Munich Cancer Registry

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ICD-10 C73: Follicular thyroid ca.

Incidence and Mortality

Year of diagnosis	1998-2019
Patients	1,026
Diseases	1,026
Creation date	01/26/2021
Database export	01/07/2021
Population	4.92 m

Munich Cancer Registry
Cancer Registry Bavaria - Upper Bavaria Regional Center
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Marchioninistr. 15
Munich, 81377
Germany

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

https://www.tumorregister-muenchen.de/en/facts/base/bC73F_E-ICD-10-C73-Follicular-thyroid-ca.-incidence-and-mortality.pdf

Index of figures and tables

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, January 2021

[#] 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
C73	Malignant neoplasm of thyroid gland

... in case of coexisting one of the following ...

Morphology codes (ICD-O-3 2013) used for specifying cancer site

Code	Description
8330/3	Follicular adenocarcinoma, NOS
8331/3	Follicular adenocarcinoma, well differentiated
8332/3	Follicular adenocarcinoma, trabecular
8335/3	Follicular carcinoma, minimally invasive

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	43			9.3	12.9	55.8	95.3
1999	35			9.0	12.6	54.3	94.3
2000	46			9.7	12.2	47.8	95.7
2001	31			9.7	12.3	32.3	87.1
2002	52			9.2	12.2	38.5	92.3 #
2003	42			10.0	11.4	35.7	95.2
2004	54			9.6	10.7	35.2	94.4
2005	42			11.0	10.1	38.1	88.1
2006	55			10.5	9.1	34.5	90.9
2007	74			11.2	9.1	31.1	87.8 #
2008	67			10.9	8.1	34.3	95.5
2009	59			10.8	7.5	22.0	96.6
2010	48			11.1	7.5	31.3	97.9
2011	40			11.2	6.3	22.5	92.5
2012	43			11.2	6.1	30.2	95.3
2013	48			11.2	5.2	12.5	100.0
2014	44			11.2	4.6	9.1	95.5
2015	50			11.9	3.0	16.0	90.0
2016	40			12.0	2.7	2.5	100.0
2017	44			12.4	1.8	4.5	97.7
2018	44			12.7	1.4		100.0
2019	25			12.5	0.0		76.0 ##
1998-2019	1026			12.5	12.9	27.4	93.9

1,026 cases diagnosed 1998-2019 are related to a total of 1,026 patients. Currently, in 259 (25.2 %) of these 1,026 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 212 / 37 / 10 (20.7 % / 3.6 % / 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 retreived from the respective headings.

How to interpret:
In 2017, a subgroup of 44 cases has been diagnosed, of which 12.4 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 1.8 % 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	10	23.3			10.0	13.6	60.0	100.0	
1999	13	37.1			13.0	12.8	69.2	100.0	
2000	15	32.6			18.4	12.3	53.3	93.3	
2001	11	35.5			14.3	12.3	27.3	81.8	
2002	17	32.7			10.6	12.4	35.3	88.2	#
2003	14	33.3			11.3	11.4	42.9	100.0	
2004	13	24.1			10.8	10.4	53.8	100.0	
2005	11	26.2			11.5	10.2	45.5	90.9	
2006	17	30.9			9.9	9.8	29.4	82.4	
2007	27	36.5			11.5	9.2	40.7	85.2	#
2008	19	28.4			12.0	8.3	31.6	100.0	
2009	25	42.4			12.5	6.9	24.0	96.0	
2010	16	33.3			13.0	7.9	43.8	100.0	
2011	12	30.0			12.7	5.9	25.0	100.0	
2012	15	34.9			12.8	6.5	40.0	93.3	
2013	24	50.0			12.4	5.6	16.7	100.0	
2014	18	40.9			12.6	3.5	11.1	100.0	
2015	15	30.0			13.0	2.9	26.7	93.3	
2016	18	45.0			13.5	1.8		100.0	
2017	15	34.1			13.5	2.6		100.0	
2018	18	40.9			14.6	4.2		100.0	
2019	6	24.0			14.3	0.0		100.0	##
1998-2019	349	34.0			14.3	13.6	29.8	95.4	

349 cases diagnosed 1998-2019 are related to a total of 349 patients. Currently, in 100 (28.7 %) of these 349 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 82 / 16 / 2 (23.5 % / 4.6 % / 0.6 %) 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 retreived from the respective headings.

How to interpret:
In 2017, a subgroup of 15 cases has been diagnosed, of which 13.5 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 2.6 % 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 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	33	76.7			9.1	12.6	54.5	93.9	
1999	22	62.9			7.3	12.5	45.5	90.9	
2000	31	67.4			5.8	12.1	45.2	96.8	
2001	20	64.5			7.5	12.2	35.0	90.0	
2002	35	67.3			8.5	12.1	40.0	94.3	#
2003	28	66.7			9.5	11.4	32.1	92.9	
2004	41	75.9			9.0	10.8	29.3	92.7	
2005	31	73.8			10.8	10.1	35.5	87.1	
2006	38	69.1			10.8	8.7	36.8	94.7	
2007	47	63.5			11.0	9.0	25.5	89.4	#
2008	48	71.6			10.4	7.9	35.4	93.8	
2009	34	57.6			10.0	7.8	20.6	97.1	
2010	32	66.7			10.2	7.3	25.0	96.9	
2011	28	70.0			10.5	6.5	21.4	89.3	
2012	28	65.1			10.5	5.8	25.0	96.4	
2013	24	50.0			10.6	5.1	8.3	100.0	
2014	26	59.1			10.4	5.2	7.7	92.3	
2015	35	70.0			11.4	3.1	11.4	88.6	
2016	22	55.0			11.3	3.2	4.5	100.0	
2017	29	65.9			11.9	1.4	6.9	96.6	
2018	26	59.1			11.7	0.0		100.0	
2019	19	76.0			11.5	0.0		68.4	##
1998-2019	677	66.0			11.5	12.6	26.1	93.1	

677 cases diagnosed 1998-2019 are related to a total of 677 patients. Currently, in 159 (23.5 %) of these 677 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 130 / 21 / 8 (19.2 % / 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 retreived from the respective headings.

How to interpret:
In 2017, a subgroup of 29 cases has been diagnosed, of which 11.9 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 1.4 % 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 4.92 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	10	33	0.9	2.8	0.6	1.5	0.8	2.1	1.0	2.6
1999	13	22	1.2	1.9	0.7	1.2	1.1	1.5	1.6	1.8
2000	15	31	1.3	2.6	0.8	2.0	1.2	2.3	1.5	2.4
2001	11	20	0.9	1.6	0.6	1.0	0.9	1.4	0.9	1.5
2002	17	35	0.9	1.8	0.6	1.1	0.8	1.5	0.9	1.7
2003	14	28	0.7	1.4	0.4	1.0	0.7	1.2	0.8	1.4
2004	13	41	0.7	2.1	0.4	1.4	0.6	1.7	0.7	1.9
2005	11	31	0.6	1.6	0.3	1.0	0.5	1.3	0.6	1.4
2006	17	38	0.9	1.9	0.6	1.1	0.8	1.5	0.8	1.6
2007	27	47	1.2	2.0	0.7	1.4	1.0	1.7	1.2	1.8
2008	19	48	0.9	2.1	0.5	1.2	0.7	1.5	0.8	1.8
2009	25	34	1.1	1.5	0.7	1.0	0.9	1.2	1.1	1.4
2010	16	32	0.7	1.4	0.4	0.8	0.5	1.0	0.7	1.2
2011	12	28	0.5	1.2	0.3	0.8	0.4	1.0	0.5	1.1
2012	15	28	0.7	1.2	0.4	0.8	0.5	1.0	0.6	1.1
2013	24	24	1.0	1.0	0.7	0.6	0.9	0.8	1.0	0.9
2014	18	26	0.8	1.1	0.5	0.8	0.6	1.0	0.7	1.0
2015	15	35	0.6	1.4	0.4	0.9	0.5	1.2	0.6	1.3
2016	18	22	0.7	0.9	0.5	0.8	0.6	0.9	0.7	0.9
2017	15	29	0.6	1.2	0.4	0.8	0.5	0.9	0.6	1.1
2018	18	26	0.7	1.0	0.5	0.6	0.6	0.8	0.7	0.9
2019	6	19	0.2	0.8	0.2	0.5	0.2	0.6	0.2	0.7
1998-2019	349	677	0.8	1.5	0.5	1.0	0.7	1.2	0.7	1.3

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	Mean	Std. dev.	Min.	Max.	10%	25%	Median 50%	75%	90%
1998	43	61.4	14.7	31.0	83.2	39.7	50.8	64.3	76.0	77.7
1999	35	61.6	16.6	19.5	80.2	40.7	49.4	62.0	77.8	78.6
2000	46	56.4	20.7	11.5	88.5	29.1	36.5	58.9	72.4	79.8
2001	31	58.7	11.8	35.8	78.9	42.9	47.8	59.9	67.9	74.4
2002	52	59.8	14.4	23.4	86.4	41.9	49.0	59.9	69.6	76.8
2003	42	57.7	16.6	21.3	89.5	36.3	47.2	58.6	70.1	78.8
2004	54	58.2	17.1	14.8	86.0	36.7	45.5	62.2	70.0	78.9
2005	42	59.2	17.1	13.5	82.6	36.6	48.7	64.0	72.1	78.7
2006	55	60.3	14.8	20.2	94.9	39.5	53.1	61.9	69.4	77.2
2007	74	55.9	16.1	24.3	83.8	35.0	43.2	57.5	69.1	75.4
2008	67	60.9	14.7	29.7	86.4	42.4	48.2	64.0	70.9	80.6
2009	59	57.7	15.9	13.5	85.9	36.0	47.6	58.5	68.3	79.7
2010	48	61.7	17.2	17.2	87.7	35.7	48.6	63.8	76.0	83.4
2011	40	58.0	15.7	20.1	79.8	36.7	47.9	61.3	70.7	75.0
2012	43	55.7	16.5	20.2	88.5	30.9	45.0	53.2	68.1	74.2
2013	48	58.5	15.8	20.7	88.7	36.1	46.5	61.4	70.4	75.3
2014	44	54.9	17.6	7.7	92.3	33.1	45.2	56.7	64.4	75.4
2015	50	58.1	16.6	20.7	84.5	34.5	46.1	58.6	72.1	77.6
2016	40	51.4	16.5	16.8	82.4	33.3	38.8	49.2	68.8	72.2
2017	44	57.4	15.6	23.5	86.1	36.0	46.9	55.6	69.4	77.6
2018	44	58.2	17.2	23.3	82.3	32.7	44.3	61.4	72.8	78.7
2019	25	56.1	18.4	21.1	86.0	30.0	45.8	55.3	69.6	79.0
1998–2019	1026	58.1	16.3	7.7	94.9	36.0	46.3	59.9	70.9	78.4

Table 3a

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

Year of diagnosis	Cases n	Mean	Std. dev.	Min.	Max.	10%	25%	Median 50%	75%	90%
1998	10	58.5	9.5	46.2	76.3	47.9	52.9	55.0	64.3	73.8
1999	13	67.5	12.6	47.9	80.2	49.4	53.6	72.6	77.9	79.9
2000	15	66.0	15.0	40.5	88.5	46.6	56.0	63.6	78.8	86.7
2001	11	58.1	10.7	40.8	77.0	44.4	50.1	59.0	65.1	69.3
2002	17	58.0	14.1	23.4	81.0	39.3	53.1	59.8	65.5	76.8
2003	14	65.3	8.6	54.3	79.9	55.6	57.5	65.6	71.7	79.2
2004	13	62.7	17.2	36.7	85.2	40.5	45.8	64.1	75.2	83.1
2005	11	60.0	16.4	36.6	78.7	37.8	42.9	64.1	74.2	78.4
2006	17	59.7	12.0	27.2	74.8	41.4	53.5	61.5	68.5	73.1
2007	27	59.1	15.3	24.9	83.6	36.8	44.2	60.5	70.2	77.8
2008	19	59.4	13.0	30.0	79.4	35.0	49.5	64.0	68.9	73.3
2009	25	59.7	15.7	13.5	84.7	47.1	50.9	60.2	68.3	82.7
2010	16	65.1	13.9	38.8	84.7	46.6	54.0	68.3	75.2	84.1
2011	12	62.3	13.4	41.0	79.8	46.5	51.7	62.3	74.1	78.9
2012	15	61.0	13.9	39.6	88.5	45.6	48.0	63.7	73.6	75.2
2013	24	60.4	10.5	39.7	76.2	43.6	54.5	61.9	67.2	73.7
2014	18	60.9	16.4	33.1	92.3	41.7	45.9	61.1	73.7	87.6
2015	15	57.3	17.4	23.6	82.0	24.4	50.9	56.8	73.3	75.3
2016	18	54.8	16.2	28.4	82.4	32.7	40.6	52.4	71.0	72.5
2017	15	58.2	11.4	41.3	77.6	43.9	48.5	55.9	68.3	74.8
2018	18	57.0	17.8	23.7	82.3	27.4	43.1	60.9	71.6	78.7
2019	6	50.3	26.1	21.1	86.0	21.1	30.0	45.4	74.2	86.0
1998–2019	349	60.1	14.4	13.5	92.3	41.0	50.4	60.9	71.6	78.0

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 50%	75%	90%
1998	33	62.2	16.0	31.0	83.2	37.6	50.8	65.4	76.3	77.7
1999	22	58.1	18.0	19.5	78.8	34.6	48.3	60.7	75.7	78.6
2000	31	51.8	21.8	11.5	88.4	28.9	33.7	55.9	67.9	74.5
2001	20	59.0	12.6	35.8	78.9	40.9	46.9	61.2	68.7	75.1
2002	35	60.7	14.6	27.3	86.4	41.9	48.6	59.9	71.7	79.4
2003	28	53.9	18.3	21.3	89.5	25.3	39.9	51.8	67.2	78.8
2004	41	56.8	17.1	14.8	86.0	33.9	45.5	61.6	69.2	75.5
2005	31	58.9	17.6	13.5	82.6	33.3	48.7	64.0	71.8	79.4
2006	38	60.6	16.1	20.2	94.9	36.8	52.0	62.9	70.6	80.7
2007	47	54.1	16.4	24.3	83.8	32.6	38.7	53.0	69.0	74.1
2008	48	61.5	15.4	29.7	86.4	42.4	48.1	64.3	72.8	82.1
2009	34	56.2	16.2	22.8	85.9	35.1	44.9	58.0	67.8	79.4
2010	32	60.0	18.7	17.2	87.7	35.3	45.2	62.1	76.1	82.3
2011	28	56.2	16.4	20.1	79.1	30.2	44.0	61.3	69.9	74.0
2012	28	52.9	17.4	20.2	81.7	28.0	41.3	52.3	67.7	73.8
2013	24	56.6	19.8	20.7	88.7	32.8	38.5	57.5	71.7	80.3
2014	26	50.7	17.5	7.7	84.0	25.7	42.1	52.3	63.0	72.5
2015	35	58.4	16.5	20.7	84.5	38.3	44.8	60.8	70.7	78.1
2016	22	48.7	16.6	16.8	75.0	33.9	38.4	45.9	63.2	69.6
2017	29	57.0	17.6	23.5	86.1	31.5	46.5	53.6	72.4	83.2
2018	26	59.0	17.1	23.3	82.0	33.1	48.2	61.7	74.7	79.4
2019	19	57.9	15.7	22.3	81.3	33.0	48.3	55.3	69.6	79.0
1998–2019	677	57.1	17.1	7.7	94.9	33.8	44.6	59.4	70.4	78.6

Table 4

Age distribution by 5-year age group and sex for period 2007-2019
(incl. DCO)

Age at diagnosis Years	Cases n	%	Cum.%	Males n	%	Cum.%	Females n	%	Cum.%
0-4									
5-9	1	0.2	0.2			0.0	1	0.3	0.3
10-14	1	0.2	0.3	1	0.4	0.4			0.3
15-19	3	0.5	0.8			0.4	3	0.8	1.0
20-24	19	3.0	3.8	5	2.2	2.6	14	3.5	4.5
25-29	11	1.8	5.6	3	1.3	3.9	8	2.0	6.5
30-34	25	4.0	9.6	5	2.2	6.1	20	5.0	11.6
35-39	39	6.2	15.8	9	3.9	10.1	30	7.5	19.1
40-44	51	8.1	24.0	17	7.5	17.5	34	8.5	27.6
45-49	66	10.5	34.5	23	10.1	27.6	43	10.8	38.4
50-54	52	8.3	42.8	21	9.2	36.8	31	7.8	46.2
55-59	58	9.3	52.1	27	11.8	48.7	31	7.8	54.0
60-64	67	10.7	62.8	29	12.7	61.4	38	9.5	63.6
65-69	71	11.3	74.1	26	11.4	72.8	45	11.3	74.9
70-74	75	12.0	86.1	30	13.2	86.0	45	11.3	86.2
75-79	41	6.5	92.7	18	7.9	93.9	23	5.8	92.0
80-84	35	5.6	98.2	10	4.4	98.2	25	6.3	98.2
85+	11	1.8	100.0	4	1.8	100.0	7	1.8	100.0
All ages	626	100.0		228	100.0		398	100.0	

Table 5

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

Age at diagnosis Years	Males n	Females n	Males Age-spec. incid.	Females Age-spec. incid.	Males DCO rate n=0 %	Females DCO rate n=0 %	Males Prop.all cancers n=143063 %	Females Prop.all cancers n=144724 %
0- 4								
5- 9		1		0.1				1.1
10-14	1		0.1				0.8	
15-19		3		0.2				1.2
20-24	5	14	0.3	0.8			0.9	3.0
25-29	3	8	0.1	0.4			0.3	0.7
30-34	5	20	0.2	0.9			0.4	1.0
35-39	9	30	0.4	1.4			0.5	0.9
40-44	17	34	0.7	1.5			0.7	0.6
45-49	23	43	0.9	1.8			0.5	0.5
50-54	21	31	0.9	1.3			0.3	0.3
55-59	27	31	1.4	1.6			0.2	0.3
60-64	29	38	1.8	2.2			0.2	0.3
65-69	26	45	1.7	2.7			0.1	0.3
70-74	30	45	2.1	2.8			0.1	0.2
75-79	18	23	1.6	1.7			0.1	0.1
80-84	10	25	1.5	2.6			0.1	0.2
85+	4	7	0.9	0.7			0.0	0.0
All ages	228	398			0.0	0.0	0.2	0.3
Incidence								
Raw			0.8	1.3				
WS			0.5	0.8				
ES			0.6	1.0				
BRD-S			0.7	1.2				

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

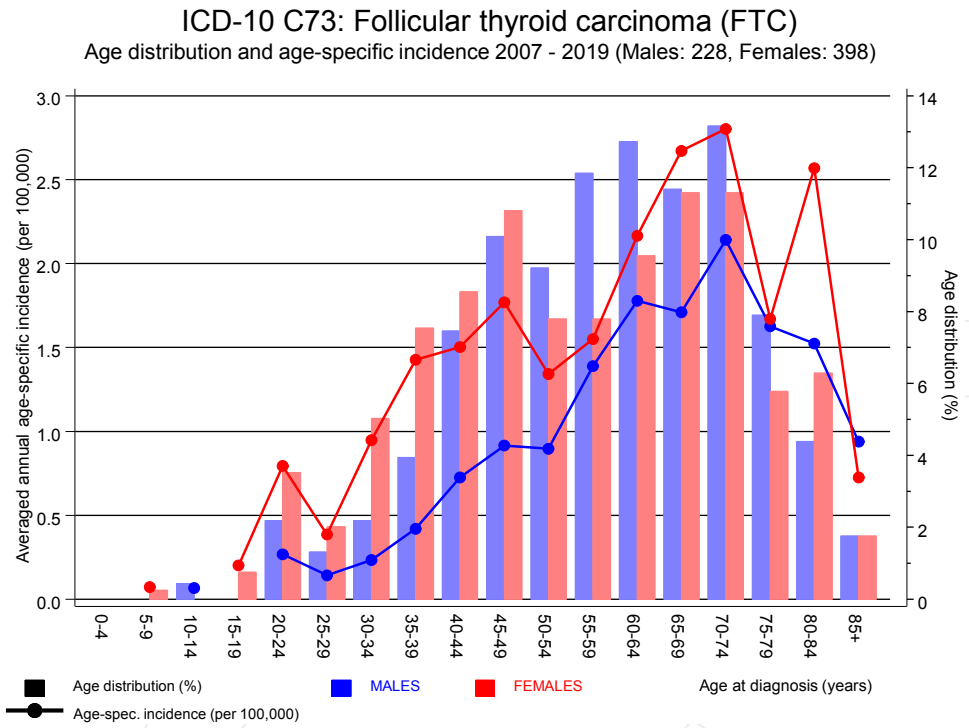


Figure 6. Age distribution (males: mean=59.3 yrs, median=60.3 yrs; females: mean=56.4 yrs, median=57.8 yrs) and age-specific incidence.

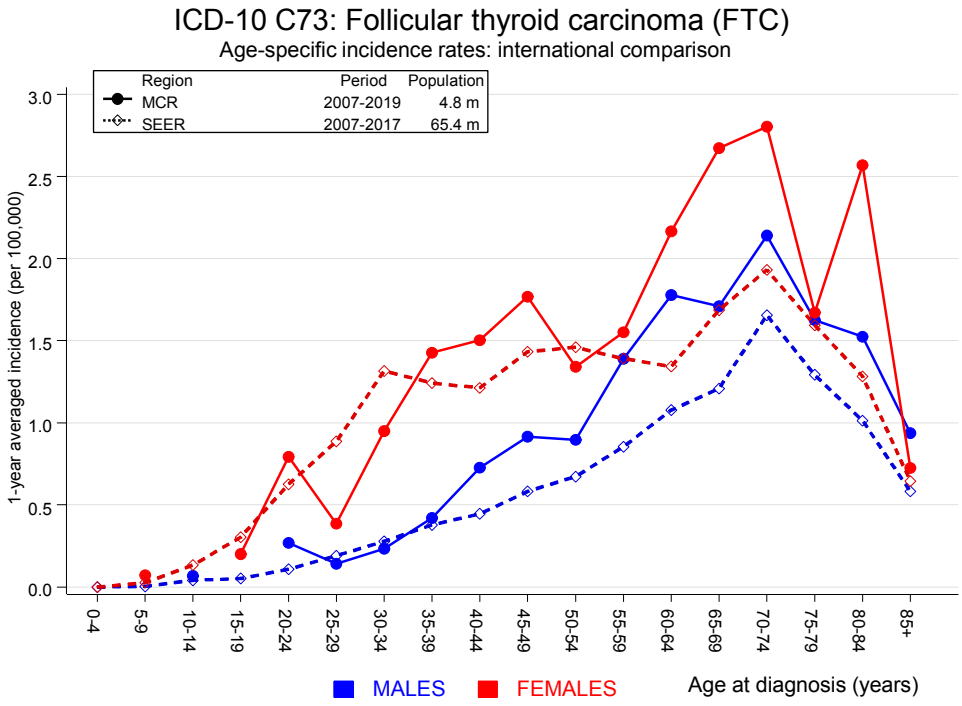


Figure 6a. Age-specific incidence in MCR registry areas compared to SEER (Surveillance, Epidemiology, and End Results, USA).

Reference:
Surveillance, Epidemiology, and End Results (SEER) Program SEER*Stat Database: Incidence - SEER 18 Regs Research Data, released April 2019, based on the November 2018 submission. http://www.seer.cancer.gov.

Table 7a

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

Diagnosis		Observed n	Expected n	SIR	CI 95%	CI 95%		EAR	DCO %
C03–C06	Oral cavity	1	0.2	5.0	0.1	27.8		5.4	
C16	Stomach	4	0.8	5.0	1.4	12.7	#	21.7	
C18	Colon	4	1.9	2.1	0.6	5.3		14.0	
C19–C20	Rectum	7	1.1	6.2	2.5	12.8	#	39.9	
C21	Anus/canal	1	0.1	19.6	0.5	109.3		6.4	
C22	Liver	2	0.6	3.3	0.4	12.0		9.5	
C25	Pancreas	2	0.8	2.5	0.3	9.2		8.2	
C32	Larynx	1	0.2	4.4	0.1	24.5		5.2	
C33–C34	Lung	4	2.5	1.6	0.4	4.1		10.3	25.0
C61	Prostate	6	5.9	1.0	0.4	2.2		0.5	
C64	Kidney	2	0.7	2.7	0.3	9.9		8.6	
C65	Renal pelvis	1	0.1	11.4	0.3	63.7		6.2	
C67	Bladder	3	0.9	3.3	0.7	9.7		14.2	33.3
C69	Eye melanoma	1	0.0	42.9	1.1	238.8	#	6.6	
C73	Thyroid	10	0.2	63.3	30.4	116.4	#	66.8	
C76–C79	CUP	1	0.3	2.9	0.1	16.2		4.4	
C82–C85	NHL	1	0.9	1.2	0.0	6.5		0.9	
C90	Mult. myeloma	1	0.3	3.7	0.1	20.7		5.0	
C91–C96	Leukaemia	2	0.3	6.6	0.8	23.9		11.5	
Not observed		0	3.2	0.0	0.0	1.2		−21.8	
All further malignancies		54	21.1	2.6	1.9	3.3	#	223.7	3.7

Patients	342
Median age at next malignancy (years)	69.6
Person-years	1473
Mean observation time (years)	4.3
Median observation time (years)	2.2

The occurrence of further specified malignancy is statistically significant.

Table 7b

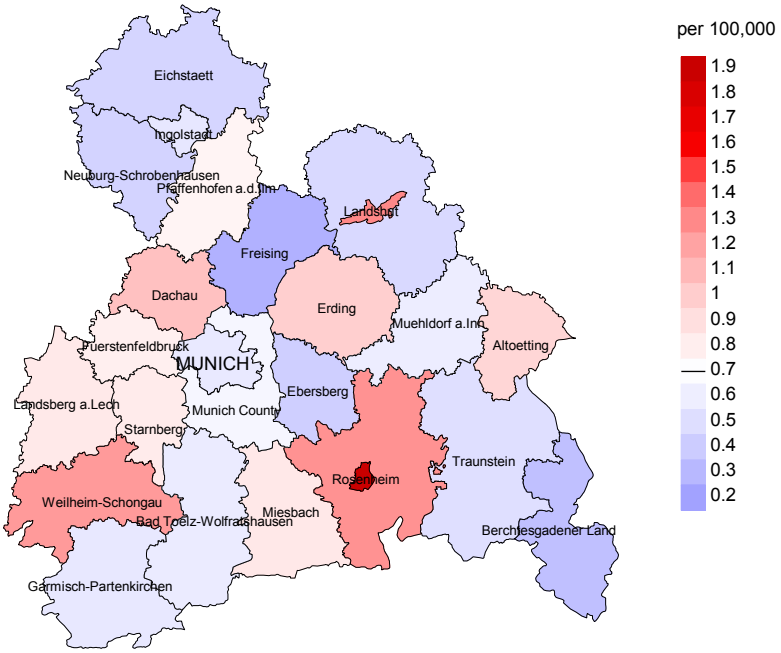
Standardized incidence ratio (SIR, with 95% confidence limits), excess absolute risk (EAR) and DCO rate of further malignancies for period 1998–2019
FEMALES

Diagnosis		Observed n	Expected n	SIR	CI 95%	CI 95%		EAR	DCO %
C07–C08	Salivary gland	1	0.1	19.8	0.5	110.4		2.9	
C09–C10	Oropharynx	1	0.1	7.4	0.2	41.4		2.6	100.0
C15	Oesophagus	1	0.2	5.1	0.1	28.6		2.4	
C16	Stomach	2	1.0	1.9	0.2	6.9		2.9	
C18	Colon	4	3.0	1.4	0.4	3.5		3.2	
C19–C20	Rectum	4	1.3	3.2	0.9	8.2		8.3	
C25	Pancreas	3	1.4	2.2	0.4	6.3		4.9	
C33–C34	Lung	5	2.3	2.1	0.7	5.0		8.1	
C37	Thymus	1	0.0	54.4	1.4	302.9	#	3.0	
C38,C45	Mesothelioma	1	0.1	17.4	0.4	96.7		2.9	
C43	Malign. melanoma	2	1.2	1.6	0.2	5.8		2.3	
C46,C49	Soft tissue	1	0.2	5.5	0.1	30.7		2.5	
C50	Breast	19	9.8	1.9	1.2	3.0	#	27.9	5.3
C51	Vulva	3	0.3	9.4	1.9	27.6	#	8.1	
C52	Vagina	1	0.1	17.1	0.4	95.4		2.9	
C54	Corpus uteri	5	1.8	2.8	0.9	6.6		9.8	
C56	Ovary	1	1.3	0.8	0.0	4.4		−0.8	
C64	Kidney	3	0.7	4.0	0.8	11.8		6.8	
C66	Ureter	1	0.1	19.9	0.5	110.7		2.9	
C67	Bladder	3	0.6	5.2	1.1	15.1	#	7.3	
C69	Eye melanoma	1	0.0	23.9	0.6	133.0		2.9	
C70–C72	CNS cancer	3	0.4	7.0	1.4	20.5	#	7.8	
C73	Thyroid	16	0.6	26.8	15.3	43.5	#	46.7	
C82–C85	NHL	3	1.2	2.5	0.5	7.2		5.4	
C90	Mult. myeloma	1	0.4	2.6	0.1	14.4		1.9	
C91–C96	Leukaemia	5	0.5	11.0	3.6	25.8	#	13.8	
Not observed		0	3.1	0.0	0.0	1.2		−9.4	
All further malignancies		91	31.7	2.9	2.3	3.5	#	180.0	2.2

Patients	663
Median age at next malignancy (years)	65.2
Person-years	3297
Mean observation time (years)	5.0
Median observation time (years)	3.6

The occurrence of further specified malignancy is statistically significant.

Average incidence (Germany 1987 standard population) 2007 - 2019: Males



Average incidence (Germany 1987 standard population) 2007 - 2019: Females

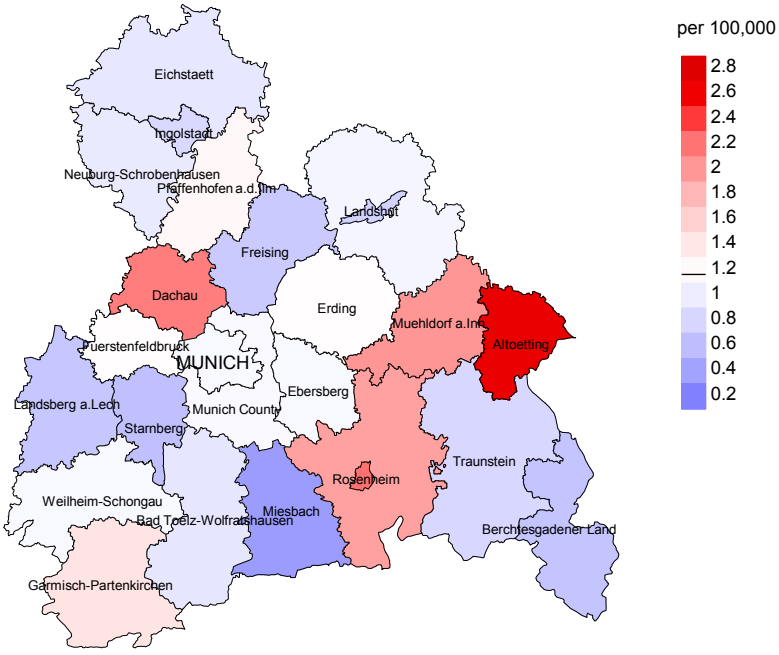
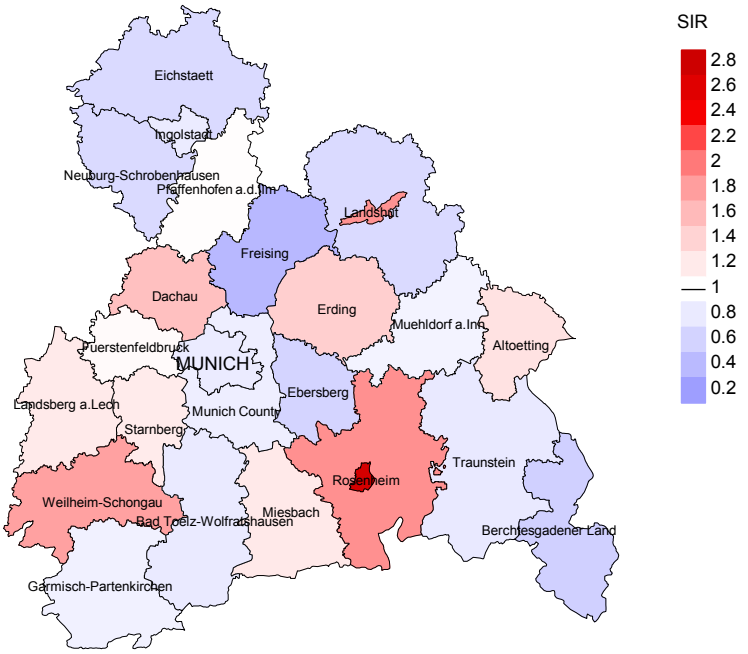


Figure 8a. Map of cancer incidence (german standard population, incl. DCO cases) by county averaged for period 2007 to 2019. According to their individual incidence rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (males 0.7/100,000 WS N=228, females 1.2/100,000 WS N=398).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 67,462 female residents (averaged) in the period from 2007 to 2019 a total of 10 women were identified with newly diagnosed follicular thyroid ca.. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 1.1/100,000 (german standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 0.4 and 2.4/100,000.

Standardized incidence ratio (SIR) 2007 - 2019: Males



Standardized incidence ratio (SIR) 2007 - 2019: Females

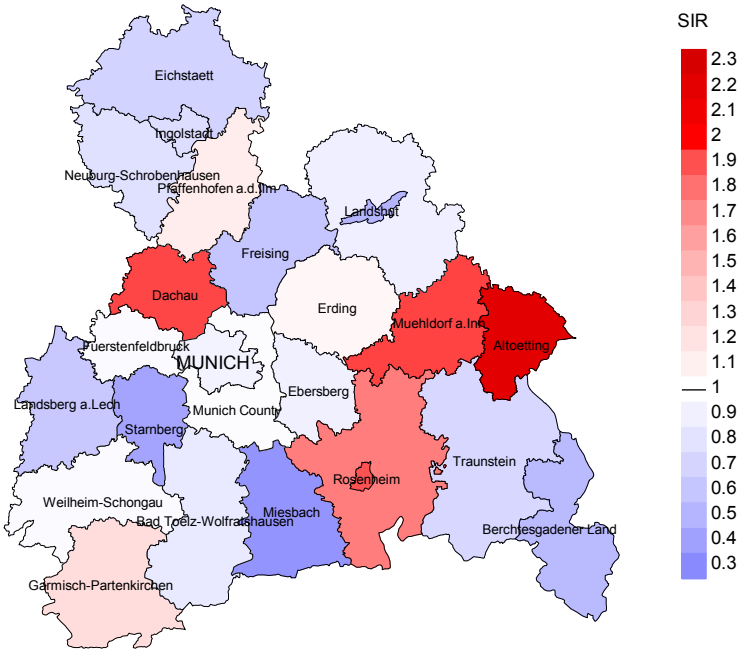


Figure 8b. Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2007 to 2019. According to their individual SIR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (males N=228, females N=398).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 67,153 female residents (averaged) in the period from 2007 to 2019 a total of 10 women were identified with newly diagnosed follicular thyroid ca.. Therefore, the mean standardized incidence ratio (SIR) for this cancer type in this area can be calculated at 0.90. Though, the value of this parameter may vary with an underlying probability of 99% between 0.33 and 1.92, 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 4.92 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	43	95.3		24	55.8	95.8
1999	35	94.3		19	54.3	100.0
2000	46	95.7		22	47.8	100.0
2001	31	87.1		10	32.3	100.0
2002	52	92.3		20	38.5	95.0
2003	42	95.2		15	35.7	86.7
2004	54	94.4		19	35.2	100.0
2005	42	88.1		16	38.1	87.5
2006	55	90.9		19	34.5	89.5
2007	74	87.8		23	31.1	91.3
2008	67	95.5		23	34.3	91.3
2009	59	96.6		13	22.0	100.0
2010	48	97.9		15	31.3	86.7
2011	40	92.5		9	22.5	100.0
2012	43	95.3		13	30.2	92.3
2013	48	100.0		6	12.5	100.0
2014	44	95.5		4	9.1	75.0
2015	50	90.0		8	16.0	62.5
2016	40	100.0		1	2.5	100.0
2017	44	97.7		2	4.5	100.0
2018	44	100.0				
2019	25	76.0				
1998-2019	1026	93.9		281	27.4	93.2

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 4.92 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	43	15	100.0	6	14.0
1999	35	14	92.9	1	2.9
2000	46	17	88.2	3	6.5
2001	31	9	66.7	1	3.2
2002	52	17	100.0		
2003	42	14	92.9		
2004	54	16	93.8	3	5.6
2005	42	24	100.0	1	2.4
2006	55	23	95.7		
2007	74	20	95.0	1	1.4
2008	67	16	100.0	1	1.5
2009	59	24	95.8	2	3.4
2010	48	34	97.1	4	8.3
2011	40	36	100.0	3	7.5
2012	43	19	100.0	1	2.3
2013	48	26	100.0	1	2.1
2014	44	22	100.0	1	2.3
2015	50	23	100.0		
2016	40	39	100.0		
2017	44	16	100.0		
2018	44	21	23.8		
2019	25	12	50.0		
1998–2019	1026	457	92.6	29	2.8

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 4.92 m as of 2007, respectively)

Year of death	Deaths n	Prop. cancer-related %	Prop. non-cancer-related %	Prop. cancer recorded on death certificate %
1998	15	86.7	13.3	93.3
1999	14	85.7	14.3	92.3
2000	17	76.5	23.5	73.3
2001	9	88.9	11.1	100.0
2002	17	94.1	5.9	100.0
2003	14	71.4	28.6	92.3
2004	16	62.5	37.5	60.0
2005	24	75.0	25.0	79.2
2006	23	65.2	34.8	77.3
2007	20	90.0	10.0	94.7
2008	16	62.5	37.5	93.8
2009	24	70.8	29.2	78.3
2010	34	76.5	23.5	81.8
2011	36	61.1	38.9	72.2
2012	19	63.2	36.8	52.6
2013	26	50.0	50.0	53.8
2014	22	72.7	27.3	72.7
2015	23	60.9	39.1	65.2
2016	39	66.7	33.3	79.5
2017	16	62.5	37.5	56.3
2018	21	38.1	61.9	40.0
2019	12	58.3	41.7	16.7
1998-2019	457	68.7	31.3	75.4

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	7	74.4	69.1	74.5	69.1
1999	5	62.6	67.1	62.1	67.1
2000	9	78.4	78.3	79.1	78.4
2001	4	75.0	72.3	77.8	74.4
2002	10	73.8	73.1	90.1	73.8
2003	4	71.0	71.0		71.0
2004	7	80.0	80.0	77.2	75.2
2005	7	81.2	82.5	68.6	83.8
2006	5	78.2	78.2		78.2
2007	9	73.4	73.4		73.4
2008	4	66.6	62.3	70.8	66.6
2009	8	78.6	76.0	84.9	76.9
2010	15	79.7	78.9	87.1	78.9
2011	8	77.2	70.8	77.2	70.8
2012	6	77.8	76.7	91.4	76.7
2013	8	76.8	76.6	77.0	76.4
2014	9	82.1	84.8	76.3	82.1
2015	8	78.7	81.4	78.7	82.9
2016	16	74.5	74.8	74.2	75.1
2017	2	76.8	68.4	85.1	
2018	8	75.7	53.5	77.5	
2019	5	86.1	82.7	86.1	
1998-2019	164	76.7	75.6	77.8	75.7

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	8	79.0	76.7	81.3	79.0
1999	9	72.3	71.9	85.3	71.9
2000	8	79.3	76.3	79.9	78.1
2001	5	66.1	66.1		72.7
2002	7	75.6	75.6		75.6
2003	10	82.2	71.1	89.1	74.7
2004	9	78.9	80.0	73.6	78.7
2005	17	77.2	77.0	82.1	77.9
2006	18	77.0	72.5	85.8	72.5
2007	11	78.0	78.0	73.2	81.7
2008	12	78.5	72.6	82.4	76.2
2009	16	85.3	85.1	87.9	85.3
2010	19	72.8	70.5	79.3	71.1
2011	28	85.1	80.3	88.0	80.3
2012	13	79.3	80.4	73.6	79.3
2013	18	80.4	78.1	80.6	78.1
2014	13	79.7	77.9	91.6	69.7
2015	15	84.9	83.4	91.1	83.2
2016	23	79.1	77.0	87.0	77.0
2017	14	82.3	81.9	86.6	81.9
2018	13	78.6	77.2	81.1	75.5
2019	7	84.7	84.7	77.1	87.9
1998–2019	293	79.9	77.2	83.6	77.4

By 2018, Bavarians' life expectancy at birth is estimated at 79.3 years for boys and 83.8 years for girls.

Deaths of patients are considered to be cancer-related, in case that fact was recorded on the death certificate, or patients had suffered from metastasis or recurrence.

Table 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	0.60	0.3	0.51	0.5	0.56	0.6	0.67
1999	4	0.4	0.31	0.2	0.28	0.3	0.27	0.4	0.23
2000	8	0.7	0.53	0.3	0.43	0.6	0.54	1.1	0.74
2001	3	0.3	0.27	0.1	0.24	0.2	0.27	0.3	0.35
2002	9	0.5	0.53	0.3	0.44	0.4	0.50	0.5	0.60
2003	4	0.2	0.29	0.1	0.27	0.2	0.28	0.2	0.28
2004	5	0.3	0.38	0.1	0.29	0.2	0.36	0.3	0.48
2005	6	0.3	0.55	0.1	0.37	0.2	0.49	0.4	0.68
2006	5	0.3	0.29	0.1	0.21	0.2	0.28	0.3	0.37
2007	9	0.4	0.33	0.2	0.27	0.3	0.31	0.4	0.37
2008	3	0.1	0.16	0.1	0.15	0.1	0.15	0.1	0.19
2009	6	0.3	0.24	0.1	0.16	0.2	0.20	0.3	0.26
2010	13	0.6	0.81	0.3	0.69	0.4	0.76	0.6	0.81
2011	4	0.2	0.33	0.1	0.31	0.1	0.32	0.2	0.40
2012	5	0.2	0.33	0.1	0.21	0.1	0.29	0.2	0.36
2013	5	0.2	0.21	0.1	0.13	0.1	0.16	0.2	0.21
2014	6	0.3	0.33	0.1	0.16	0.1	0.24	0.2	0.35
2015	6	0.3	0.40	0.1	0.27	0.2	0.35	0.2	0.37
2016	13	0.5	0.72	0.2	0.47	0.4	0.57	0.5	0.69
2017	1	0.0	0.07	0.0	0.06	0.0	0.07	0.0	0.07
2018	3	0.1	0.17	0.1	0.14	0.1	0.16	0.1	0.16
2019	2	0.1	0.33	0.0	0.18	0.1	0.26	0.1	0.29
1998-2019	126	0.3	0.36	0.1	0.26	0.2	0.31	0.3	0.38

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	7	0.6	0.21	0.2	0.13	0.3	0.16	0.5	0.19
1999	8	0.7	0.36	0.3	0.27	0.5	0.31	0.6	0.35
2000	5	0.4	0.16	0.2	0.09	0.3	0.11	0.3	0.13
2001	5	0.4	0.25	0.2	0.20	0.3	0.21	0.4	0.24
2002	7	0.4	0.20	0.1	0.12	0.2	0.14	0.3	0.18
2003	6	0.3	0.21	0.1	0.12	0.2	0.15	0.2	0.17
2004	5	0.3	0.12	0.1	0.05	0.1	0.06	0.2	0.09
2005	12	0.6	0.39	0.2	0.20	0.3	0.26	0.5	0.34
2006	10	0.5	0.26	0.2	0.19	0.3	0.21	0.4	0.24
2007	9	0.4	0.19	0.1	0.09	0.2	0.12	0.3	0.16
2008	7	0.3	0.15	0.1	0.10	0.2	0.11	0.2	0.13
2009	11	0.5	0.32	0.1	0.15	0.2	0.18	0.3	0.21
2010	13	0.6	0.41	0.2	0.30	0.4	0.35	0.5	0.38
2011	18	0.8	0.64	0.2	0.26	0.3	0.35	0.5	0.46
2012	7	0.3	0.25	0.1	0.07	0.1	0.12	0.2	0.17
2013	8	0.3	0.33	0.1	0.16	0.2	0.21	0.2	0.26
2014	10	0.4	0.38	0.2	0.19	0.2	0.23	0.3	0.32
2015	8	0.3	0.23	0.1	0.09	0.1	0.12	0.2	0.16
2016	13	0.5	0.59	0.2	0.21	0.3	0.29	0.4	0.43
2017	9	0.4	0.31	0.1	0.15	0.2	0.19	0.3	0.24
2018	5	0.2	0.19	0.1	0.09	0.1	0.12	0.1	0.14
2019	5	0.2	0.26	0.0	0.06	0.1	0.09	0.1	0.17
1998-2019	188	0.4	0.28	0.1	0.14	0.2	0.18	0.3	0.22

Table 12

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

Age at death Years	Cases n	%	Cum.%	Males n	%	Cum.%	Females n	%	Cum.%
0-4									
5-9									
10-14									
15-19									
20-24									
25-29									
30-34									
35-39	1	0.5	0.5	1	1.3	1.3			0.0
40-44	0	0.0	0.5			1.3			0.0
45-49	4	2.0	2.5	2	2.6	3.9	2	1.6	1.6
50-54	4	2.0	4.5	3	3.9	7.9	1	0.8	2.4
55-59	2	1.0	5.5			7.9	2	1.6	4.1
60-64	23	11.6	17.1	11	14.5	22.4	12	9.8	13.8
65-69	14	7.0	24.1	5	6.6	28.9	9	7.3	21.1
70-74	32	16.1	40.2	14	18.4	47.4	18	14.6	35.8
75-79	39	19.6	59.8	17	22.4	69.7	22	17.9	53.7
80-84	34	17.1	76.9	8	10.5	80.3	26	21.1	74.8
85+	46	23.1	100.0	15	19.7	100.0	31	25.2	100.0
All ages	199	100.0		76	100.0		123	100.0	

Table 13

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

Age at death Years	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								
15-19								
20-24								
25-29								
30-34								
35-39	1		0.0	0.11			0.4	
40-44								
45-49	2	2	0.1	0.09	0.1	0.05	0.1	0.1
50-54	3	1	0.1	0.14	0.0	0.03	0.1	0.0
55-59		2			0.1	0.06		0.1
60-64	11	12	0.7	0.38	0.7	0.32	0.2	0.3
65-69	5	9	0.3	0.19	0.5	0.20	0.1	0.1
70-74	14	18	1.0	0.47	1.1	0.40	0.1	0.2
75-79	17	22	1.5	0.94	1.6	0.96	0.1	0.2
80-84	8	26	1.2	0.80	2.7	1.04	0.1	0.3
85+	15	31	3.5	3.75	3.2	4.43	0.2	0.3
All ages	76	123					0.1	0.2
Mortality								
Raw			0.3	0.33	0.4	0.31		
WS			0.1	0.23	0.1	0.14		
ES			0.2	0.28	0.2	0.19		
BRD-S			0.2	0.34	0.3	0.24		
PYLL-70								
per 100,000			0.8		0.8			
ES			0.7		0.6			
AYLL-70			10.2		7.7			

Table 14a

Further malignancies in deaths in period 1998–2019
MALES

Diagnosis		Total n	Total %↓	Pre n	Pre ←%	Syn-chron ±30d n	Syn-chron ±30d ←%	Post n	Post ←%
C03–C06	Oral cavity	1	1.6			1	100.0		
C15	Oesophagus	1	1.6	1	100.0				
C16	Stomach	4	6.6					4	100.0
C18	Colon	3	4.9					3	100.0
C19–C20	Rectum	4	6.6					4	100.0
C21	Anus/canal	1	1.6					1	100.0
C22	Liver	3	4.9					3	100.0
C25	Pancreas	1	1.6					1	100.0
C32	Larynx	3	4.9	2	66.7	1	33.3		
C33–C34	Lung	6	9.8					6	100.0
C43	Malign. melanoma	1	1.6	1	100.0				
C44	Skin others	4	6.6					4	100.0
C48	Peritoneal	1	1.6					1	100.0
C61	Prostate	10	16.4	7	70.0			3	30.0
C62	Testis	1	1.6	1	100.0				
C64	Kidney	4	6.6	2	50.0			2	50.0
C65	Renal pelvis	1	1.6					1	100.0
C67	Bladder	2	3.3					2	100.0
C69	Eye melanoma	1	1.6	1	100.0				
C73	Thyroid	2	3.3			2	100.0		
C76–C79	CUP	1	1.6					1	100.0
C82–C85	NHL	1	1.6					1	100.0
C90	Mult. myeloma	1	1.6					1	100.0
C91–C96	Leukaemia	4	6.6					4	100.0
All further malignancies		61	100.0	15	24.6	4	6.6	42	68.9

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 1998–2019
FEMALES

Diagnosis		Total n	Total %↓	Pre n	Pre ←%	Syn-chron ±30d n	Syn-chron ±30d ←%	Post n	Post ←%
C15	Oesophagus	2	2.0					2	100.0
C16	Stomach	4	4.0	1	25.0			3	75.0
C18	Colon	3	3.0	1	33.3			2	66.7
C19–C20	Rectum	2	2.0			1	50.0	1	50.0
C21	Anus/canal	1	1.0	1	100.0				
C22	Liver	2	2.0					2	100.0
C25	Pancreas	4	4.0	1	25.0			3	75.0
C33–C34	Lung	8	8.0					8	100.0
C37	Thymus	1	1.0					1	100.0
C43	Malign. melanoma	3	3.0	3	100.0				
C44	Skin others	5	5.0	2	40.0			3	60.0
C46,C49	Soft tissue	1	1.0					1	100.0
C50	Breast	31	31.0	14	45.2			17	54.8
C53	Cervix uteri	1	1.0	1	100.0				
C54	Corpus uteri	6	6.0	3	50.0			3	50.0
C56	Ovary	3	3.0	1	33.3			2	66.7
C64	Kidney	5	5.0	4	80.0			1	20.0
C66	Ureter	1	1.0					1	100.0
C67	Bladder	1	1.0					1	100.0
C70–C72	CNS cancer	2	2.0					2	100.0
C73	Thyroid	2	2.0			1	50.0	1	50.0
C76–C79	CUP	1	1.0	1	100.0				
C82–C85	NHL	3	3.0	1	33.3			2	66.7
C91–C96	Leukaemia	8	8.0					8	100.0
All further malignancies		100	100.0	34	34.0	2	2.0	64	64.0

ICD-10 C44 (Other malignant neoplasms of skin) is not systematically recorded by MCR and therefore not considered for evaluation as a particular primary but at least as a further malignancy.

Table 15

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

Age at death Years	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								
15-19								
20-24								
25-29								
30-34								
35-39	1		0.0	0.14			0.4	
40-44								
45-49	1	1	0.0	0.06	0.0	0.02	0.1	0.1
50-54	3	1	0.1	0.16	0.0	0.04	0.1	0.0
55-59		2			0.1	0.08		0.1
60-64	9	10	0.6	0.38	0.6	0.31	0.2	0.3
65-69	4	9	0.3	0.21	0.5	0.26	0.1	0.2
70-74	13	18	0.9	0.59	1.1	0.47	0.2	0.3
75-79	13	15	1.2	1.08	1.1	0.83	0.2	0.2
80-84	7	21	1.1	1.17	2.2	1.05	0.1	0.3
85+	12	21	2.8	4.00	2.2	7.00	0.2	0.2
All ages	63	98					0.1	0.2
Mortality								
Raw			0.2	0.35	0.3	0.29		
WS			0.1	0.24	0.1	0.14		
ES			0.1	0.29	0.2	0.17		
BRD-S			0.2	0.35	0.2	0.22		
PYLL-70								
per 100,000			0.7		0.6			
ES			0.6		0.5			
AYLL-70			10.3		7.1			

* See corresponding tables with multiple malignancies.

Table 16

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

Age at death Years	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								
15-19								
20-24								
25-29								
30-34								
35-39	1		0.0	0.14			0.4	
40-44								
45-49	1		0.0	0.06			0.1	
50-54	3	1	0.1	0.17	0.0	0.04	0.1	0.0
55-59		1			0.1	0.04		0.0
60-64	6	5	0.4	0.30	0.3	0.19	0.1	0.1
65-69	1	9	0.1	0.08	0.5	0.33	0.0	0.2
70-74	8	8	0.6	0.42	0.5	0.24	0.1	0.1
75-79	9	9	0.8	0.75	0.7	0.53	0.1	0.1
80-84	4	13	0.6	0.67	1.3	0.72	0.1	0.2
85+	7	16	1.6	3.50	1.7	5.33	0.1	0.2
All ages	40	62					0.1	0.1
Mortality								
Raw			0.1	0.24	0.2	0.20		
WS			0.1	0.17	0.1	0.09		
ES			0.1	0.20	0.1	0.12		
BRD-S			0.1	0.24	0.1	0.15		
PYLL-70								
per 100,000			0.6		0.3			
ES			0.5		0.3			
AYLL-70			12.9		5.6			

* See corresponding tables with multiple malignancies.

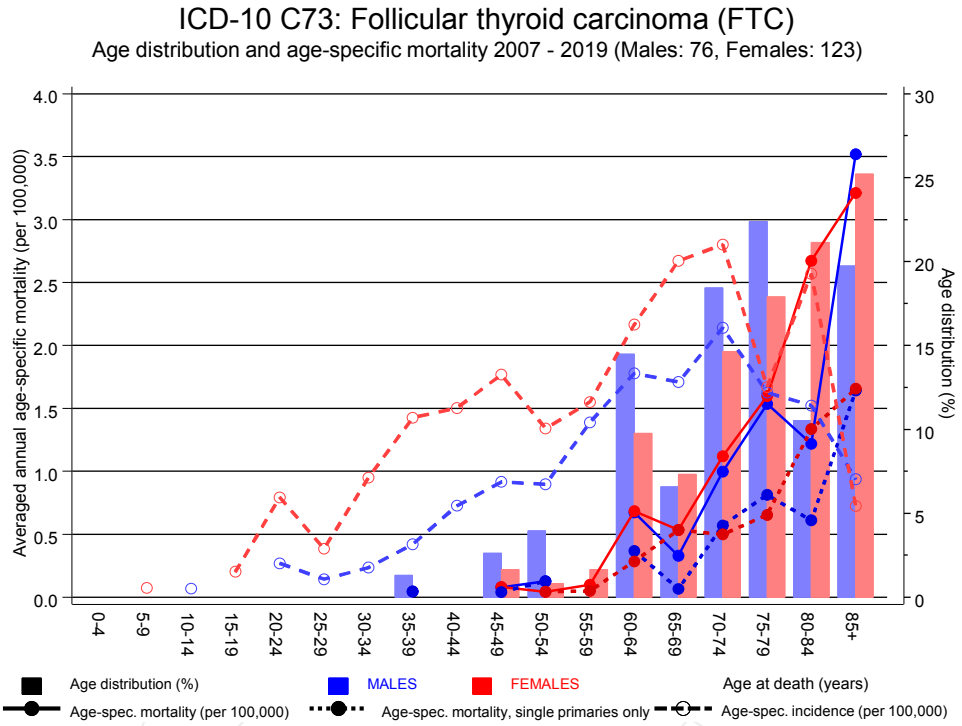


Figure 17. Distribution of age at death (bars; males: mean=65.5 yrs, median=65.9 yrs; females: mean=67.2 yrs, median=67.7 yrs) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

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

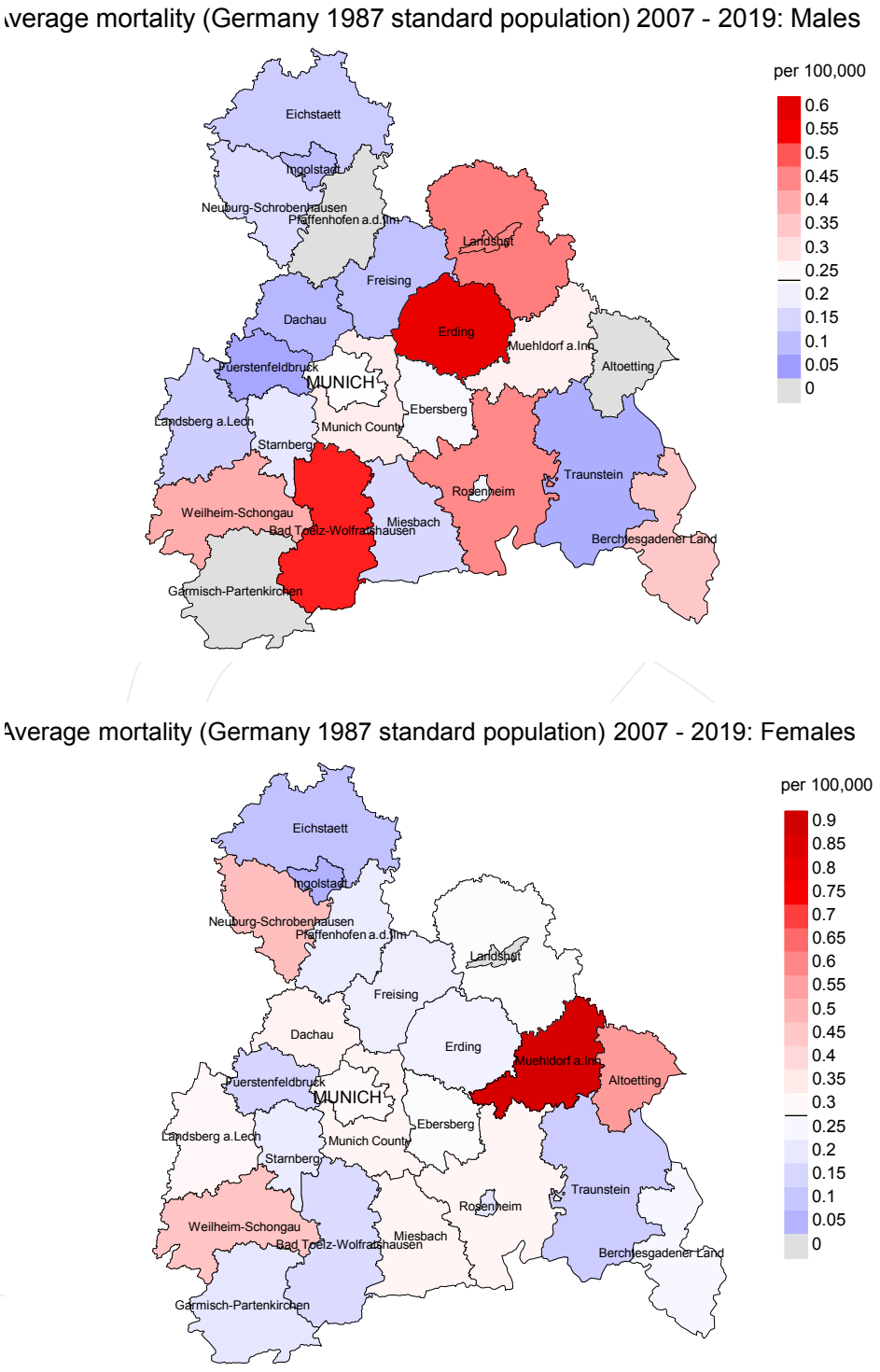
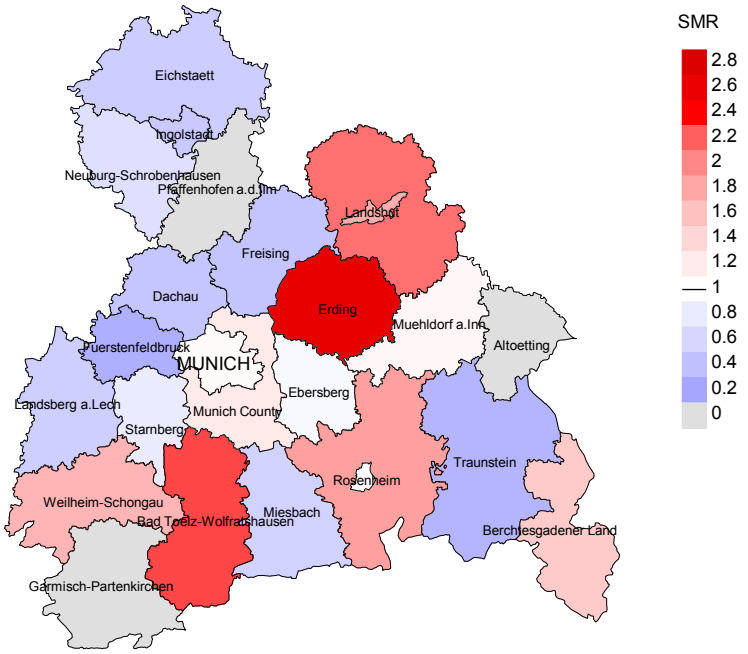


Figure 18a. Map of cancer mortality (german standard population) by county averaged for period 2007 to 2019. According to their individual mortality rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (males 0.2/100,000 WS N=76, females 0.3/100,000 WS N=123).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 67,462 female residents (averaged) in the period from 2007 to 2019 a total of 3 women died from follicular thyroid ca.. Therefore, the mean mortality rate for this cancer type in this area can be calculated at 0.3/100,000 (german 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 - 2019: Males



Standardized mortality ratio (SMR) 2007 - 2019: Females

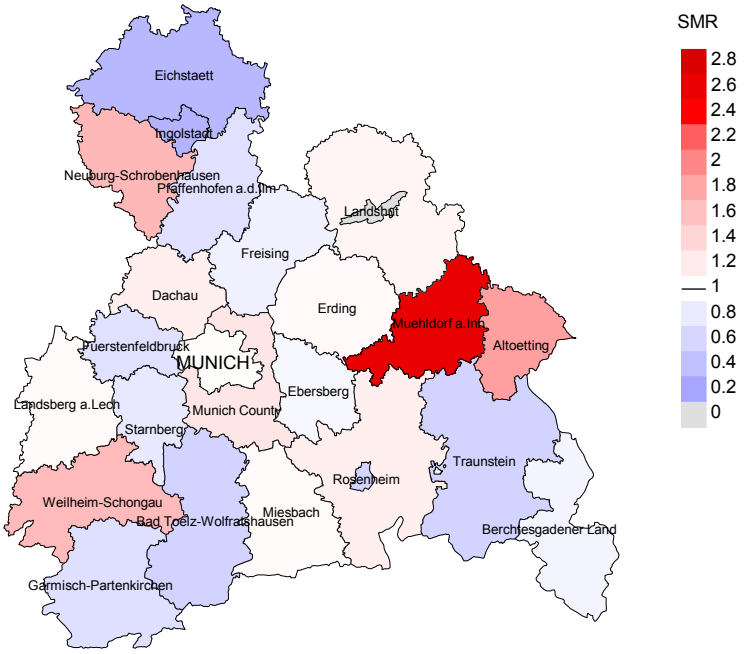


Figure 18b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2007 to 2019. According to their individual SMR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (males N=76, females N=123).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 67,153 female residents (averaged) in the period from 2007 to 2019 a total of 3 women died from follicular thyroid ca.. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 0.92. Though, the value of this parameter may vary with an underlying probability of 99% between 0.10 and 3.36, and is therefore not statistically striking.

Statistical Notes

In all tables and figures the respective reference values should be carefully considered. The incidence rates include diagnoses (with multiple primary), and death certificate only (DCO) cases, where applicable. For mortality statistics patients, diagnoses and progressive course of disease are presented. In the calculations, all courses of disease are considered whereby progressions occurred and/or death certificate identified progressive cancers were ascertained. Additionally there are three groups of disease course to consider:

1. **All multiple primaries included**

   The mortality statistic describes the tumor-specific death, independent of any malignancy. The patient perspective, induced secondary malignancies, and the problem of multiple malignancies from the same primary tumor all have reasons for their inclusion.

2. **First singular primary** (no information about other prior or synchronous malignancy)

   The mortality statistic describes the cancer-related death for patients who have no therapeutic restrictions due to a previous or synchronous cancer. These statistics are comparable to studies that have exclusion criteria based on a second malignancy.

3. **Single primary** (no information about other prior, syn- or metachronous malignancy)

   The mortality statistic describes the tumor-specific death that occurs without any impact through secondary primaries, earlier, synchronous, later or induced. Precisely the difference between disease group 1 and 2 highlight the magnitude of the problem of secondary malignancies.

For this reason differences appear concerning official mono-causal mortality statistics. To judge the maximum deviation, 2 further tables are presented. In the first table the distribution of secondary malignancies before, at or after the described cancer are shown, that could be an alternative cause of death. In the second table, the age-specific mortality rates for all courses of disease, without designation of secondary malignancies are shown.

A previously minimally acknowledged statistic is the **age at death**, which allows for a good assessment of the quality of classification of the apparent tumor-specific death. For assumed tumor-independent deaths, the age of death should be estimated from the age of diagnosis and the normal life expectancy, whereas tumor-dependent deaths can be estimated from the age of diagnosis plus the average tumor-specific life expectancy. The comparison of different tumors demonstrates this association, if the causes of cancer and the competing cause of death are independent of each other (e.g. breast and colon versus head&neck and lung).

The ratio of mortality and incidence (mortality-to-incidence ratio, **MIR**, **MI-Index**) is a statistical index that allows for the evaluation of the quality of data. For diseases with poor prognoses, comparable values are obtained from all age groups, because to a large extent, the numerator and denominator contain the same cases. For tumors with a good prognosis, increasing and decreasing incidence and age-specific differences in prognosis can more strongly alter the MIR. Additionally, attention should be paid to the confidence intervals where fewer cases are reported.

The complexity of problems identified here emphasizes the importance of relative survival data for the appropriate analysis of long term results.

As a measurement of the burden of disease, the number of potential life years loss due to premature deaths in a cohort can be calculated (**PYLL**, potential years of life lost, standardized per 100,000 persons or per European standard) as well as the average loss of life years per individual (**AYLL**, average years of life lost). Depending upon the analytic aim (health economy, prevention, health care research) different methods exist for the generation of these measurements. In the results presented here, the age for a premature death is considered to be before 70 years, according to the guidelines of the OECD and the WHO (as seen in the abbreviation PYLL-70 or AYLL-70).

Shortcuts

MCR	Munich Cancer Registry (Tumorregister München)
GEKID	Association of Population-based Cancer Registries in Germany (Gesellschaft der epidemiologischen Krebsregister in Deutschland e.V.)
SEER	Surveillance, Epidemiology, and End Results (USA)
DCO	Death certificate only
BRD-S	German (FRG) standard population
ES	European standard population (old)
WS	World standard population
SIR	Standardized incidence ratio
CI	Confidence interval
EAR	Excess absolute risk = excess cancer cases (O - E) per 10,000 person-years
PYLL-70	Potential years of life lost prior to age 70 given a person dies before that age
AYLL-70	Average years of life lost prior to age 70 given a person dies before that age
SMR	Standardized mortality ratio
MI-index	Ratio of mortality to incidence, MIR
FRG	Federal Republic of Germany

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