

Munich Cancer Registry



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

ICD-10 C74: Adrenal cancer

Incidence and Mortality

Year of diagnosis	1998-2016
Patients	243
Diseases	244
Creation date	08/21/2018
Export date	08/09/2018
Population	4.81 m





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

https://www.tumorregister-muenchen.de/en/facts/base/bC74__E-ICD-10-C74-Adrenal-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[#], 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
C74.-	Malignant neoplasm of adrenal gland
C74.0	Cortex of adrenal gland
C74.1	Medulla of adrenal gland
C74.9	Adrenal gland, unspecified

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	8			37.5	5.8	37.5	100.0
1999	7	1	14.3	26.7	6.0	85.7	100.0
2000	9	1	11.1	20.8	4.9	66.7	100.0
2001	9	1	11.1	15.2	4.6	55.6	88.9
2002	7			12.5	4.3	85.7	100.0 #
2003	11	1	9.1	11.8	4.0	72.7	100.0
2004	16	1	6.3	10.4	4.2	56.3	100.0
2005	14	2	14.3	8.6	3.4	35.7	85.7
2006	14			9.5	3.1	71.4	100.0
2007	12			9.3	2.7	50.0	75.0 #
2008	10			8.5	3.0	70.0	80.0
2009	15	1	6.7	9.1	2.4	46.7	73.3
2010	15			10.2	2.7	66.7	73.3
2011	16			11.0	2.1	50.0	62.5
2012	17	3	17.6	11.7	2.5	64.7	82.4
2013	21	2	9.5	12.4	3.2	33.3	71.4
2014	19	2	10.5	12.3	0.0	63.2	84.2
2015	11			12.1	0.0	36.4	100.0
2016	13	2	15.4	12.3	0.0	46.2	84.6 ##
1998-2016	244	17	7.0	12.3	5.8	55.7	85.2

244 cases diagnosed 1998-2016 are related to a total of 243 patients. Currently, in 44 (18.1 %) of these 243 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 34 / 5 / 5 (14.0 % / 2.1 % / 2.1 %) 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 19 cases has been diagnosed, of which 12.3 % 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 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	1	12.5			0.0	8.1		100.0
1999	2	28.6			33.3	8.2	50.0	100.0
2000	6	66.7	1	16.7	11.1	6.5	66.7	100.0
2001	3	33.3			8.3	5.9	33.3	100.0
2002	3	42.9			6.7	6.1	66.7	100.0 #
2003	3	27.3			5.6	6.3	66.7	100.0
2004	7	43.8	1	14.3	4.0	6.5	85.7	100.0
2005	10	71.4	1	10.0	2.9	4.7	20.0	90.0
2006	6	42.9			4.9	3.9	66.7	100.0
2007	6	50.0			4.3	2.9	50.0	66.7 #
2008	3	30.0			4.0	3.1	66.7	100.0
2009	6	40.0	1	16.7	5.4	3.3	33.3	66.7
2010	6	40.0			6.5	3.6	50.0	50.0
2011	8	50.0			7.1	4.1	50.0	62.5
2012	10	58.8			10.0	4.9	50.0	80.0
2013	13	61.9			10.8	6.3	23.1	69.2
2014	9	47.4	1	11.1	10.8	0.0	66.7	88.9
2015	4	36.4			11.3	0.0	50.0	100.0
2016	7	53.8	1	14.3	12.4	0.0	42.9	100.0 ##
1998-2016	113	46.3	6	5.3	12.4	8.1	48.7	84.1

113 cases diagnosed 1998-2016 are related to a total of 112 patients. Currently, in 22 (19.6 %) of these 112 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 16 / 2 / 4 (14.3 % / 1.8 % / 3.6 %) 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 9 cases has been diagnosed, of which 10.8 % 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 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	7	87.5			42.9	3.9	42.9	100.0
1999	5	71.4	1	20.0	25.0	4.1	100.0	100.0
2000	3	33.3			26.7	3.4	66.7	100.0
2001	6	66.7	1	16.7	19.0	3.5	66.7	83.3
2002	4	57.1			16.0	2.8	100.0	100.0 #
2003	8	72.7	1	12.5	15.2	1.9	75.0	100.0
2004	9	56.3			14.3	2.1	33.3	100.0
2005	4	28.6	1	25.0	13.0	2.3	75.0	75.0
2006	8	57.1			13.0	2.4	75.0	100.0
2007	6	50.0			13.3	2.6	50.0	83.3 #
2008	7	70.0			11.9	2.8	71.4	71.4
2009	9	60.0			11.8	1.6	55.6	77.8
2010	9	60.0			12.9	1.8	77.8	88.9
2011	8	50.0			14.0	0.0	50.0	62.5
2012	7	41.2	3	42.9	13.0	0.0	85.7	85.7
2013	8	38.1	2	25.0	13.9	0.0	50.0	75.0
2014	10	52.6	1	10.0	13.6	0.0	60.0	80.0
2015	7	63.6			12.8	0.0	28.6	100.0
2016	6	46.2	1	16.7	12.2	0.0	50.0	66.7 ##
1998-2016	131	53.7	11	8.4	12.2	3.9	61.8	86.3

131 cases diagnosed 1998-2016 are related to a total of 131 patients. Currently, in 22 (16.8 %) of these 131 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 18 / 3 / 1 (13.7 % / 2.3 % / 0.8 %) 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 10 cases has been diagnosed, of which 13.6 % 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 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	1	7	0.1	0.6	0.2	0.7	0.1	0.6	0.1	0.6
1999	2	5	0.2	0.4	0.3	0.2	0.2	0.3	0.2	0.4
2000	6	3	0.5	0.2	0.4	0.3	0.5	0.3	0.5	0.3
2001	3	6	0.3	0.5	0.5	0.5	0.4	0.5	0.2	0.5
2002	3	4	0.2	0.2	0.3	0.2	0.2	0.2	0.2	0.2
2003	3	8	0.2	0.4	0.3	0.4	0.2	0.4	0.1	0.4
2004	7	9	0.4	0.5	0.2	0.7	0.3	0.6	0.4	0.4
2005	10	4	0.5	0.2	0.8	0.2	0.7	0.2	0.6	0.2
2006	6	8	0.3	0.4	0.2	0.4	0.3	0.4	0.3	0.4
2007	6	6	0.3	0.3	0.4	0.3	0.3	0.3	0.3	0.2
2008	3	7	0.1	0.3	0.1	0.2	0.1	0.2	0.1	0.3
2009	6	9	0.3	0.4	0.3	0.3	0.3	0.4	0.2	0.4
2010	6	9	0.3	0.4	0.4	0.3	0.3	0.3	0.3	0.4
2011	8	8	0.4	0.3	0.5	0.4	0.4	0.4	0.3	0.3
2012	10	7	0.4	0.3	0.4	0.2	0.4	0.2	0.4	0.2
2013	13	8	0.6	0.3	0.7	0.2	0.6	0.2	0.6	0.2
2014	9	10	0.4	0.4	0.2	0.2	0.3	0.3	0.4	0.4
2015	4	7	0.2	0.3	0.1	0.2	0.1	0.2	0.1	0.3
2016	7	6	0.3	0.2	0.2	0.2	0.2	0.2	0.3	0.2
1998-2016	113	131	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3

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.		Median						
		Mean	dev.	Min.	Max.	10%	25%	50%	75%	90%
1998	8	37.1	30.9	0.1	66.7	0.1	0.6	53.1	61.4	66.7
1999	7	56.8	28.1	4.8	83.1	4.8	31.1	70.1	72.6	83.1
2000	9	54.2	25.1	4.6	75.5	4.6	61.1	63.0	66.0	75.5
2001	9	34.0	27.9	0.1	77.8	0.1	4.1	33.2	53.8	77.8
2002	7	35.6	32.9	0.1	76.1	0.1	1.1	47.9	67.2	76.1
2003	11	41.4	30.9	0.3	78.5	0.8	2.5	56.6	64.2	71.3
2004	16	45.6	32.5	2.0	84.6	2.1	7.0	52.7	73.7	83.8
2005	14	39.4	36.1	0.3	87.9	0.6	1.0	47.4	76.2	79.4
2006	14	53.3	20.3	0.5	81.5	40.3	43.7	54.8	64.9	77.6
2007	12	36.1	29.6	0.0	80.5	0.0	4.4	38.0	62.2	72.7
2008	10	60.5	27.0	1.4	88.2	15.0	56.1	66.3	80.9	85.9
2009	15	48.0	22.5	2.0	78.7	5.5	39.6	52.6	62.7	77.6
2010	15	42.2	30.9	0.0	82.7	0.8	4.3	44.6	72.7	77.4
2011	16	37.8	28.9	0.0	78.5	0.1	1.4	44.3	58.6	74.1
2012	17	55.6	27.2	0.1	90.4	0.3	49.7	61.6	69.5	88.9
2013	21	50.4	34.5	0.0	94.5	0.4	25.6	55.7	80.2	91.9
2014	19	64.6	16.5	26.9	86.4	41.2	48.4	65.7	76.7	84.1
2015	11	56.2	12.9	36.7	80.3	44.9	45.8	55.7	61.5	74.0
2016	13	57.0	17.8	27.6	83.1	29.7	43.1	57.3	69.8	75.4
1998-2016	244	48.4	28.1	0.0	94.5	0.8	28.1	55.7	71.1	80.2

Table 3a

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

Year of diagnosis	Cases n	Std.		Median						
		Mean	dev.	Min.	Max.	10%	25%	50%	75%	90%
1998	1	0.8		0.8	0.8	0.8	0.8	0.8	0.8	0.8
1999	2	37.7	46.5	4.8	70.6	4.8	4.8	37.7	70.6	70.6
2000	6	55.9	25.6	4.6	75.5	4.6	62.4	63.4	66.0	75.5
2001	3	17.3	29.3	0.1	51.2	0.1	0.1	0.8	51.2	51.2
2002	3	17.8	26.1	1.1	47.9	1.1	1.1	4.4	47.9	47.9
2003	3	22.4	36.3	0.3	64.2	0.3	0.3	2.5	64.2	64.2
2004	7	69.4	12.5	47.5	83.8	47.5	57.8	72.4	77.9	83.8
2005	10	35.0	36.8	0.6	87.9	0.7	1.0	26.0	74.4	82.1
2006	6	58.8	13.5	42.2	77.6	42.2	43.9	62.0	64.9	77.6
2007	6	28.0	25.1	0.0	60.7	0.0	0.0	29.7	48.0	60.7
2008	3	61.8	8.2	56.1	71.2	56.1	56.1	57.9	71.2	71.2
2009	6	39.4	19.2	2.0	54.9	2.0	39.6	43.8	52.6	54.9
2010	6	28.9	35.9	0.0	82.7	0.0	0.8	13.0	63.9	82.7
2011	8	37.6	32.8	0.5	78.5	0.5	1.4	44.4	65.0	78.5
2012	10	50.8	25.5	0.3	88.9	7.7	49.1	58.8	62.2	76.3
2013	13	38.7	31.1	0.0	84.0	0.4	4.0	46.7	59.9	78.1
2014	9	66.5	11.7	41.2	81.1	41.2	62.9	65.7	76.0	81.1
2015	4	59.7	10.2	50.2	74.0	50.2	52.9	57.3	66.5	74.0
2016	7	58.2	16.2	29.7	75.4	29.7	48.8	57.3	74.5	75.4
1998-2016	113	45.1	28.6	0.0	88.9	0.7	15.0	54.3	65.7	76.2

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	7	42.3	29.3	0.1	66.7	0.1	0.3	57.1	64.8	66.7
1999	5	64.5	19.7	31.1	83.1	31.1	65.8	70.1	72.6	83.1
2000	3	50.7	29.3	17.7	73.4	17.7	17.7	61.1	73.4	73.4
2001	6	42.3	25.5	4.1	77.8	4.1	29.7	43.5	55.0	77.8
2002	4	49.0	34.0	0.1	76.1	0.1	26.3	59.8	71.7	76.1
2003	8	48.6	27.8	0.8	78.5	0.8	28.4	59.5	66.9	78.5
2004	9	27.2	31.4	2.0	84.6	2.0	5.8	7.1	43.4	84.6
2005	4	50.6	36.7	0.3	79.4	0.3	23.2	61.3	77.9	79.4
2006	8	49.2	24.3	0.5	81.5	0.5	42.0	50.2	63.5	81.5
2007	6	44.1	33.9	0.2	80.5	0.2	8.6	51.5	72.7	80.5
2008	7	59.9	32.8	1.4	88.2	1.4	28.6	75.5	83.5	88.2
2009	9	53.7	23.7	5.5	78.7	5.5	51.9	60.3	64.2	78.7
2010	9	51.1	25.4	4.3	77.4	4.3	32.7	55.7	72.7	77.4
2011	8	38.0	26.7	0.0	70.3	0.0	13.8	44.3	58.6	70.3
2012	7	62.5	30.2	0.1	90.4	0.1	53.0	69.5	85.8	90.4
2013	8	69.3	32.9	0.4	94.5	0.4	54.4	82.4	93.0	94.5
2014	10	62.8	20.4	26.9	86.4	36.5	46.2	65.6	83.1	85.2
2015	7	54.2	14.6	36.7	80.3	36.7	44.9	48.4	61.5	80.3
2016	6	55.7	20.9	27.6	83.1	27.6	43.1	55.2	69.8	83.1
1998-2016	131	51.3	27.5	0.0	94.5	2.1	32.7	56.6	72.7	83.1

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	21	14.1	14.1	14	19.4	19.4	7	9.1	9.1
5-9	2	1.3	15.4			19.4	2	2.6	11.7
10-14	0	0.0	15.4			19.4			11.7
15-19	1	0.7	16.1	1	1.4	20.8			11.7
20-24	2	1.3	17.4	2	2.8	23.6			11.7
25-29	9	6.0	23.5	3	4.2	27.8	6	7.8	19.5
30-34	1	0.7	24.2			27.8	1	1.3	20.8
35-39	5	3.4	27.5	3	4.2	31.9	2	2.6	23.4
40-44	8	5.4	32.9	2	2.8	34.7	6	7.8	31.2
45-49	12	8.1	40.9	6	8.3	43.1	6	7.8	39.0
50-54	8	5.4	46.3	6	8.3	51.4	2	2.6	41.6
55-59	13	8.7	55.0	9	12.5	63.9	4	5.2	46.8
60-64	17	11.4	66.4	9	12.5	76.4	8	10.4	57.1
65-69	9	6.0	72.5	3	4.2	80.6	6	7.8	64.9
70-74	10	6.7	79.2	5	6.9	87.5	5	6.5	71.4
75-79	11	7.4	86.6	5	6.9	94.4	6	7.8	79.2
80-84	12	8.1	94.6	3	4.2	98.6	9	11.7	90.9
85+	8	5.4	100.0	1	1.4	100.0	7	9.1	100.0
All ages	149	100.0		72	100.0		77	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=3 %	Females DCO rate n=7 %	Males Prop.all cancers n=113978 %	Females Prop.all cancers n=112253 %
0- 4	14	7	1.3	0.7			7.1	4.7
5- 9		2		0.2				2.4
10-14								
15-19	1		0.1				0.4	
20-24	2		0.1				0.4	
25-29	2	6	0.1	0.4			0.3	0.7
30-34		1		0.1				0.1
35-39	3	2	0.2	0.1			0.2	0.1
40-44	2	6	0.1	0.3			0.1	0.1
45-49	6	6	0.3	0.3			0.2	0.1
50-54	6	2	0.3	0.1	16.7	50.0	0.1	0.0
55-59	9	4	0.6	0.3			0.1	0.0
60-64	9	8	0.7	0.6			0.1	0.1
65-69	3	6	0.3	0.5	33.3	33.3	0.0	0.0
70-74	5	5	0.5	0.4			0.0	0.0
75-79	5	6	0.6	0.6	20.0		0.0	0.0
80-84	3	9	0.7	1.3			0.0	0.1
85+	1	7	0.3	1.0		57.1	0.0	0.1
All ages	71	77			4.2	9.1	0.1	0.1
Incidence								
Raw			0.3	0.3				
WS			0.3	0.3				
ES			0.3	0.3				
BRD-S			0.3	0.3				

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).

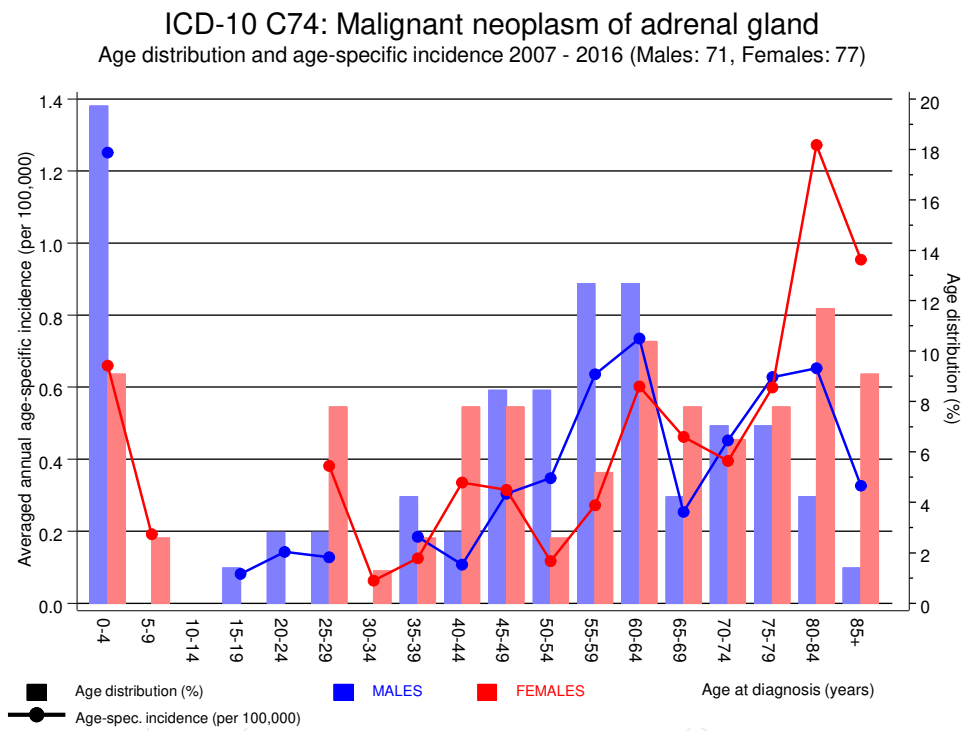


Figure 6. Age distribution (males: mean=46.4 yrs, median=54.9 yrs; females: mean=55.4 yrs, median=61.4 yrs) and age-specific incidence.

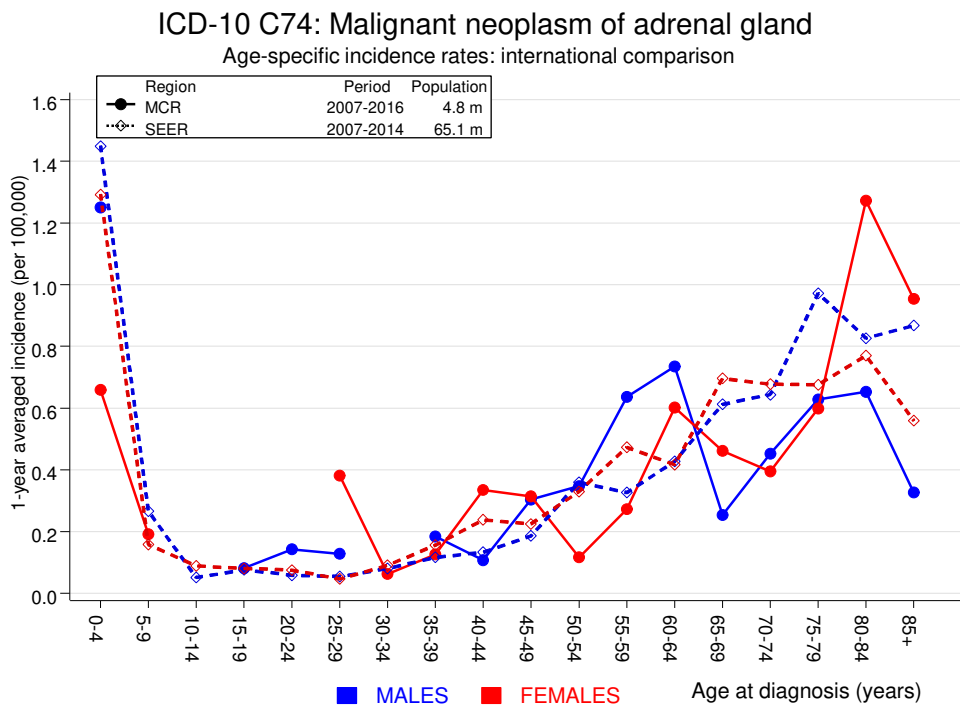


Figure 6a. Age-specific incidence in MCR registry areas compared to SEER (Surveillance, Epidemiology, and End Results, USA).

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 n	Expected n	SIR	CI 95%	CI 95%	EAR	DCO %
C43 Malign. melanoma	2	0.1	16.0	1.9	57.8 #	56.1	
C61 Prostate	3	0.8	3.9	0.8	11.3	66.5	
C74–C80 Cancer others	2	0.0	256.6	31.1	926.9 #	59.6	
Others, specified	6	0.8	7.2	2.6	15.6 #	154.4	
Not observed	0	1.2	0.0	0.0	3.1	-35.1	
All further malignancies	13	2.9	4.5	2.4	7.6 #	301.5	
Patients		102					
Median age at next malignancy (years)		63.9					
Person-years		334					
Mean observation time (years)		3.3					
Median observation time (years)		1.8					

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

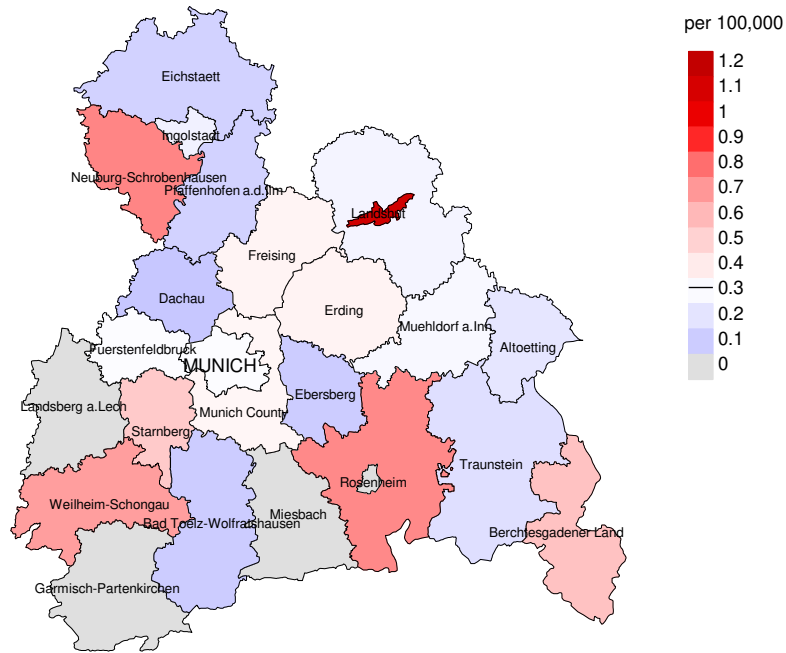
FEMALES

Diagnosis	Observed n	Expected n	SIR	CI 95%	CI 95%	EAR	DCO %
Others, specified	7	1.4	5.0	2.0	10.3 #	129.3	14.3
Not observed	0	1.7	0.0	0.0	2.2	-38.5	
All further malignancies	7	3.1	2.3	0.9	4.7	90.8	14.3
Patients		114					
Median age at next malignancy (years)		68.4					
Person-years		433					
Mean observation time (years)		3.8					
Median observation time (years)		2.5					

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

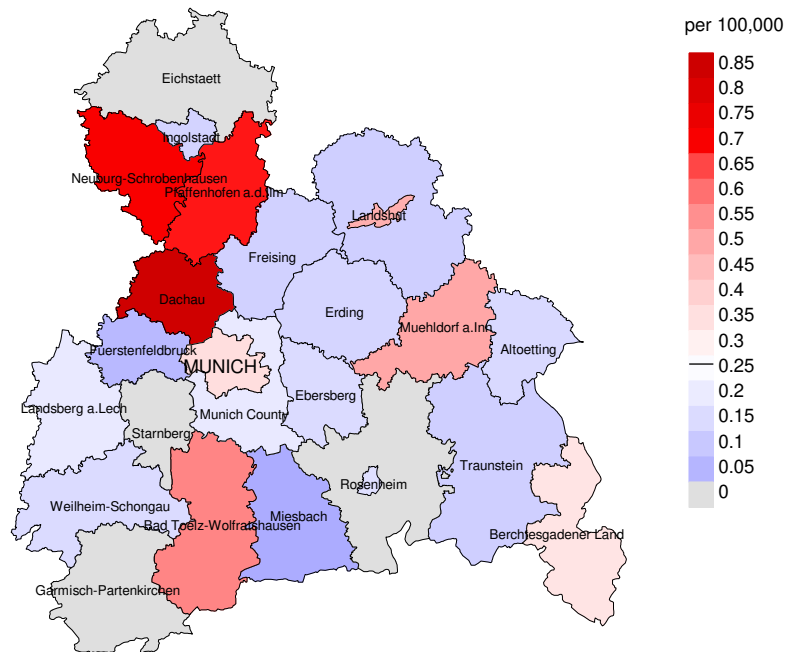
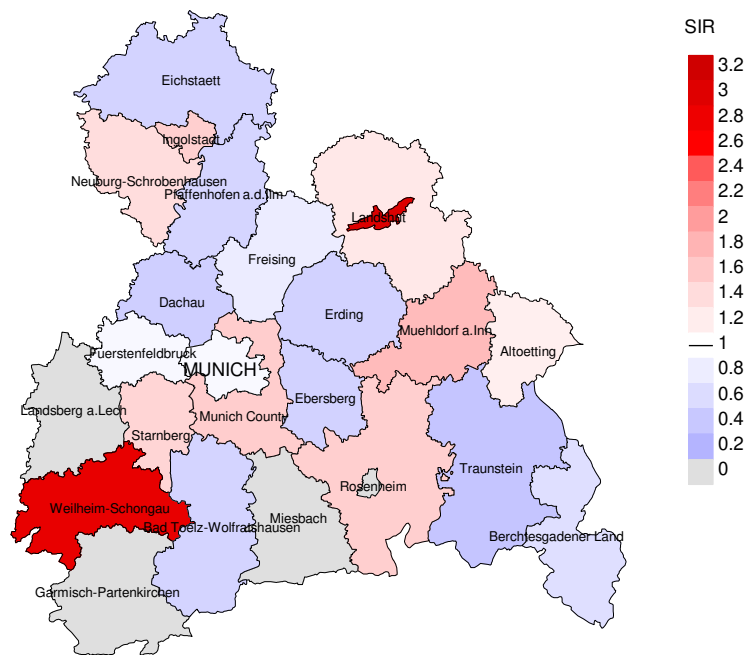


Figure 8a. Map of cancer incidence (world standard population, incl. DCO cases) by county averaged for period 2007 to 2016. According to their individual incidence rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (males 0.3/100,000 WS N=71, females 0.3/100,000 WS N=77).

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 were identified with newly diagnosed adrenal cancer. Therefore, the mean incidence 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 incidence ratio (SIR) 2007 - 2016: Males



Standardized incidence ratio (SIR) 2007 - 2016: Females

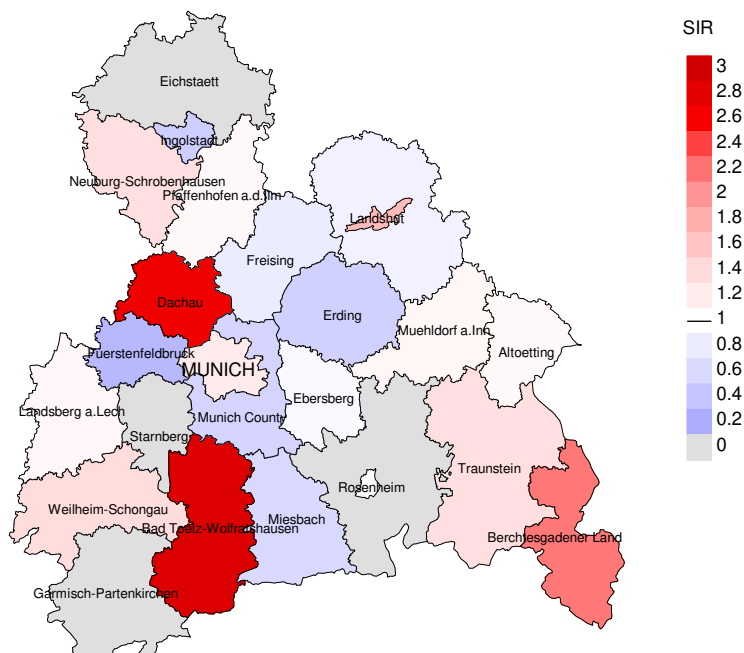


Figure 8b. Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2007 to 2016. According to their individual SIR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (males N=71, females N=77).

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 were identified with newly diagnosed adrenal cancer. Therefore, the mean standardized incidence ratio (SIR) for this cancer type in this area can be calculated at 0.95. Though, the value of this parameter may vary with an underlying probability of 99% between 0.05 and 4.40, 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	8	100.0		3	37.5	100.0
1999	7	100.0	14.3	6	85.7	100.0
2000	9	100.0	11.1	6	66.7	100.0
2001	9	88.9	11.1	5	55.6	80.0
2002	7	100.0		6	85.7	100.0
2003	11	100.0	9.1	8	72.7	100.0
2004	16	100.0	6.3	9	56.3	100.0
2005	14	85.7	14.3	5	35.7	100.0
2006	14	100.0		10	71.4	100.0
2007	12	75.0		6	50.0	100.0
2008	10	80.0		7	70.0	100.0
2009	15	73.3	6.7	7	46.7	100.0
2010	15	73.3		10	66.7	90.0
2011	16	62.5		8	50.0	87.5
2012	17	82.4	17.6	11	64.7	100.0
2013	21	71.4	9.5	7	33.3	100.0
2014	19	84.2	10.5	12	63.2	91.7
2015	11	100.0		4	36.4	100.0
2016	13	84.6	15.4	6	46.2	83.3
1998-2016	244	85.2	7.0	136	55.7	96.3

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	8	4	100.0		
1999	7	4	100.0	1	14.3
2000	9	3	66.7		
2001	9	6	100.0	2	22.2
2002	7	8	100.0	2	28.6
2003	11	7	100.0	3	27.3
2004	16	7	85.7	2	12.5
2005	14	7	100.0	3	21.4
2006	14	5	100.0		
2007	12	6	100.0		
2008	10	11	100.0	3	30.0
2009	15	8	100.0	1	6.7
2010	15	6	100.0	1	6.7
2011	16	10	90.0	2	12.5
2012	17	14	100.0	5	29.4
2013	21	15	100.0	3	14.3
2014	19	13	100.0	6	31.6
2015	11	13	100.0	2	18.2
2016	13	10	100.0	5	38.5
1998-2016	244	157	98.1	41	16.8

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	4	100.0		100.0
1999	4	100.0		100.0
2000	3	100.0		100.0
2001	6	100.0		100.0
2002	8	100.0		87.5
2003	7	100.0		100.0
2004	7	85.7	14.3	83.3
2005	7	100.0		100.0
2006	5	80.0	20.0	80.0
2007	6	100.0		100.0
2008	11	90.9	9.1	90.9
2009	8	87.5	12.5	87.5
2010	6	83.3	16.7	100.0
2011	10	70.0	30.0	100.0
2012	14	92.9	7.1	100.0
2013	15	93.3	6.7	100.0
2014	13	84.6	15.4	92.3
2015	13	100.0		92.3
2016	10	70.0	30.0	70.0
1998-2016	157	90.4	9.6	93.5

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					
1999	1	48.2	48.2		48.2
2000	1	4.2	4.2		
2001	4	64.2	64.2		64.2
2002	2	27.6	27.6		27.6
2003					
2004	3	70.9	70.9		70.9
2005	3	78.7	78.7		78.7
2006	3	65.8	67.3	51.8	67.3
2007	2	58.8	58.8		58.8
2008	5	56.4	56.4		56.4
2009	3	66.8	60.4	80.5	60.4
2010	4	56.5	39.1	82.1	56.5
2011	4	70.1	60.6	79.6	70.1
2012	6	58.8	50.9	75.1	58.8
2013	7	62.2	62.2		62.2
2014	4	72.5	72.5		72.5
2015	6	75.8	75.8		75.8
2016	3	49.0	49.0		49.0
1998–2016	61	63.9	63.0	79.6	64.1

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	69.2	69.2		69.2
1999	3	72.0	72.0		72.0
2000	2	66.7	66.7		66.7
2001	2	66.8	66.8		66.8
2002	6	70.8	70.8		73.1
2003	7	68.1	68.1		68.1
2004	4	54.1	35.5	82.3	52.5
2005	4	70.6	70.6		70.6
2006	2	62.2	62.2		62.2
2007	4	47.6	47.6		47.6
2008	6	64.4	58.1	83.6	58.1
2009	5	57.5	57.5		57.5
2010	2	64.6	64.6		64.6
2011	6	46.2	51.7	31.2	62.4
2012	8	54.9	54.9		54.9
2013	8	74.6	69.7	93.9	74.6
2014	9	76.1	76.1	85.1	80.3
2015	7	82.4	82.4		72.0
2016	7	84.3	75.3	88.9	75.3
1998–2016	96	69.2	67.8	83.9	68.3

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									
1999	1	0.1	0.50	0.1	0.33	0.1	0.45	0.1	0.60
2000	1	0.1	0.17	0.2	0.44	0.1	0.27	0.1	0.15
2001	4	0.3	1.33	0.2	0.48	0.3	0.82	0.3	1.22
2002	2	0.1	0.67	0.2	0.56	0.1	0.64	0.1	0.65
2003									
2004	3	0.2	0.43	0.1	0.45	0.1	0.41	0.2	0.36
2005	3	0.2	0.30	0.1	0.08	0.1	0.19	0.2	0.36
2006	2	0.1	0.33	0.1	0.26	0.1	0.26	0.1	0.25
2007	2	0.1	0.33	0.1	0.15	0.1	0.21	0.1	0.27
2008	5	0.2	1.67	0.2	2.16	0.2	1.70	0.2	1.84
2009	2	0.1	0.33	0.1	0.20	0.1	0.27	0.1	0.31
2010	3	0.1	0.50	0.2	0.38	0.1	0.43	0.1	0.42
2011	3	0.1	0.38	0.2	0.33	0.1	0.34	0.1	0.40
2012	5	0.2	0.50	0.1	0.31	0.2	0.40	0.2	0.44
2013	7	0.3	0.58	0.3	0.47	0.3	0.53	0.3	0.60
2014	4	0.2	0.44	0.1	0.63	0.2	0.51	0.2	0.46
2015	6	0.3	1.50	0.1	1.06	0.2	1.15	0.2	1.57
2016	3	0.1	0.43	0.1	0.51	0.1	0.50	0.1	0.44
1998-2016	56	0.2	0.50	0.1	0.36	0.1	0.44	0.1	0.50

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	4	0.3	0.57	0.2	0.26	0.3	0.41	0.3	0.55
1999	3	0.3	0.60	0.1	0.49	0.2	0.56	0.2	0.59
2000	2	0.2	0.67	0.1	0.34	0.1	0.47	0.1	0.50
2001	2	0.2	0.33	0.1	0.14	0.1	0.24	0.2	0.31
2002	6	0.3	1.50	0.3	1.19	0.3	1.27	0.3	1.42
2003	7	0.4	0.88	0.2	0.45	0.2	0.62	0.3	0.82
2004	3	0.2	0.33	0.1	0.14	0.1	0.23	0.1	0.31
2005	4	0.2	1.00	0.1	0.46	0.1	0.72	0.2	0.87
2006	2	0.1	0.25	0.1	0.19	0.1	0.24	0.1	0.26
2007	4	0.2	0.67	0.2	0.50	0.2	0.61	0.2	0.65
2008	5	0.2	0.71	0.1	0.54	0.2	0.77	0.2	0.68
2009	5	0.2	0.56	0.2	0.71	0.2	0.62	0.2	0.52
2010	2	0.1	0.22	0.1	0.16	0.1	0.20	0.1	0.20
2011	4	0.2	0.50	0.1	0.30	0.1	0.34	0.2	0.50
2012	8	0.3	1.14	0.2	1.00	0.3	1.24	0.3	1.49
2013	7	0.3	0.88	0.1	0.63	0.2	0.83	0.2	0.93
2014	7	0.3	0.70	0.1	0.39	0.1	0.50	0.2	0.56
2015	7	0.3	1.00	0.1	0.55	0.2	0.67	0.2	0.77
2016	4	0.2	0.67	0.1	0.37	0.1	0.45	0.1	0.53
1998-2016	86	0.2	0.66	0.1	0.41	0.2	0.53	0.2	0.61

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	3	3.2	3.2	2	5.0	5.0	1	1.9	1.9
5-9	1	1.1	4.3	1	2.5	7.5			1.9
10-14	2	2.2	6.5	1	2.5	10.0	1	1.9	3.8
15-19	1	1.1	7.5	1	2.5	12.5			3.8
20-24	1	1.1	8.6	1	2.5	15.0			3.8
25-29	3	3.2	11.8			15.0	3	5.7	9.4
30-34	0	0.0	11.8			15.0			9.4
35-39	3	3.2	15.1	1	2.5	17.5	2	3.8	13.2
40-44	2	2.2	17.2	1	2.5	20.0	1	1.9	15.1
45-49	7	7.5	24.7	5	12.5	32.5	2	3.8	18.9
50-54	5	5.4	30.1	2	5.0	37.5	3	5.7	24.5
55-59	8	8.6	38.7	3	7.5	45.0	5	9.4	34.0
60-64	13	14.0	52.7	6	15.0	60.0	7	13.2	47.2
65-69	10	10.8	63.4	4	10.0	70.0	6	11.3	58.5
70-74	9	9.7	73.1	5	12.5	82.5	4	7.5	66.0
75-79	7	7.5	80.6	2	5.0	87.5	5	9.4	75.5
80-84	9	9.7	90.3	3	7.5	95.0	6	11.3	86.8
85+	9	9.7	100.0	2	5.0	100.0	7	13.2	100.0
All ages	93	100.0		40	100.0		53	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	2	1	0.2	0.14	0.1	0.14	13.3	6.7
5- 9	1		0.1	1.00			4.2	
10-14	1	1	0.1	1.00	0.1	1.00	4.3	4.2
15-19	1		0.1	1.00			2.3	
20-24	1		0.1	0.50			1.8	
25-29		3			0.2	0.50		4.1
30-34								
35-39	1	2	0.1	0.33	0.1	1.00	0.5	0.7
40-44	1	1	0.1	0.50	0.1	0.17	0.2	0.1
45-49	5	2	0.3	0.83	0.1	0.33	0.4	0.2
50-54	2	3	0.1	0.33	0.2	1.50	0.1	0.2
55-59	3	5	0.2	0.33	0.3	1.25	0.1	0.2
60-64	6	7	0.5	0.67	0.5	0.88	0.1	0.2
65-69	4	6	0.3	1.33	0.5	1.00	0.1	0.1
70-74	5	4	0.5	1.00	0.3	0.80	0.1	0.1
75-79	2	5	0.3	0.40	0.5	0.83	0.0	0.1
80-84	3	6	0.7	1.00	0.8	0.67	0.0	0.1
85+	2	7	0.7	2.00	1.0	1.00	0.0	0.1
All ages	40	53					0.1	0.1
Mortality								
Raw			0.2	0.56	0.2	0.69		
WS			0.1	0.43	0.1	0.50		
ES			0.2	0.49	0.2	0.60		
BRD-S			0.2	0.55	0.2	0.65		
PYLL-70								
per 100,000			3.2		2.9			
ES			3.7		2.9			
AYLL-70			23.4		18.5			

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 ←%
C16 Stomach	1	6.7					1	100.0
C33-C34 Lung	1	6.7	1	100.0				
C43 Malign. melanoma	2	13.3	1	50.0			1	50.0
C44 Skin others	2	13.3					2	100.0
C61 Prostate	4	26.7	3	75.0			1	25.0
C64 Kidney	1	6.7					1	100.0
C67 Bladder	2	13.3	2	100.0				
C73 Thyroid	1	6.7					1	100.0
C91-C96 Leukaemia	1	6.7					1	100.0
All further malignancies	15	100.0	7	46.7			8	53.3

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 ←%
C16 Stomach	1	5.3					1	100.0
C17 Small intestine	1	5.3					1	100.0
C22 Liver	1	5.3					1	100.0
C33-C34 Lung	3	15.8			2	66.7	1	33.3
C43 Malign. melanoma	1	5.3					1	100.0
C44 Skin others	1	5.3	1	100.0				
C46,C49 Soft tissue	1	5.3			1	100.0		
C50 Breast	3	15.8	3	100.0				
C54 Corpus uteri	3	15.8	3	100.0				
C64 Kidney	1	5.3			1	100.0		
C67 Bladder	2	10.5			1	50.0	1	50.0
C73 Thyroid	1	5.3			1	100.0		
All further malignancies	19	100.0	7	36.8	6	31.6	6	31.6

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		Males		Females		Females	
	n	n	Age- spec. mortal.	MI-index	Age- spec. mortal.	MI-index	Prop.all cancers %	Prop.all cancers %
0- 4	2	1	0.2	0.14	0.1	0.14	14.3	6.7
5- 9	1		0.1	1.00			4.3	
10-14	1	1	0.1	1.00	0.1	1.00	4.3	4.8
15-19	1		0.1	1.00			2.4	
20-24	1		0.1	0.50			2.0	
25-29		3			0.2	0.50		4.5
30-34								
35-39	1	2	0.1	0.33	0.1	1.00	0.5	0.8
40-44	1	1	0.1	0.50	0.1	0.20	0.2	0.2
45-49	4	2	0.2	1.33	0.1	0.40	0.4	0.2
50-54	2	3	0.1	0.33	0.2	1.50	0.1	0.2
55-59	2	5	0.1	0.33	0.3	1.25	0.1	0.2
60-64	4	7	0.3	0.67	0.5	1.00	0.1	0.2
65-69	4	5	0.3	2.00	0.4	0.83	0.1	0.1
70-74	5	4	0.5	1.00	0.3	1.00	0.1	0.1
75-79	2	5	0.3	0.50	0.5	1.25	0.0	0.1
80-84	2	5	0.4	1.00	0.7	0.71	0.0	0.1
85+	2	5	0.7	2.00	0.7	0.83	0.0	0.1
All ages	35	49					0.1	0.1
Mortality								
Raw			0.2	0.60	0.2	0.72		
WS			0.1	0.44	0.1	0.51		
ES			0.1	0.51	0.2	0.62		
BRD-S			0.1	0.59	0.2	0.69		
PYLL-70								
per 100,000			3.0		2.9			
ES			3.5		2.9			
AYLL-70			25.2		19.0			

* 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		Males		Females		Females	
	n	n	Age- spec. mortal.	MI-index	Age- spec. mortal.	MI-index	Prop.all cancers %	Prop.all cancers %
0- 4	2	1	0.2	0.14	0.1	0.14	14.3	6.7
5- 9	1		0.1	1.00			4.3	
10-14	1	1	0.1	1.00	0.1	1.00	4.3	4.8
15-19	1		0.1	1.00			2.4	
20-24	1		0.1	0.50			2.0	
25-29		3			0.2	0.50		4.6
30-34								
35-39	1	2	0.1	0.33	0.1	1.00	0.5	0.8
40-44	1	1	0.1	0.50	0.1	0.20	0.2	0.2
45-49	4	2	0.2	1.33	0.1	0.40	0.4	0.2
50-54	1	3	0.1	0.20	0.2	1.50	0.1	0.2
55-59	2	5	0.1	0.33	0.3	1.25	0.1	0.2
60-64	4	6	0.3	0.67	0.5	0.86	0.1	0.2
65-69	3	5	0.3	1.50	0.4	1.00	0.1	0.1
70-74	4	3	0.4	0.80	0.2	0.75	0.1	0.1
75-79	2	5	0.3	0.50	0.5	1.25	0.0	0.1
80-84	2	5	0.4	1.00	0.7	0.71	0.0	0.1
85+	1	5	0.3	1.00	0.7	1.00	0.0	0.1
All ages	31	47					0.1	0.1
Mortality								
Raw			0.1	0.54	0.2	0.71		
WS			0.1	0.41	0.1	0.50		
ES			0.1	0.47	0.1	0.61		
BRD-S			0.1	0.54	0.2	0.68		
PYLL-70								
per 100,000			2.9		2.8			
ES			3.4		2.9			
AYLL-70			26.6		19.4			

* See corresponding tables with multiple malignancies.

ICD-10 C74: Malignant neoplasm of adrenal gland
 Age distribution and age-specific mortality 2007 - 2016 (Males: 40, Females: 53)

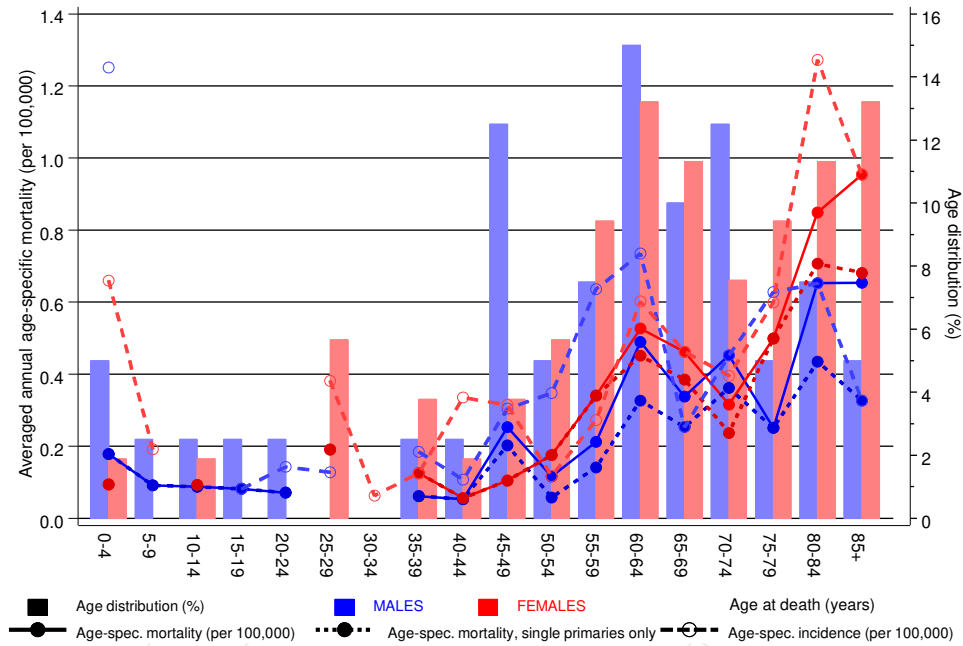
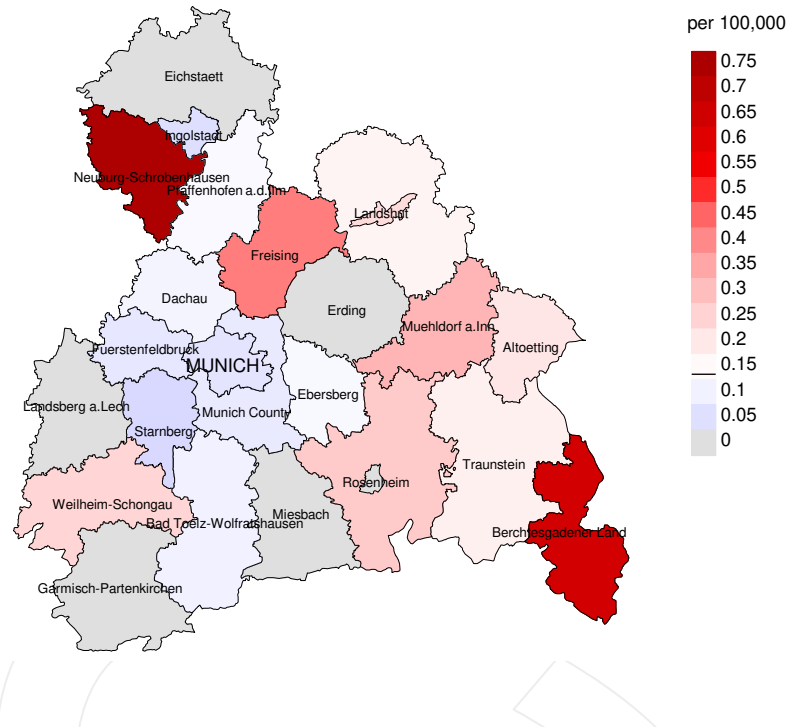


Figure 17. Distribution of age at death (bars; males: mean=52.6 yrs, median=57.0 yrs; females: mean=60.6 yrs, median=61.5 yrs) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

The difference between age at diagnosis (Table 3) and age at adrenal 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

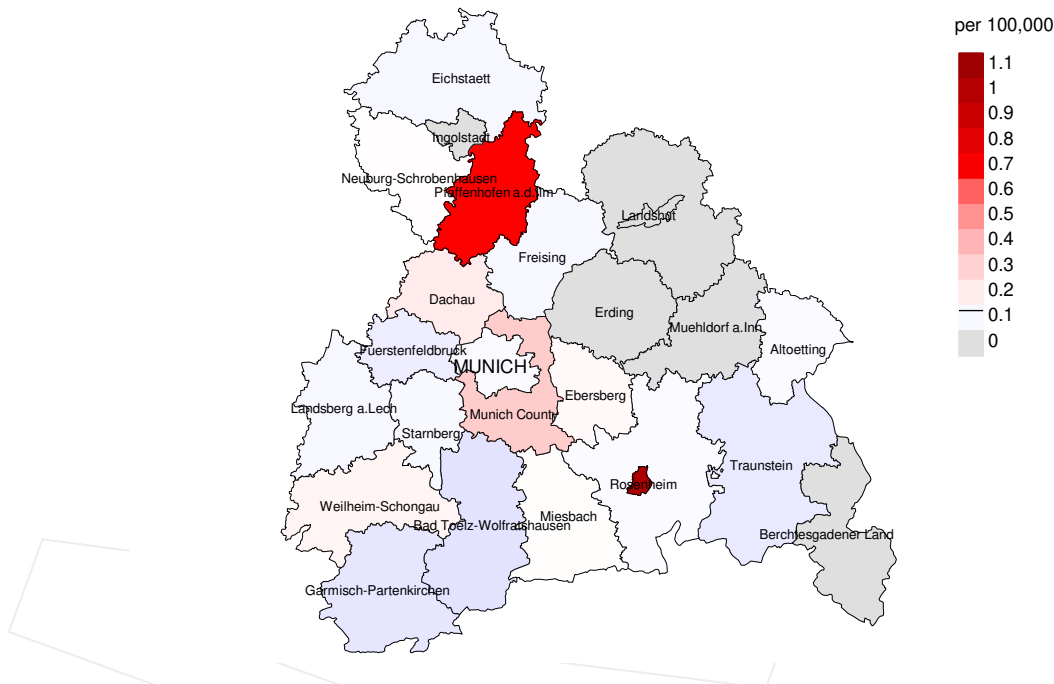
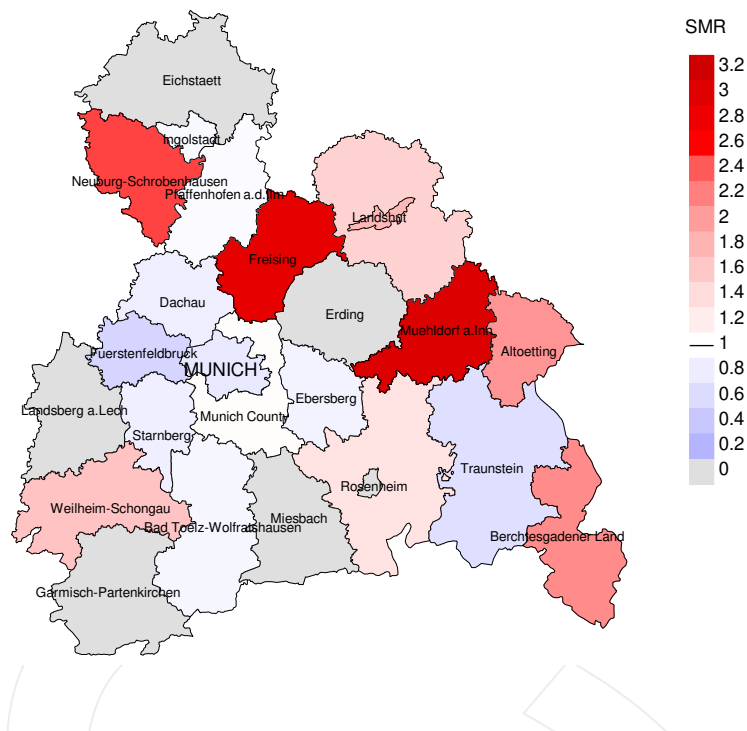


Figure 18a. Map of cancer mortality (world standard population) by county averaged for period 2007 to 2016. According to their individual mortality rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (males 0.1/100,000 WS N=40, females 0.1/100,000 WS N=53).

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 adrenal 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

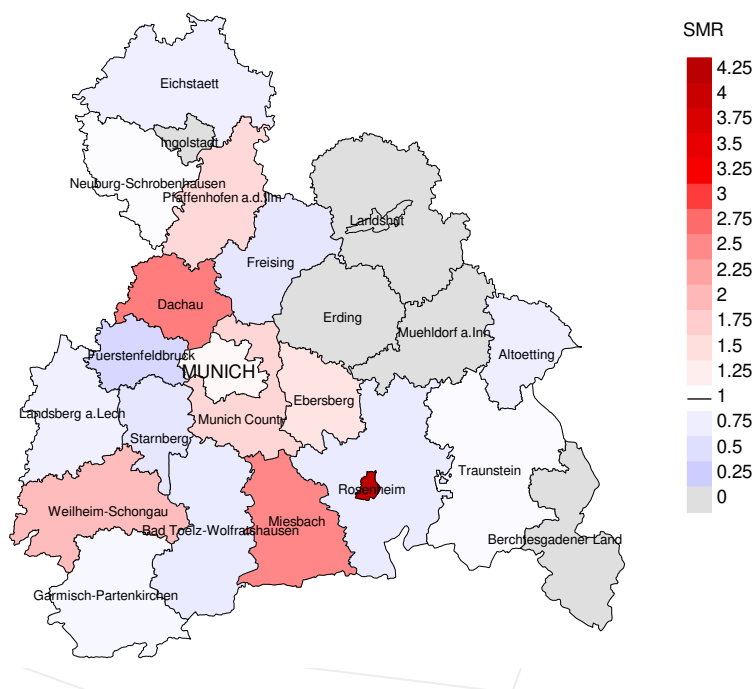


Figure 18b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2007 to 2016. According to their individual SMR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (males N=40, females N=53).

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 adrenal cancer. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 1.40. Though, the value of this parameter may vary with an underlying probability of 99% between 0.07 and 6.49, 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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