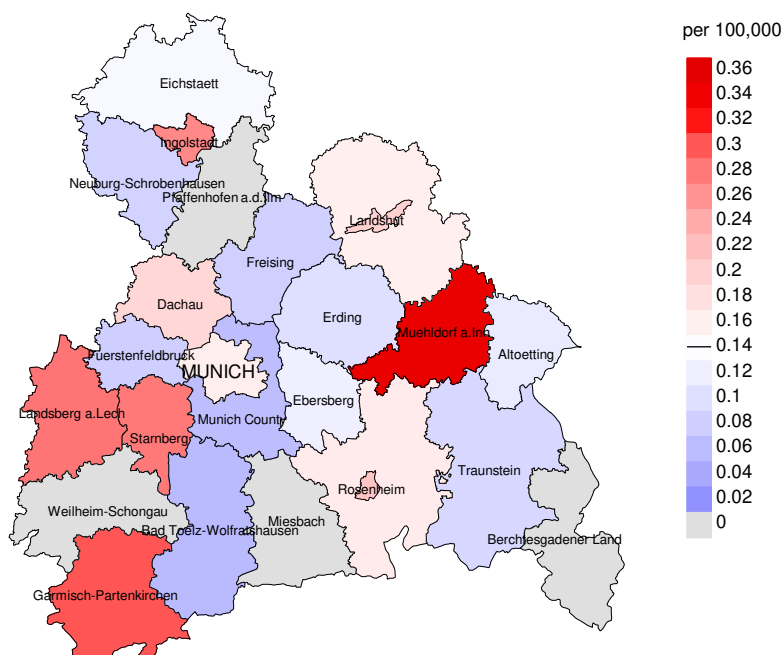
**Figure 17.** Distribution of age at death (bars; males: mean=62.4 yrs, median=61.4 yrs; females: mean=65.0 yrs, median=65.8 yrs) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

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

Average mortality (world standard population) 2007 - 2016: Males



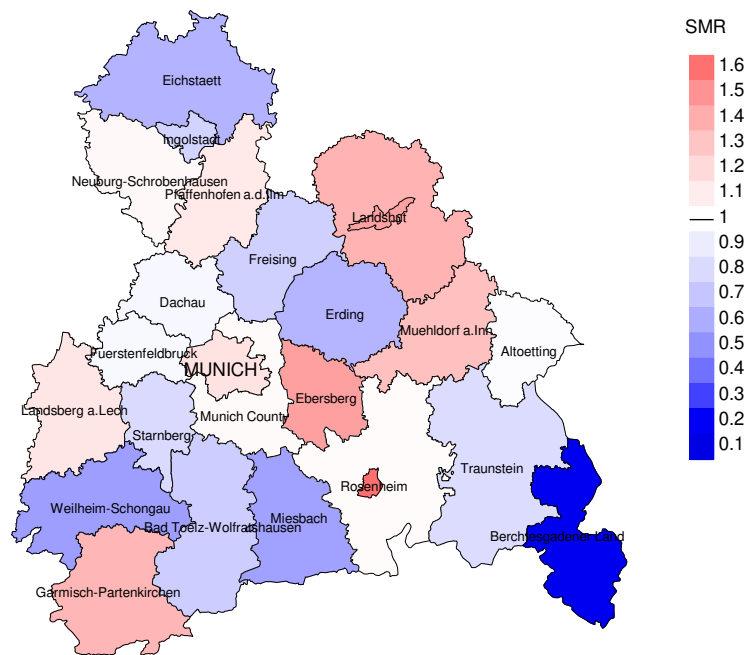
Average mortality (world standard population) 2007 - 2016: Females



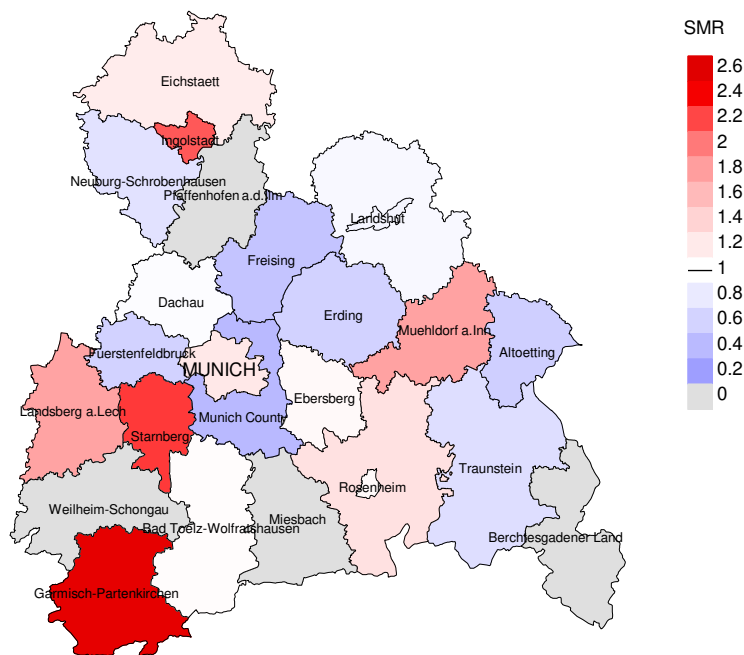
**Figure 18a.** Map of cancer mortality (world standard population) by county averaged for period 2007 to 2016. According to their individual mortality rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (males 0.6/100,000 WS N=241, females 0.1/100,000 WS N=70).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 66,416 female residents (averaged) in the period from 2007 to 2016 a total of 2 women died from base of tongue cancer. Therefore, the mean mortality rate for this cancer type in this area can be calculated at 0.1/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 0.0 and 1.1/100,000.

Standardized mortality ratio (SMR) 2007 - 2016: Males



Standardized mortality ratio (SMR) 2007 - 2016: Females



**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 (males N=241, females N=70).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 66,416 female residents (averaged) in the period from 2007 to 2016 a total of 2 women died from base of tongue cancer. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 1.04. Though, the value of this parameter may vary with an underlying probability of 99% between 0.05 and 4.84, 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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