

Munich Cancer Registry



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

ICD-10 C73: Thyroid cancer

Incidence and Mortality

Year of diagnosis	1998-2016
Patients	7,554
Diseases	7,610
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/bC73__E-ICD-10-C73-Thyroid-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	7
3	Age distribution parameters by year of diagnosis	8
4	Age distribution by 5-year age group and sex	9
5	Age-specific incidence, DCO rate, proportion malignancies	10
6	Age distribution and age-specific incidence (chart)	11
6a	Age-specific incidence internationally (chart)	12
7	Standardized incidence ratio of further malignancies	13
8a	Map of cancer incidence (WS) by county (chart)	15
8b	Standardized incidence ratio (SIR) by county (chart)	16
9a	Pts incident cohorts and mortality / yr	17
9b	Incidence and mortality by year of diagnosis	18
9c	Cancer-related deaths, death certification available / yr	19
10	Medians of age at death / yr	20
11	Mortality by year of death	22
12	Distribution of age at death	23
13	Age-specific mortality	24
14	Further malignancies in deaths	25
15	Age-specific mortality (first primaries)	27
16	Age-specific mortality (single primaries)	28
17	Age distribution and age-specific mortality (chart)	29
18a	Map of cancer mortality (WS) by county (chart)	30
18b	Standardized mortality ratio (SMR) by county (chart)	31

**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
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C73	Malignant neoplasm of thyroid gland
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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	212	9	4.2	8.5	9.6	35.4	91.0
1999	204	4	2.0	7.2	9.3	23.0	89.2
2000	240	5	2.1	9.1	8.8	26.7	90.8
2001	198	5	2.5	9.3	8.6	24.2	90.4
2002	314	14	4.5	9.5	8.4	29.6	93.9 #
2003	302	8	2.6	9.5	8.0	23.2	90.7
2004	354	9	2.5	8.9	7.8	18.9	88.1
2005	372	7	1.9	9.1	7.5	17.7	87.1
2006	424	9	2.1	9.0	7.0	16.5	79.7
2007	583	7	1.2	9.0	6.4	16.3	58.1 #
2008	663	12	1.8	8.8	5.9	12.7	44.5
2009	630	4	0.6	9.3	5.4	11.3	43.5
2010	524	15	2.9	9.5	4.9	12.8	42.6
2011	468	8	1.7	9.8	4.0	12.2	45.7
2012	457	1	0.2	9.8	3.5	11.8	46.0
2013	465	13	2.8	9.9	3.0	12.3	45.8
2014	419	8	1.9	10.0	2.1	8.4	42.5
2015	404	7	1.7	10.1	1.8	7.2	96.8
2016	377	9	2.4	10.1	0.8	4.2	71.9 ##
1998-2016	7610	154	2.0	10.1	9.6	15.3	64.7

7,610 cases diagnosed 1998-2016 are related to a total of 7,554 patients. Currently, in 1,425 (18.9 %) of these 7,554 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 1,169 / 194 / 62 (15.5 % / 2.6 % / 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 419 cases has been diagnosed, of which 10.0 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 2.1 % 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 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	43	20.3	2	4.7	9.3	10.3	44.2	93.0
1999	53	26.0	3	5.7	6.3	9.9	45.3	90.6
2000	63	26.3	2	3.2	10.7	9.5	33.3	90.5
2001	54	27.3	1	1.9	11.3	9.2	33.3	90.7
2002	80	25.5	4	5.0	10.9	9.0	33.8	96.3 #
2003	84	27.8	5	6.0	10.6	8.7	32.1	91.7
2004	107	30.2	3	2.8	10.1	8.5	27.1	90.7
2005	82	22.0			10.4	8.4	26.8	93.9
2006	118	27.8	3	2.5	10.1	8.0	21.2	83.1
2007	174	29.8	3	1.7	10.3	7.3	23.6	60.9 #
2008	173	26.1	4	2.3	10.7	6.1	16.2	47.4
2009	180	28.6			11.4	5.5	12.8	43.9
2010	120	22.9	3	2.5	11.6	5.3	21.7	49.2
2011	141	30.1	3	2.1	12.0	4.3	17.0	50.4
2012	145	31.7			12.2	3.8	20.0	52.4
2013	181	38.9	5	2.8	12.3	3.2	13.8	45.9
2014	129	30.8	2	1.6	12.5	3.3	14.0	48.8
2015	122	30.2	4	3.3	12.8	3.0	13.9	97.5
2016	123	32.6	4	3.3	12.8	0.0	5.7	65.9 ##
1998-2016	2172	28.5	51	2.3	12.8	10.3	20.7	66.3

2,172 cases diagnosed 1998-2016 are related to a total of 2,149 patients. Currently, in 477 (22.2 %) of these 2,149 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 385 / 67 / 25 (17.9 % / 3.1 % / 1.2 %) 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 129 cases has been diagnosed, of which 12.5 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 3.3 % 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 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	169	79.7	7	4.1	8.3	9.3	33.1	90.5
1999	151	74.0	1	0.7	7.5	9.0	15.2	88.7
2000	177	73.8	3	1.7	8.7	8.6	24.3	91.0
2001	144	72.7	4	2.8	8.6	8.3	20.8	90.3
2002	234	74.5	10	4.3	9.0	8.1	28.2	93.2 #
2003	218	72.2	3	1.4	9.1	7.7	19.7	90.4
2004	247	69.8	6	2.4	8.5	7.5	15.4	87.0
2005	290	78.0	7	2.4	8.7	7.2	15.2	85.2
2006	306	72.2	6	2.0	8.6	6.6	14.7	78.4
2007	409	70.2	4	1.0	8.6	6.1	13.2	57.0 #
2008	490	73.9	8	1.6	8.1	5.8	11.4	43.5
2009	450	71.4	4	0.9	8.5	5.4	10.7	43.3
2010	404	77.1	12	3.0	8.7	4.7	10.1	40.6
2011	327	69.9	5	1.5	9.0	3.9	10.1	43.7
2012	312	68.3	1	0.3	8.9	3.4	8.0	42.9
2013	284	61.1	8	2.8	9.0	2.9	11.3	45.8
2014	290	69.2	6	2.1	9.0	1.6	5.9	39.7
2015	282	69.8	3	1.1	9.0	1.3	4.3	96.5
2016	254	67.4	5	2.0	9.0	1.2	3.5	74.8 ##
1998-2016	5438	71.5	103	1.9	9.0	9.3	13.1	64.1

5,438 cases diagnosed 1998-2016 are related to a total of 5,405 patients. Currently, in 948 (17.5 %) of these 5,405 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 784 / 127 / 37 (14.5 % / 2.3 % / 0.7 %) patients exist having 2 / 3 / 4+ malignancies.

The increases of incident cases in 2002 and 2007 reflect the expansion to additional registry areas.

Please be aware that data of recent annual patient cohorts may not yet be fully processed. The years under evaluation can be retrieved from the respective headings.

How to interpret:

In 2014, a subgroup of 290 cases has been diagnosed, of which 9.0 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 1.6 % 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 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	43	169	3.9	14.4	2.7	9.9	3.5	12.3	4.0	13.6
1999	53	151	4.7	12.7	3.2	9.4	4.3	11.4	5.2	12.3
2000	63	177	5.5	14.7	3.7	10.7	5.0	13.1	5.8	13.7
2001	54	144	4.7	11.8	3.2	8.0	4.2	10.1	4.5	10.8
2002	80	234	4.3	12.0	3.0	8.5	3.8	10.5	4.2	11.4
2003	84	218	4.5	11.1	2.9	8.1	3.9	9.9	4.4	10.4
2004	107	247	5.7	12.5	3.9	8.9	5.0	11.0	5.7	11.8
2005	82	290	4.3	14.6	2.8	10.1	3.7	12.7	4.2	13.4
2006	118	306	6.2	15.2	4.1	10.6	5.3	13.4	5.8	14.2
2007	174	409	7.9	17.7	5.3	12.6	6.8	15.7	7.4	16.5
2008	173	490	7.8	21.1	5.4	14.6	6.9	18.3	7.5	19.6
2009	180	450	8.1	19.3	5.6	14.1	7.1	17.3	7.6	18.5
2010	120	404	5.3	17.3	3.3	12.1	4.4	15.0	5.0	16.0
2011	141	327	6.3	14.0	4.2	9.9	5.3	12.0	5.8	13.0
2012	145	312	6.4	13.2	4.3	9.9	5.4	11.9	5.9	12.5
2013	181	284	7.9	11.9	5.4	8.0	6.8	10.1	7.3	10.9
2014	129	290	5.5	12.0	3.7	9.0	4.7	10.8	5.2	11.3
2015	122	282	5.1	11.6	3.6	9.0	4.5	10.6	4.8	11.2
2016	123	254	5.1	10.3	3.5	7.8	4.4	9.4	4.7	10.0
1998-2016	2172	5438	5.9	14.2	3.9	10.1	5.1	12.4	5.6	13.2

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

Table 3

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

Year of diagnosis	Cases n	Std.		Median						
		Mean	dev.	Min.	Max.	10%	25%	50%	75%	90%
1998	212	54.8	16.2	13.0	89.6	33.4	42.7	54.4	67.3	76.9
1999	204	52.9	15.9	16.7	88.4	30.0	42.1	53.6	62.2	75.7
2000	240	53.5	16.8	11.3	93.7	32.1	41.7	54.7	65.2	75.6
2001	198	54.2	14.8	17.6	95.4	35.2	42.5	54.8	65.0	73.4
2002	314	55.3	16.2	7.8	91.2	34.6	44.9	55.9	66.6	75.0
2003	302	54.2	16.1	7.6	100	33.6	43.1	55.0	64.7	73.5
2004	354	53.5	15.9	14.8	91.6	32.3	41.9	53.2	64.7	75.1
2005	372	55.0	15.6	13.5	98.2	36.2	43.2	54.7	66.1	74.2
2006	424	54.2	14.6	15.1	94.9	34.9	43.4	55.1	65.0	73.1
2007	583	52.8	14.8	9.3	92.0	34.2	42.0	52.4	63.9	72.2
2008	663	54.4	15.1	12.7	97.7	34.5	43.0	54.9	65.1	73.6
2009	630	52.7	15.7	12.7	93.1	31.9	41.9	52.9	63.6	72.3
2010	524	54.3	16.0	14.3	94.5	34.6	42.9	54.1	65.8	76.2
2011	468	53.7	16.7	10.1	91.5	32.3	41.0	53.1	67.4	75.2
2012	457	52.2	15.7	5.7	91.7	31.8	41.3	51.5	64.0	72.9
2013	465	54.1	16.3	11.6	93.9	32.8	41.7	53.6	66.0	76.2
2014	419	52.7	16.3	7.7	93.1	31.9	41.5	51.5	63.9	73.7
2015	404	51.1	16.4	6.4	97.7	29.2	38.9	50.3	63.6	72.9
2016	377	51.3	15.8	12.6	91.6	31.7	39.0	50.5	63.2	73.5
1998–2016	7610	53.5	15.8	5.7	100	33.1	42.0	53.5	64.8	74.2

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	43	54.7	13.9	27.2	81.5	37.2	46.2	55.2	66.2	76.2
1999	53	58.1	15.9	17.5	88.4	34.1	50.1	58.3	71.0	78.0
2000	63	57.6	17.9	15.9	93.7	32.7	45.9	56.7	69.9	79.8
2001	54	54.6	12.4	29.9	78.5	39.7	44.4	55.1	65.0	71.3
2002	80	54.9	16.8	7.8	88.6	34.8	43.0	56.5	65.8	75.4
2003	84	58.7	14.1	24.0	87.9	36.2	50.6	59.7	67.5	77.0
2004	107	55.9	15.4	16.1	88.1	36.4	45.2	57.4	66.5	75.8
2005	82	58.6	14.2	20.1	91.3	41.7	48.3	58.2	68.7	78.2
2006	118	56.2	13.9	19.6	93.4	37.4	46.6	57.8	65.4	72.3
2007	174	53.9	14.0	23.1	84.6	36.5	43.3	53.5	65.0	72.6
2008	173	55.2	14.5	12.7	89.5	35.0	46.6	57.0	64.7	72.7
2009	180	54.6	15.0	13.4	84.7	33.5	46.2	57.6	66.0	71.2
2010	120	58.1	14.9	20.5	88.5	37.9	47.4	57.4	70.4	76.3
2011	141	54.5	15.5	17.3	86.7	35.7	42.8	54.0	67.8	74.5
2012	145	55.7	15.3	19.6	91.7	36.8	44.3	57.3	66.7	74.3
2013	181	54.4	15.3	11.6	89.9	34.2	43.8	55.2	65.4	73.5
2014	129	56.2	16.4	14.3	92.3	35.7	45.0	57.5	67.1	77.6
2015	122	54.7	15.9	10.5	90.8	33.9	44.4	53.8	66.7	75.0
2016	123	53.8	15.3	24.4	85.9	34.1	41.9	52.1	64.8	73.8
1998–2016	2172	55.5	15.1	7.8	93.7	35.7	45.0	56.2	66.5	74.7

Table 3b

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

Year of diagnosis	Cases n	Mean	Std. dev.	Min. Max.		10% 25%		Median		
				Min.	Max.	10%	25%	50%	75%	90%
1998	169	54.9	16.8	13.0	89.6	32.7	42.2	54.4	67.7	77.2
1999	151	51.1	15.6	16.7	86.8	28.5	39.7	52.3	61.5	72.7
2000	177	52.0	16.2	11.3	91.0	31.9	40.7	53.2	63.6	72.4
2001	144	54.0	15.7	17.6	95.4	34.4	40.6	54.7	65.0	74.3
2002	234	55.5	16.0	10.0	91.2	34.5	46.5	55.8	66.8	75.0
2003	218	52.4	16.5	7.6	100	32.8	40.2	53.3	63.2	73.5
2004	247	52.4	16.0	14.8	91.6	31.6	40.0	52.6	63.6	74.3
2005	290	54.0	15.8	13.5	98.2	33.9	42.3	53.9	65.3	73.4
2006	306	53.4	14.8	15.1	94.9	34.7	42.1	54.5	63.7	73.2
2007	409	52.3	15.1	9.3	92.0	33.2	41.4	51.8	63.9	72.2
2008	490	54.0	15.4	16.2	97.7	34.3	42.3	54.2	65.2	74.0
2009	450	51.9	15.9	12.7	93.1	31.6	39.9	51.5	62.7	72.7
2010	404	53.2	16.2	14.3	94.5	33.9	41.3	52.5	63.9	76.1
2011	327	53.4	17.2	10.1	91.5	30.4	40.7	52.8	67.1	75.5
2012	312	50.6	15.6	5.7	90.3	30.4	39.2	50.6	61.9	70.4
2013	284	53.9	16.8	20.7	93.9	32.4	41.0	53.0	67.5	78.3
2014	290	51.1	16.1	7.7	93.1	30.9	40.2	49.6	62.1	71.6
2015	282	49.6	16.4	6.4	97.7	28.4	37.1	48.5	61.3	71.5
2016	254	50.2	16.0	12.6	91.6	31.5	37.3	49.8	62.6	72.1
1998–2016	5438	52.6	16.0	5.7	100	32.3	40.8	52.4	64.0	73.7

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	5	0.1	0.1		0.0		5	0.1	0.1
10–14	25	0.5	0.6	7	0.5	0.5	18	0.5	0.7
15–19	35	0.7	1.3	10	0.7	1.1	25	0.7	1.4
20–24	121	2.4	3.7	28	1.9	3.0	93	2.7	4.0
25–29	161	3.2	7.0	37	2.5	5.5	124	3.5	7.6
30–34	306	6.1	13.1	66	4.4	9.9	240	6.9	14.4
35–39	441	8.8	21.9	100	6.7	16.7	341	9.7	24.2
40–44	526	10.5	32.5	144	9.7	26.3	382	10.9	35.1
45–49	568	11.4	43.8	150	10.1	36.4	418	11.9	47.0
50–54	562	11.3	55.1	191	12.8	49.3	371	10.6	57.6
55–59	522	10.5	65.6	166	11.2	60.4	356	10.2	67.8
60–64	514	10.3	75.9	176	11.8	72.2	338	9.7	77.4
65–69	422	8.5	84.3	150	10.1	82.3	272	7.8	85.2
70–74	350	7.0	91.3	129	8.7	91.0	221	6.3	91.5
75–79	213	4.3	95.6	73	4.9	95.9	140	4.0	95.5
80–84	125	2.5	98.1	41	2.8	98.7	84	2.4	97.9
85+	94	1.9	100.0	20	1.3	100.0	74	2.1	100.0
All ages	4990	100.0		1488	100.0		3502	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=28 %	Females DCO rate n=56 %	Males	Females
							Prop.all cancers n=113978 %	Prop.all cancers n=112253 %
0- 4								
5- 9		5		0.5				6.0
10-14	7	18	0.6	1.7		5.6	6.1	17.8
15-19	10	25	0.8	2.2			4.0	12.1
20-24	28	93	2.0	6.9			6.1	24.7
25-29	37	124	2.4	7.9			5.4	14.8
30-34	66	238	4.1	14.9			6.9	16.1
35-39	99	337	6.1	21.1			7.2	13.5
40-44	141	381	7.6	21.3	0.7		6.5	8.4
45-49	147	413	7.4	21.6			3.7	6.0
50-54	190	371	11.0	21.7			3.1	4.3
55-59	163	353	11.5	24.0			1.8	3.8
60-64	174	334	14.2	25.1	0.6	0.9	1.3	3.0
65-69	146	271	12.3	20.9	2.1		0.8	1.9
70-74	128	219	11.6	17.3	5.5	0.5	0.6	1.5
75-79	73	138	9.2	13.8	9.6	3.6	0.4	1.0
80-84	40	84	8.7	11.9	12.5	19.0	0.4	0.8
85+	20	74	6.5	10.1	20.0	40.5	0.3	0.6
All ages	1469	3478			1.9	1.6	1.3	3.1
Incidence								
Raw			6.4	14.7				
WS			4.3	10.6				
ES			5.5	12.9				
BRD-S			6.0	13.7				

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

ICD-10 C73: Malignant neoplasm of thyroid gland
 Age distribution and age-specific incidence 2007 - 2016 (Males: 1469, Females: 3478)

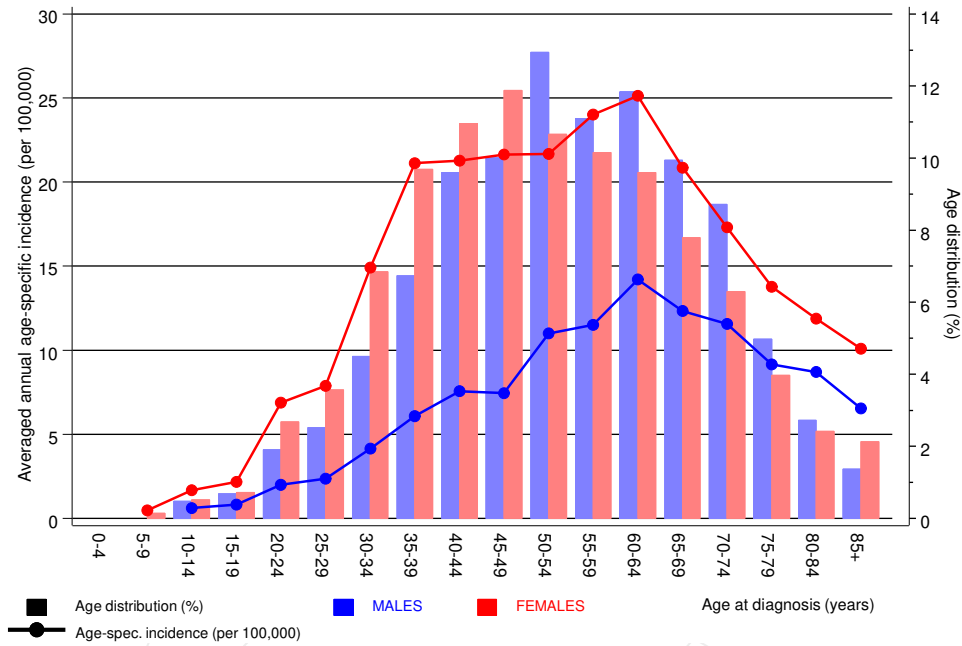


Figure 6. Age distribution (males: mean=55.0 yrs, median=55.4 yrs; females: mean=52.2 yrs, median=51.4 yrs) and age-specific incidence.

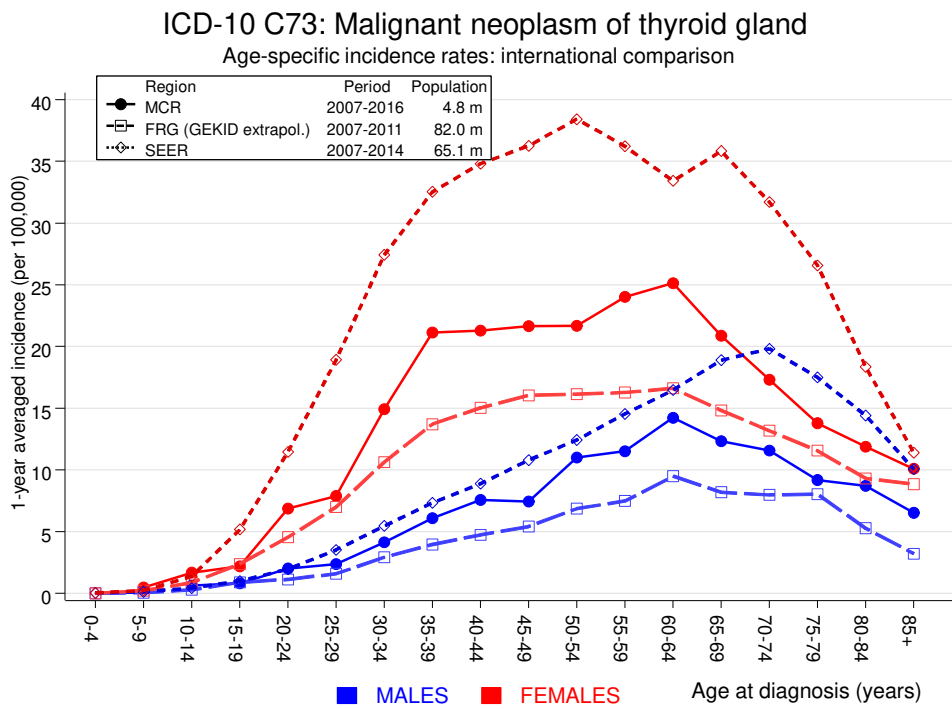


Figure 6a. Age-specific incidence in MCR registry areas compared to Germany (FRG, GEKID extrapolation) and SEER (Surveillance, Epidemiology, and End Results, USA).

Reference:

Extrapolated age-specific patient population of Germany, data status middle of 2010. Association of Population-based Cancer Registries in Germany (GEKID e.V.). Berlin, 2014. <http://www.gekid.de>. Last access: 02/11/2015
 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 %
C03–C06 Oral cavity	2	0.8	2.4	0.3	8.5	1.7	
C09–C10 Oropharynx	2	1.1	1.9	0.2	6.7	1.3	
C15 Oesophagus	7	1.6	4.4	1.8	9.0 #	7.8	
C16 Stomach	8	2.8	2.9	1.3	5.7 #	7.5	
C18 Colon	13	6.6	2.0	1.0	3.4 #	9.2	
C19–C20 Rectum	19	4.2	4.5	2.7	7.1 #	21.3	
C21 Anus/canal	2	0.2	10.5	1.3	37.8 #	2.6	
C22 Liver	5	2.2	2.3	0.7	5.3	4.0	20.0
C25 Pancreas	7	2.7	2.6	1.0	5.3 #	6.2	14.3
C32 Larynx	4	0.9	4.5	1.2	11.4 #	4.5	
C33–C34 Lung	20	9.0	2.2	1.4	3.4 #	15.8	5.0
C43 Malign. melanoma	11	3.6	3.0	1.5	5.4 #	10.6	
C46,C49 Soft tissue	4	0.4	9.1	2.5	23.4 #	5.1	
C50 Breast	2	0.2	10.3	1.2	37.1 #	2.6	
C61 Prostate	42	21.1	2.0	1.4	2.7 #	30.1	
C64 Kidney	7	2.8	2.5	1.0	5.1 #	6.0	
C67 Bladder	7	2.9	2.4	1.0	4.9	5.9	14.3
C70–C72 CNS cancer	6	1.1	5.5	2.0	11.9 #	7.0	
C73 Thyroid	21	0.7	29.8	18.4	45.5 #	29.2	
C76–C79 CUP	6	1.2	5.0	1.8	10.8 #	6.9	
C82–C85 NHL	10	3.0	3.3	1.6	6.1 #	10.1	
C90 Mult. myeloma	5	0.9	5.5	1.8	12.8 #	5.9	
C91–C96 Leukaemia	4	1.1	3.5	1.0	9.0	4.1	
Others, specified	5	2.5	2.0	0.6	4.6	3.6	
Not observed	0	2.2	0.0	0.0	1.7	-3.1	
All further malignancies	219	75.9	2.9	2.5	3.3 #	205.6	1.8
Patients		1975					
Median age at next malignancy (years)		67.1					
Person-years		6956					
Mean observation time (years)		3.5					
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".

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

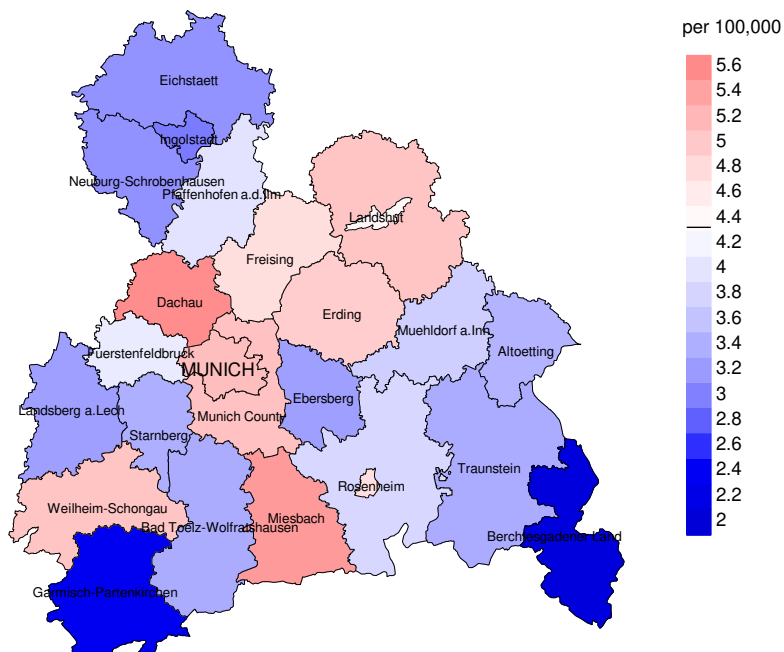
Diagnosis	Observed n	Expected n	SIR	CI 95%	CI 95%	EAR	DCO %
C07-C08 Salivary gland	3	0.2	12.8	2.6	37.3 #	1.4	
C09-C10 Oropharynx	2	0.8	2.6	0.3	9.2	0.6	50.0
C15 Oesophagus	3	0.9	3.2	0.7	9.3	1.0	
C16 Stomach	9	4.0	2.2	1.0	4.3 #	2.5	
C18 Colon	24	11.5	2.1	1.3	3.1 #	6.2	
C19-C20 Rectum	14	5.4	2.6	1.4	4.3 #	4.3	
C22 Liver	3	1.5	2.0	0.4	5.7	0.7	33.3
C23-C24 Bile	4	1.6	2.5	0.7	6.4	1.2	
C25 Pancreas	11	5.3	2.1	1.0	3.7 #	2.8	
C32 Larynx	2	0.3	6.4	0.8	23.0	0.8	50.0
C33-C34 Lung	35	11.3	3.1	2.2	4.3 #	11.8	8.6
C38,C45 Mesothelioma	5	0.2	21.2	6.9	49.4 #	2.4	
C43 Malign. melanoma	17	6.7	2.5	1.5	4.0 #	5.1	5.9
C46,C49 Soft tissue	4	0.9	4.6	1.3	11.8 #	1.6	
C48 Peritoneal	2	0.6	3.4	0.4	12.5	0.7	
C50 Breast	147	51.6	2.8	2.4	3.3 #	47.6	0.7
C51 Vulva	3	1.3	2.4	0.5	7.0	0.9	
C53 Cervix uteri	3	2.9	1.0	0.2	3.0	0.1	
C54 Corpus uteri	18	8.3	2.2	1.3	3.4 #	4.8	
C56 Ovary	13	6.0	2.2	1.2	3.7 #	3.5	
C64 Kidney	17	3.3	5.2	3.0	8.3 #	6.8	5.9
C67 Bladder	5	2.1	2.4	0.8	5.5	1.4	
C70-C72 CNS cancer	6	2.1	2.8	1.0	6.2 #	1.9	
C73 Thyroid	32	4.0	8.0	5.5	11.3 #	14.0	
C74-C80 Cancer others	4	0.3	11.7	3.2	29.9 #	1.8	
C76-C79 CUP	9	2.1	4.3	2.0	8.2 #	3.5	
C82-C85 NHL	17	5.2	3.3	1.9	5.2 #	5.9	
C90 Mult. myeloma	3	1.6	1.9	0.4	5.6	0.7	33.3
C91-C96 Leukaemia	21	2.1	10.1	6.2	15.4 #	9.4	14.3
Others, specified	7	2.7	2.6	1.1	5.4 #	2.2	
Not observed	0	2.6	0.0	0.0	1.4	-1.3	
All further malignancies	443	149.4	3.0	2.7	3.3 #	146.5	2.9

Patients	5012
Median age at next malignancy (years)	65.0
Person-years	20039
Mean observation time (years)	4.0
Median observation time (years)	2.2

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

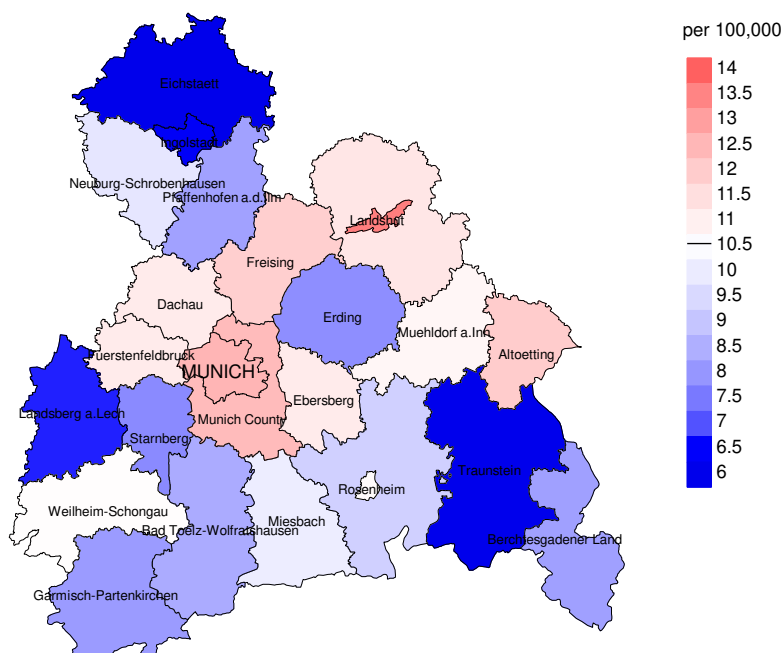
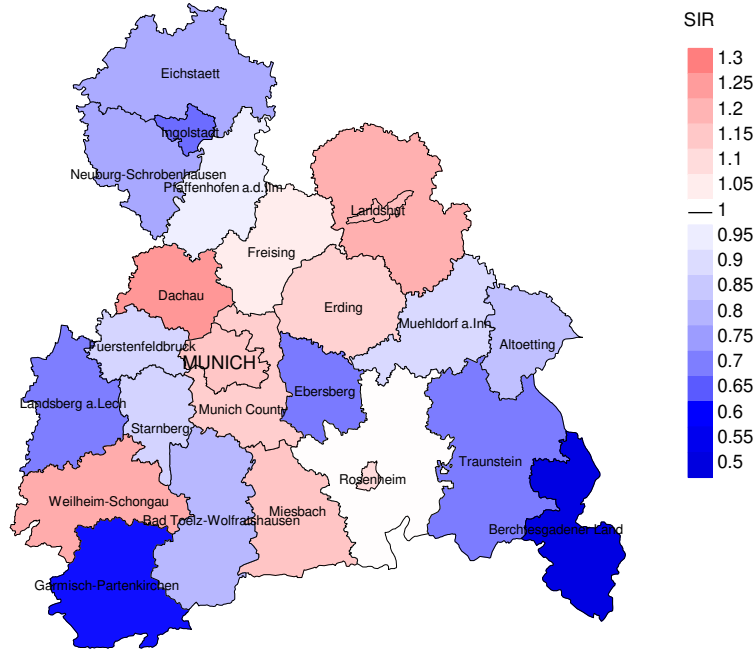


Figure 8a. Map of cancer incidence (world standard population, incl. DCO cases) by county averaged for period 2007 to 2016. According to their individual incidence rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (males 4.3/100,000 WS N=1,469, females 10.6/100,000 WS N=3,478).

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 100 women were identified with newly diagnosed thyroid cancer. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 11.2/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 8.3 and 14.8/100,000.

Standardized incidence ratio (SIR) 2007 - 2016: Males



Standardized incidence ratio (SIR) 2007 - 2016: Females

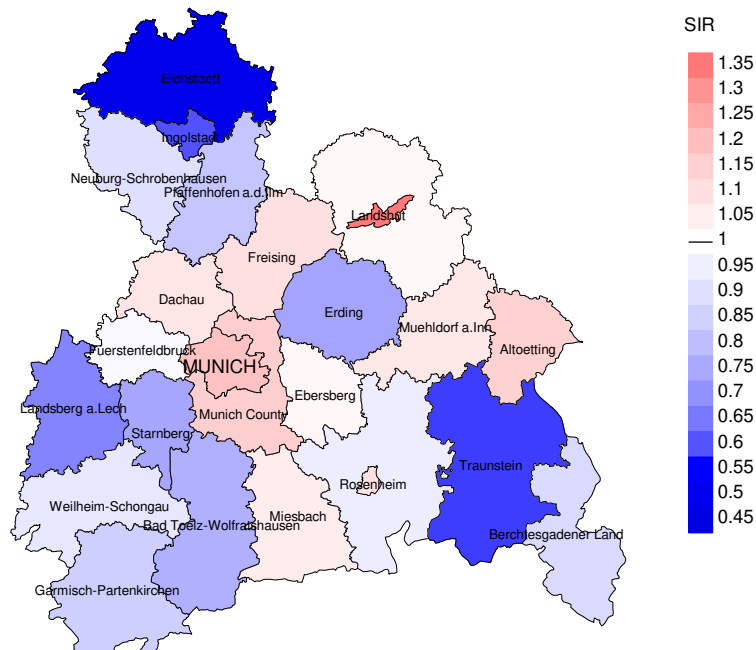


Figure 8b. Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2007 to 2016. According to their individual SIR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (males N=1,469, females N=3,478).

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 100 women were identified with newly diagnosed thyroid cancer. Therefore, the mean standardized incidence ratio (SIR) for this cancer type in this area can be calculated at 1.03. Though, the value of this parameter may vary with an underlying probability of 99% between 0.78 and 1.32, 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	212	91.0	4.2	75	35.4	97.3
1999	204	89.2	2.0	47	23.0	95.7
2000	240	90.8	2.1	64	26.7	98.4
2001	198	90.4	2.5	48	24.2	95.8
2002	314	93.9	4.5	93	29.6	96.8
2003	302	90.7	2.6	70	23.2	97.1
2004	354	88.1	2.5	67	18.9	100.0
2005	372	87.1	1.9	66	17.7	98.5
2006	424	79.7	2.1	70	16.5	98.6
2007	583	58.1	1.2	95	16.3	94.7
2008	663	44.5	1.8	84	12.7	98.8
2009	630	43.5	0.6	71	11.3	98.6
2010	524	42.6	2.9	67	12.8	95.5
2011	468	45.7	1.7	57	12.2	98.2
2012	457	46.0	0.2	54	11.8	98.1
2013	465	45.8	2.8	57	12.3	98.2
2014	419	42.5	1.9	35	8.4	97.1
2015	404	96.8	1.7	29	7.2	93.1
2016	377	71.9	2.4	16	4.2	93.8
1998-2016	7610	64.7	2.0	1165	15.3	97.3

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	212	53	96.2	18	8.5
1999	204	45	88.9	11	5.4
2000	240	48	91.7	13	5.4
2001	198	38	86.8	13	6.6
2002	314	69	98.6	26	8.3
2003	302	81	93.8	18	6.0
2004	354	68	95.6	20	5.6
2005	372	84	100.0	20	5.4
2006	424	100	98.0	18	4.2
2007	583	92	93.5	24	4.1
2008	663	73	98.6	24	3.6
2009	630	88	96.6	19	3.0
2010	524	114	98.2	30	5.7
2011	468	134	100.0	32	6.8
2012	457	118	95.8	17	3.7
2013	465	123	99.2	28	6.0
2014	419	135	99.3	29	6.9
2015	404	120	99.2	16	4.0
2016	377	131	96.9	15	4.0
1998-2016	7610	1714	97.0	391	5.1

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	53	79.2	20.8	94.1
1999	45	71.1	28.9	87.5
2000	48	77.1	22.9	88.6
2001	38	68.4	31.6	87.9
2002	69	84.1	15.9	98.5
2003	81	66.7	33.3	84.2
2004	68	70.6	29.4	81.5
2005	84	76.2	23.8	77.4
2006	100	71.0	29.0	82.7
2007	92	73.9	26.1	83.7
2008	73	68.5	31.5	87.5
2009	88	73.9	26.1	87.1
2010	114	71.9	28.1	75.9
2011	134	67.2	32.8	80.6
2012	118	61.9	38.1	67.3
2013	123	61.8	38.2	70.5
2014	135	72.6	27.4	81.3
2015	120	58.3	41.7	68.9
2016	131	58.8	41.2	73.2
1998-2016	1714	68.9	31.1	79.9

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	18	73.3	73.3	59.1	73.3
1999	18	68.9	69.2	63.7	70.5
2000	22	76.8	78.0	74.0	76.8
2001	14	72.2	70.7	75.0	71.1
2002	21	74.8	74.7	87.0	75.5
2003	26	74.8	74.9	73.2	74.9
2004	27	72.3	73.8	71.3	70.7
2005	29	79.1	79.4	68.6	76.6
2006	36	72.2	71.1	80.1	71.5
2007	35	73.3	73.3	66.6	73.3
2008	19	77.1	77.7	70.8	77.7
2009	26	73.0	68.7	79.2	70.6
2010	41	72.3	71.5	81.1	71.6
2011	44	71.6	68.0	77.3	70.4
2012	45	75.0	74.7	75.6	75.0
2013	48	74.6	68.3	80.9	71.6
2014	57	70.3	70.3	75.4	70.3
2015	41	76.1	75.2	79.7	75.9
2016	51	75.1	74.8	75.2	75.1
1998–2016	618	74.1	72.9	76.4	73.4

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	35	78.1	77.4	79.8	79.3
1999	27	74.7	72.0	76.9	71.7
2000	26	77.0	71.2	89.6	76.5
2001	24	79.1	67.3	80.0	78.9
2002	48	76.6	76.7	75.2	76.6
2003	55	76.9	77.7	74.8	78.4
2004	41	79.4	78.4	80.3	76.5
2005	55	78.0	76.1	83.6	76.1
2006	64	76.6	75.3	83.5	75.4
2007	57	78.0	78.0	75.9	78.1
2008	54	76.6	73.0	81.2	76.2
2009	62	76.9	76.9	79.4	80.0
2010	73	77.0	72.3	82.8	73.4
2011	90	78.5	78.1	81.3	78.1
2012	73	79.3	78.7	80.0	77.7
2013	75	78.5	76.5	79.4	77.1
2014	78	77.0	76.2	78.7	75.9
2015	79	78.6	77.6	81.5	77.6
2016	80	77.0	76.1	79.1	75.3
1998–2016	1096	77.7	76.4	80.0	76.6

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	16	1.4	0.37	0.8	0.30	1.3	0.37	1.9	0.48
1999	13	1.2	0.25	0.7	0.21	1.0	0.24	1.4	0.27
2000	19	1.7	0.31	0.9	0.24	1.5	0.31	2.2	0.40
2001	10	0.9	0.19	0.5	0.15	0.8	0.18	1.0	0.23
2002	18	1.0	0.23	0.5	0.16	0.8	0.21	1.1	0.27
2003	20	1.1	0.24	0.5	0.19	0.9	0.22	1.2	0.28
2004	20	1.1	0.19	0.5	0.14	0.8	0.17	1.2	0.22
2005	22	1.2	0.27	0.6	0.20	0.9	0.24	1.3	0.31
2006	29	1.5	0.25	0.8	0.18	1.2	0.22	1.6	0.27
2007	26	1.2	0.15	0.6	0.11	0.9	0.13	1.2	0.17
2008	14	0.6	0.08	0.3	0.05	0.5	0.07	0.7	0.09
2009	19	0.9	0.11	0.4	0.08	0.6	0.09	0.8	0.11
2010	32	1.4	0.27	0.7	0.20	1.0	0.23	1.3	0.26
2011	31	1.4	0.22	0.7	0.17	1.0	0.20	1.3	0.22
2012	35	1.5	0.24	0.7	0.16	1.1	0.20	1.5	0.25
2013	28	1.2	0.16	0.6	0.12	0.9	0.13	1.2	0.16
2014	45	1.9	0.35	0.9	0.25	1.4	0.30	1.8	0.34
2015	28	1.2	0.24	0.5	0.16	0.8	0.19	1.1	0.23
2016	35	1.5	0.29	0.6	0.19	1.0	0.23	1.3	0.29
1998-2016	460	1.2	0.21	0.6	0.15	0.9	0.19	1.3	0.23

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	26	2.2	0.15	0.8	0.08	1.3	0.10	1.9	0.14
1999	19	1.6	0.13	0.7	0.08	1.1	0.10	1.4	0.12
2000	18	1.5	0.10	0.8	0.07	1.1	0.08	1.3	0.09
2001	16	1.3	0.11	0.6	0.07	0.8	0.08	1.0	0.10
2002	40	2.0	0.17	0.8	0.09	1.2	0.12	1.7	0.15
2003	34	1.7	0.16	0.7	0.08	1.0	0.10	1.3	0.13
2004	28	1.4	0.11	0.5	0.06	0.8	0.07	1.1	0.09
2005	42	2.1	0.14	0.8	0.08	1.2	0.10	1.6	0.12
2006	42	2.1	0.14	0.8	0.07	1.3	0.09	1.7	0.12
2007	42	1.8	0.10	0.7	0.05	1.0	0.07	1.4	0.09
2008	36	1.6	0.07	0.6	0.04	0.9	0.05	1.2	0.06
2009	46	2.0	0.10	0.7	0.05	1.1	0.06	1.3	0.07
2010	50	2.1	0.13	0.8	0.07	1.3	0.08	1.6	0.10
2011	59	2.5	0.18	0.8	0.08	1.3	0.11	1.8	0.14
2012	38	1.6	0.12	0.6	0.06	0.9	0.07	1.2	0.10
2013	48	2.0	0.17	0.8	0.10	1.1	0.11	1.5	0.14
2014	53	2.2	0.18	0.8	0.09	1.2	0.11	1.6	0.14
2015	42	1.7	0.15	0.6	0.06	0.9	0.09	1.3	0.11
2016	42	1.7	0.17	0.7	0.09	1.0	0.11	1.3	0.13
1998-2016	721	1.9	0.13	0.7	0.07	1.1	0.09	1.4	0.11

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	1	0.1	0.1			0.0	1	0.2	0.2
15-19	0	0.0	0.1			0.0			0.2
20-24	0	0.0	0.1			0.0			0.2
25-29	3	0.4	0.5	1	0.3	0.3	2	0.4	0.7
30-34	2	0.3	0.8	1	0.3	0.7	1	0.2	0.9
35-39	5	0.7	1.5	4	1.4	2.0	1	0.2	1.1
40-44	3	0.4	1.9	1	0.3	2.4	2	0.4	1.5
45-49	15	2.0	3.9	5	1.7	4.1	10	2.2	3.7
50-54	22	2.9	6.8	10	3.4	7.5	12	2.6	6.4
55-59	38	5.1	11.9	11	3.8	11.3	27	5.9	12.3
60-64	80	10.7	22.6	47	16.0	27.3	33	7.2	19.5
65-69	92	12.3	34.8	41	14.0	41.3	51	11.2	30.7
70-74	121	16.2	51.0	54	18.4	59.7	67	14.7	45.4
75-79	134	17.9	68.9	59	20.1	79.9	75	16.4	61.8
80-84	110	14.7	83.6	31	10.6	90.4	79	17.3	79.2
85+	123	16.4	100.0	28	9.6	100.0	95	20.8	100.0
All ages	749	100.0		293	100.0		456	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 n	Females n	Males Age- spec. mortal.	Males MI-index	Females Age- spec. mortal.	Females MI-index	Males Prop.all cancers %	Females Prop.all cancers %
0- 4								
5- 9								
10-14		1			0.1	0.06		4.2
15-19								
20-24								
25-29	1	2	0.1	0.03	0.1	0.02	1.4	2.7
30-34	1	1	0.1	0.02	0.1	0.00	1.0	0.8
35-39	4	1	0.2	0.04	0.1	0.00	2.0	0.4
40-44	1	2	0.1	0.01	0.1	0.01	0.2	0.3
45-49	5	10	0.3	0.03	0.5	0.02	0.4	0.8
50-54	10	12	0.6	0.05	0.7	0.03	0.5	0.6
55-59	11	27	0.8	0.07	1.8	0.08	0.3	0.9
60-64	47	33	3.8	0.27	2.5	0.10	0.9	0.9
65-69	41	51	3.5	0.28	3.9	0.19	0.6	1.0
70-74	54	67	4.9	0.42	5.3	0.31	0.6	1.0
75-79	59	75	7.4	0.81	7.5	0.54	0.7	1.1
80-84	31	79	6.7	0.78	11.2	0.94	0.4	1.2
85+	28	95	9.1	1.40	12.9	1.28	0.4	1.0
All ages	293	456					0.6	1.0
Mortality								
Raw			1.3	0.20	1.9	0.13		
WS			0.6	0.14	0.7	0.07		
ES			0.9	0.17	1.1	0.08		
BRD-S			1.2	0.20	1.4	0.10		
PYLL-70								
per 100,000			5.5		7.1			
ES			4.8		6.1			
AYLL-70			9.2		10.1			

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 ←%
C03–C06 Oral cavity	5	2.0	1	20.0	2	40.0	2	40.0
C09–C10 Oropharynx	7	2.8	3	42.9			4	57.1
C15 Oesophagus	9	3.5	3	33.3	1	11.1	5	55.6
C16 Stomach	6	2.4					6	100.0
C18 Colon	16	6.3	8	50.0	2	12.5	6	37.5
C19–C20 Rectum	8	3.1	2	25.0			6	75.0
C22 Liver	5	2.0					5	100.0
C25 Pancreas	8	3.1	1	12.5			7	87.5
C32 Larynx	6	2.4	4	66.7	1	16.7	1	16.7
C33–C34 Lung	35	13.8	5	14.3	2	5.7	28	80.0
C43 Malign. melanoma	12	4.7	9	75.0			3	25.0
C44 Skin others	9	3.5	3	33.3	2	22.2	4	44.4
C46,C49 Soft tissue	4	1.6	1	25.0			3	75.0
C61 Prostate	38	15.0	26	68.4			12	31.6
C64 Kidney	15	5.9	9	60.0			6	40.0
C67 Bladder	14	5.5	4	28.6			10	71.4
C70–C72 CNS cancer	6	2.4	1	16.7			5	83.3
C73 Thyroid	4	1.6			3	75.0	1	25.0
C76–C79 CUP	12	4.7	3	25.0	1	8.3	8	66.7
C82–C85 NHL	7	2.8	1	14.3			6	85.7
C90 Mult. myeloma	5	2.0	2	40.0			3	60.0
C91–C96 Leukaemia	6	2.4	1	16.7			5	83.3
Others, specified	17	6.7	10	58.8	1	5.9	6	35.3
All further malignancies	254	100.0	97	38.2	15	5.9	142	55.9

Further malignancies with number of cases 1 to 2 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 ←%
C15 Oesophagus	5	1.1					5	100.0
C16 Stomach	11	2.5	2	18.2			9	81.8
C18 Colon	25	5.6	11	44.0	2	8.0	12	48.0
C19–C20 Rectum	13	2.9	3	23.1	1	7.7	9	69.2
C22 Liver	7	1.6	1	14.3	1	14.3	5	71.4
C25 Pancreas	15	3.4	1	6.7			14	93.3
C33–C34 Lung	50	11.3	6	12.0	7	14.0	37	74.0
C43 Malign. melanoma	13	2.9	9	69.2			4	30.8
C44 Skin others	12	2.7	7	58.3	1	8.3	4	33.3
C50 Breast	112	25.2	46	41.1	1	0.9	65	58.0
C53 Cervix uteri	7	1.6	6	85.7			1	14.3
C54 Corpus uteri	12	2.7	7	58.3			5	41.7
C56 Ovary	26	5.9	4	15.4			22	84.6
C64 Kidney	27	6.1	14	51.9	2	7.4	11	40.7
C67 Bladder	8	1.8	2	25.0			6	75.0
C70–C72 CNS cancer	10	2.3					10	100.0
C73 Thyroid	5	1.1			4	80.0	1	20.0
C76–C79 CUP	11	2.5	1	9.1			10	90.9
C82–C85 NHL	12	2.7	3	25.0			9	75.0
C90 Mult. myeloma	5	1.1	2	40.0			3	60.0
C91–C96 Leukaemia	21	4.7			1	4.8	20	95.2
Others, specified	37	8.3	8	21.6	4	10.8	25	67.6
All further malignancies	444	100.0	133	30.0	24	5.4	287	64.6

Further malignancies with number of cases 1 to 4 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 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		2		0.1	0.02	3.0
30-34	1	1	0.1	0.02	1.0	0.9
35-39	4		0.2	0.04	2.1	
40-44	1	1	0.1	0.01	0.2	0.2
45-49	3	8	0.2	0.02	0.3	0.7
50-54	7	9	0.4	0.04	0.4	0.5
55-59	11	20	0.8	0.08	0.4	0.8
60-64	39	25	3.2	0.27	0.9	0.8
65-69	29	42	2.4	0.27	0.5	1.0
70-74	42	56	3.8	0.47	0.6	1.1
75-79	42	56	5.3	0.86	0.6	1.0
80-84	22	64	4.8	0.81	0.4	1.2
85+	17	72	5.6	1.55	0.4	1.0
All ages	218	356			0.5	1.0
Mortality						
Raw			1.0	0.17		
WS			0.5	0.12		
ES			0.7	0.14		
BRD-S			0.9	0.18		
PYLL-70						
per 100,000			4.4			5.2
ES			3.9			4.3
AYLL-70			9.3			9.5

* 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		2			0.1	0.02		3.1
30-34	1	1	0.1	0.02	0.1	0.00	1.0	1.0
35-39	3		0.2	0.03			1.6	
40-44	1		0.1	0.01			0.2	
45-49	2	3	0.1	0.02	0.2	0.01	0.2	0.3
50-54	6	4	0.3	0.04	0.2	0.01	0.3	0.2
55-59	8	9	0.6	0.06	0.6	0.03	0.3	0.4
60-64	22	11	1.8	0.18	0.8	0.04	0.5	0.4
65-69	15	22	1.3	0.16	1.7	0.11	0.3	0.5
70-74	31	27	2.8	0.38	2.1	0.18	0.4	0.5
75-79	30	29	3.8	0.68	2.9	0.31	0.5	0.6
80-84	14	42	3.0	0.52	5.9	0.78	0.3	0.8
85+	11	56	3.6	1.10	7.6	1.10	0.2	0.8
All ages	144	206					0.4	0.6
Mortality								
Raw			0.6	0.12	0.9	0.07		
WS			0.3	0.08	0.3	0.03		
ES			0.5	0.10	0.4	0.04		
BRD-S			0.6	0.13	0.6	0.05		
PYLL-70								
per 100,000			3.0		2.6			
ES			2.7		2.2			
AYLL-70			10.6		9.8			

* See corresponding tables with multiple malignancies.

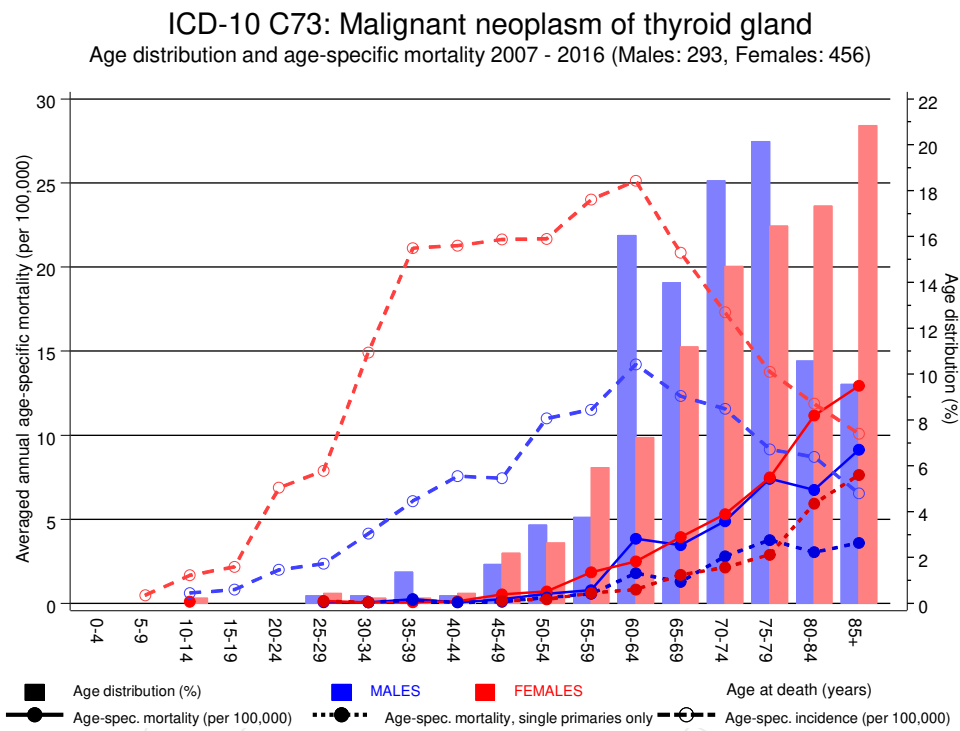
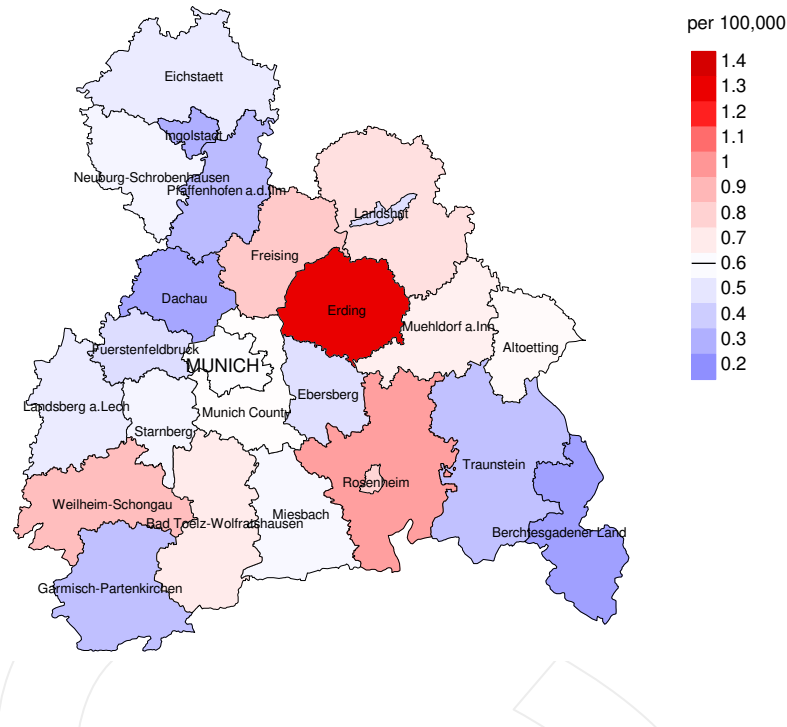


Figure 17. Distribution of age at death (bars; males: mean=64.7 yrs, median=65.7 yrs; females: mean=66.4 yrs, median=68.5 yrs) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

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

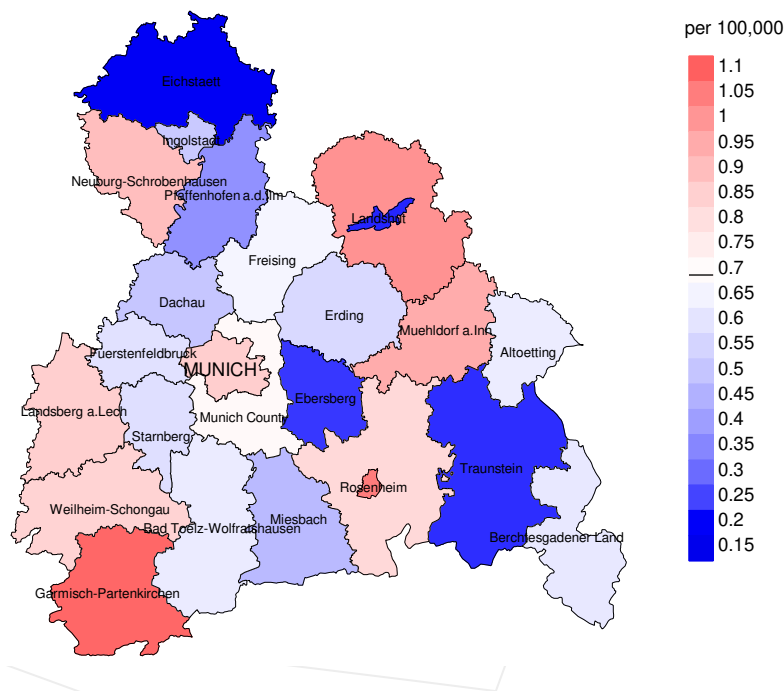
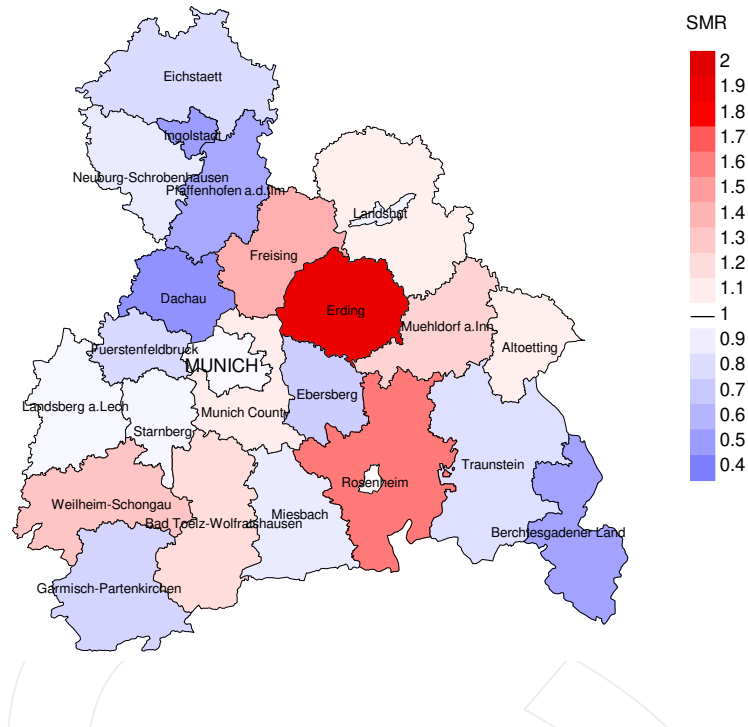


Figure 18a. Map of cancer mortality (world standard population) by county averaged for period 2007 to 2016. According to their individual mortality rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (males 0.6/100,000 WS N=293, females 0.7/100,000 WS N=456).

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 8 women died from thyroid cancer. Therefore, the mean mortality rate for this cancer type in this area can be calculated at 0.2/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 0.1 and 1.1/100,000.

Standardized mortality ratio (SMR) 2007 - 2016: Males



Standardized mortality ratio (SMR) 2007 - 2016: Females

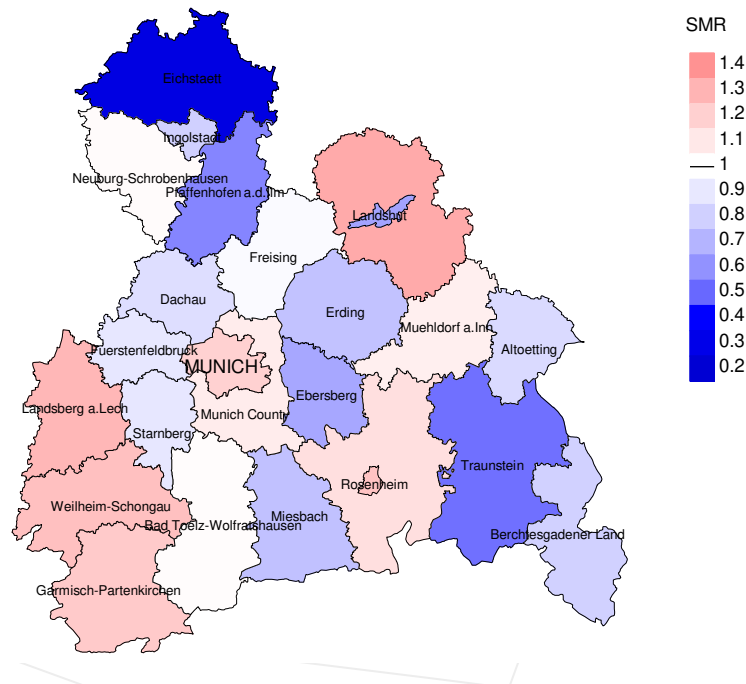


Figure 18b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2007 to 2016. According to their individual SMR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (males N=293, females N=456).

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 8 women died from thyroid cancer. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 0.66. Though, the value of this parameter may vary with an underlying probability of 99% between 0.21 and 1.53, 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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