Munich Cancer Registry

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ICD-10 C73: Papillary thyroid ca.

Incidence and Mortality

Year of diagnosis	1998-2019
Patients	6,732
Diseases	6,739
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
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https://www.tumorregister-muenchen.de/en

https://www.tumorregister-muenchen.de/en/facts/base/bC73P_E-ICD-10-C73-Papillary-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
8260/3	Papillary adenocarcinoma, NOS
8340/3	Papillary carcinoma, follicular variant
8341/3	Papillary microcarcinoma
8342/3	Papillary carcinoma, oxyphilic cell
8343/3	Papillary carcinoma, encapsulated
8344/3	Papillary carcinoma, columnar cell

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	136			6.6	9.6	25.0	89.7
1999	139			5.8	9.3	10.8	87.1
2000	167			7.9	9.0	20.4	88.6
2001	130			7.5	8.7	13.1	90.0
2002	198			8.1	8.5	23.2	91.9 #
2003	220			8.0	8.2	17.7	90.9
2004	262			7.3	7.9	11.5	87.4
2005	270			7.1	7.7	12.2	86.3
2006	319			7.4	7.3	12.2	80.6
2007	436			7.5	6.6	10.6	77.1 #
2008	532			7.1	6.1	8.6	95.7
2009	510			7.7	5.5	8.6	96.3
2010	402			7.6	5.0	6.2	94.8
2011	362			7.9	4.2	6.1	93.6
2012	354			7.8	3.5	6.2	93.2
2013	362			8.0	2.8	5.8	97.0
2014	331			8.1	2.3	3.3	87.6
2015	319			8.3	1.9	2.8	86.2
2016	356			8.3	1.6	2.5	97.8
2017	339			8.4	1.3	2.4	100.0
2018	350			8.4	1.2	1.4	99.4
2019	245			8.3	1.2	0.8	78.4 ##
1998-2019	6739			8.3	9.6	8.3	91.1

6,739 cases diagnosed 1998-2019 are related to a total of 6,732 patients. Currently, in 1,149 (17.1 %) of these 6,732 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 918 / 178 / 53 (13.6 % / 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 retreived from the respective headings.

How to interpret:
In 2017, a subgroup of 339 cases has been diagnosed, of which 8.4 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 1.3 % 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 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	26	19.1			7.7	10.5	26.9	88.5
1999	28	20.1			3.7	10.1	25.0	82.1
2000	34	20.4			6.8	9.8	23.5	85.3
2001	31	23.8			8.4	9.6	19.4	93.5
2002	44	22.2			9.2	9.4	29.5	95.5 #
2003	53	24.1			8.3	9.3	24.5	92.5
2004	76	29.0			7.9	9.1	17.1	90.8
2005	55	20.4			7.8	9.0	23.6	94.5
2006	82	25.7			8.6	8.6	17.1	84.1
2007	115	26.4			8.8	7.8	15.7	80.0 #
2008	125	23.5			9.0	6.6	9.6	97.6
2009	138	27.1			10.3	6.0	10.9	96.4
2010	85	21.1			10.0	5.6	14.1	94.1
2011	100	27.6			10.1	4.5	10.0	93.0
2012	94	26.6			10.4	3.8	12.8	93.6
2013	134	37.0			10.8	3.0	6.7	95.5
2014	93	28.1			11.2	3.0	7.5	84.9
2015	94	29.5			11.3	1.7	7.4	88.3
2016	95	26.7			11.3	0.9	2.1	98.9
2017	79	23.3			11.3	0.9	2.5	100.0
2018	89	25.4			11.1	0.0		100.0
2019	62	25.3			11.0	0.0	1.6	77.4 ##
1998-2019	1732	25.7			11.0	10.5	11.6	92.0

1,732 cases diagnosed 1998-2019 are related to a total of 1,731 patients. Currently, in 357 (20.6 %) of these 1,731 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 276 / 59 / 22 (15.9 % / 3.4 % / 1.3 %) patients exist having 2 / 3 / 4+ malignancies.

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

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

How to interpret:
In 2017, a subgroup of 79 cases has been diagnosed, of which 11.3 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 0.9 % 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	110	80.9			6.4	9.2	24.5	90.0	
1999	111	79.9			6.3	9.0	7.2	88.3	
2000	133	79.6			8.2	8.7	19.5	89.5	
2001	99	76.2			7.3	8.4	11.1	88.9	
2002	154	77.8			7.7	8.2	21.4	90.9	#
2003	167	75.9			7.9	7.8	15.6	90.4	
2004	186	71.0			7.1	7.5	9.1	86.0	
2005	215	79.6			6.9	7.3	9.3	84.2	
2006	237	74.3			7.0	6.9	10.5	79.3	
2007	321	73.6			7.0	6.2	8.7	76.0	#
2008	407	76.5			6.5	5.9	8.4	95.1	
2009	372	72.9			6.8	5.3	7.8	96.2	
2010	317	78.9			6.9	4.7	4.1	95.0	
2011	262	72.4			7.2	4.1	4.6	93.9	
2012	260	73.4			7.0	3.4	3.8	93.1	
2013	228	63.0			7.0	2.7	5.3	97.8	
2014	238	71.9			7.1	2.0	1.7	88.7	
2015	225	70.5			7.3	1.9	0.9	85.3	
2016	261	73.3			7.3	1.9	2.7	97.3	
2017	260	76.7			7.4	1.4	2.3	100.0	
2018	261	74.6			7.5	1.6	1.9	99.2	
2019	183	74.7			7.3	1.6	0.5	78.7	##
1998-2019	5007	74.3			7.3	9.2	7.1	90.8	

5,007 cases diagnosed 1998-2019 are related to a total of 5,001 patients. Currently, in 792 (15.8 %) of these 5,001 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 642 / 119 / 31 (12.8 % / 2.4 % / 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 260 cases has been diagnosed, of which 7.4 % 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	26	110	2.3	9.4	1.6	7.1	2.0	8.5	2.1	9.1
1999	28	111	2.5	9.4	1.9	7.3	2.3	8.7	2.5	9.1
2000	34	133	3.0	11.1	2.0	8.1	2.6	10.0	2.9	10.4
2001	31	99	2.7	8.1	1.9	5.8	2.4	7.2	2.5	7.5
2002	44	154	2.4	7.9	1.7	6.0	2.1	7.3	2.3	7.7
2003	53	167	2.8	8.5	1.9	6.4	2.5	7.8	2.6	8.1
2004	76	186	4.0	9.4	3.0	7.2	3.6	8.7	3.9	9.1
2005	55	215	2.9	10.8	1.9	7.9	2.5	9.8	2.7	10.2
2006	82	237	4.3	11.8	2.8	8.7	3.7	10.8	4.0	11.2
2007	115	321	5.2	13.9	3.7	10.3	4.7	12.7	4.8	13.2
2008	125	407	5.6	17.5	4.0	12.8	5.1	15.8	5.5	16.6
2009	138	372	6.2	16.0	4.5	12.2	5.6	14.8	5.9	15.6
2010	85	317	3.8	13.5	2.5	10.1	3.2	12.3	3.5	12.9
2011	100	262	4.5	11.2	3.2	8.5	4.0	10.1	4.2	10.7
2012	94	260	4.1	11.0	2.9	8.5	3.6	10.2	3.8	10.6
2013	134	228	5.8	9.6	4.2	7.1	5.2	8.7	5.5	9.1
2014	93	238	4.0	9.9	2.8	7.8	3.5	9.2	3.8	9.5
2015	94	225	4.0	9.2	2.8	7.5	3.5	8.8	3.7	9.2
2016	95	261	4.0	10.6	2.9	8.4	3.6	10.0	3.7	10.4
2017	79	260	3.3	10.5	2.4	8.4	2.9	9.9	3.1	10.3
2018	89	261	3.7	10.5	2.8	8.4	3.4	9.9	3.5	10.3
2019	62	183	2.5	7.4	1.9	6.0	2.3	7.1	2.4	7.2
1998-2019	1732	5007	3.9	10.9	2.8	8.3	3.5	10.0	3.7	10.4

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	136	50.3	14.7	13.0	80.5	30.1	40.3	50.1	60.7	69.4
1999	139	48.6	14.2	16.7	81.7	27.4	37.9	51.1	58.3	64.5
2000	167	51.1	14.7	11.3	89.1	32.2	40.7	51.6	60.8	69.9
2001	130	50.6	13.7	25.4	95.4	34.5	39.7	50.3	59.8	67.8
2002	198	52.4	14.5	16.6	91.0	32.5	43.0	53.3	63.5	68.9
2003	220	51.3	14.5	7.6	93.3	33.0	40.3	53.1	62.0	67.1
2004	262	50.2	14.1	14.8	88.1	30.9	39.9	50.1	60.3	66.9
2005	270	52.0	13.6	17.7	91.3	35.5	42.3	51.6	63.0	69.5
2006	319	51.9	13.6	15.1	82.3	34.3	41.5	52.9	61.6	69.4
2007	436	50.2	13.4	9.3	82.1	32.7	40.6	50.2	59.2	68.0
2008	532	52.2	14.0	16.2	87.9	34.0	41.4	52.5	62.1	70.4
2009	510	50.4	14.7	12.7	89.1	31.1	39.4	51.0	61.5	69.7
2010	402	51.4	14.0	14.3	87.5	33.9	41.0	51.2	61.5	70.4
2011	362	50.3	15.6	10.1	88.7	30.2	39.4	49.2	62.6	70.6
2012	354	50.1	14.3	13.3	87.2	31.8	39.7	49.7	60.9	68.8
2013	362	50.6	15.1	11.6	89.9	32.0	39.6	51.0	60.1	72.0
2014	331	49.8	15.1	6.4	86.6	30.0	39.4	49.4	59.8	70.0
2015	319	48.6	15.2	10.5	86.2	28.5	37.5	48.3	60.6	70.4
2016	356	48.4	14.5	13.0	97.7	28.9	37.9	49.5	57.3	66.2
2017	339	48.7	14.8	13.1	89.3	30.0	37.1	48.6	58.3	68.8
2018	350	48.4	14.5	10.3	91.1	29.4	38.0	47.7	57.1	68.5
2019	245	47.2	13.8	10.1	90.5	29.4	37.3	46.8	55.2	65.6
1998–2019	6739	50.3	14.4	6.4	97.7	31.5	39.7	50.3	60.6	69.3

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	26	50.7	13.8	27.2	78.4	28.6	40.4	54.4	59.9	67.3
1999	28	50.1	14.9	17.5	79.0	26.7	42.3	52.1	58.7	68.4
2000	34	53.0	16.6	24.8	89.1	32.1	35.8	54.0	66.0	70.0
2001	31	49.2	11.0	29.9	72.9	36.1	40.3	45.6	58.1	65.0
2002	44	53.0	14.7	24.7	87.0	34.6	43.0	52.3	62.7	71.5
2003	53	54.4	13.5	24.0	85.7	34.5	45.5	55.7	64.3	68.6
2004	76	52.4	14.2	16.1	88.1	29.8	43.5	52.8	63.6	68.0
2005	55	56.6	13.6	20.1	91.3	41.6	47.4	56.6	65.1	72.4
2006	82	55.4	12.8	26.1	81.2	38.6	45.5	56.0	64.6	71.8
2007	115	50.2	12.3	23.1	82.1	33.1	41.4	51.2	58.4	66.2
2008	125	54.0	13.3	18.9	81.1	34.8	46.6	55.4	62.6	70.0
2009	138	52.1	14.6	13.4	78.8	31.2	42.0	54.0	62.8	69.4
2010	85	54.7	13.7	24.1	87.5	36.0	46.0	53.1	65.3	73.6
2011	100	50.1	14.6	17.3	86.7	33.1	39.5	48.7	60.6	70.4
2012	94	52.9	14.4	19.6	83.9	35.1	42.6	53.1	64.7	71.9
2013	134	51.9	15.5	11.6	89.9	32.8	41.4	53.2	61.5	73.3
2014	93	53.1	16.0	14.3	83.6	32.3	42.0	53.2	63.3	74.8
2015	94	52.9	16.0	10.5	86.2	32.4	42.9	51.4	66.1	74.4
2016	95	48.9	13.4	13.0	82.5	30.8	40.6	50.1	55.5	66.4
2017	79	51.2	13.4	20.6	82.9	32.1	40.0	51.8	60.3	68.2
2018	89	50.1	14.3	13.8	86.5	32.3	40.7	48.5	59.6	68.5
2019	62	50.4	14.8	17.8	80.0	33.1	39.4	49.8	58.3	73.4
1998–2019	1732	52.2	14.3	10.5	91.3	33.6	42.3	52.3	62.6	70.5

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	110	50.2	15.0	13.0	80.5	30.8	40.3	49.6	61.8	70.2
1999	111	48.3	14.0	16.7	81.7	28.0	37.5	50.7	58.0	63.9
2000	133	50.6	14.2	11.3	83.3	32.3	41.2	51.5	60.8	68.8
2001	99	51.0	14.4	25.4	95.4	32.1	39.2	51.9	60.8	70.9
2002	154	52.2	14.5	16.6	91.0	32.5	43.0	53.5	63.5	67.9
2003	167	50.3	14.7	7.6	93.3	32.8	39.3	51.9	60.6	66.0
2004	186	49.3	14.0	14.8	83.0	30.9	39.4	48.9	59.7	66.3
2005	215	50.8	13.4	17.7	79.2	33.4	40.9	50.9	62.2	68.4
2006	237	50.7	13.7	15.1	82.3	33.1	39.6	52.1	60.1	68.9
2007	321	50.2	13.8	9.3	81.0	32.7	40.4	49.9	59.6	68.5
2008	407	51.6	14.2	16.2	87.9	33.4	40.6	51.6	61.9	70.4
2009	372	49.7	14.7	12.7	89.1	30.8	39.1	49.8	60.6	69.7
2010	317	50.5	14.0	14.3	85.5	33.7	40.3	50.1	60.9	69.0
2011	262	50.4	16.0	10.1	88.7	30.1	39.1	49.3	63.1	70.7
2012	260	49.1	14.1	13.3	87.2	30.7	38.5	49.4	59.9	67.8
2013	228	49.9	14.8	16.4	83.3	31.2	39.0	49.7	59.5	71.6
2014	238	48.5	14.5	6.4	86.6	29.7	38.7	48.0	58.7	69.5
2015	225	46.8	14.5	13.7	82.4	27.9	36.4	46.5	57.9	67.7
2016	261	48.3	14.8	13.1	97.7	28.3	37.1	49.1	58.0	66.0
2017	260	48.0	15.1	13.1	89.3	29.5	36.4	47.6	57.7	68.9
2018	261	47.8	14.5	10.3	91.1	29.4	37.4	46.7	55.8	68.5
2019	183	46.2	13.3	10.1	90.5	28.9	36.8	45.3	54.4	60.4
1998–2019	5007	49.6	14.4	6.4	97.7	30.9	39.0	49.5	59.8	68.8

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	2	0.0	0.0			0.0	2	0.1	0.1
10-14	31	0.6	0.7	8	0.6	0.6	23	0.6	0.7
15-19	40	0.8	1.5	12	0.9	1.5	28	0.8	1.5
20-24	127	2.6	4.1	26	2.0	3.5	101	2.8	4.3
25-29	222	4.5	8.6	44	3.4	6.9	178	5.0	9.2
30-34	359	7.3	15.9	76	5.8	12.7	283	7.9	17.1
35-39	502	10.2	26.2	109	8.4	21.1	393	10.9	28.0
40-44	578	11.8	38.0	139	10.7	31.8	439	12.2	40.3
45-49	616	12.6	50.6	161	12.4	44.1	455	12.7	52.9
50-54	636	13.0	63.6	188	14.4	58.6	448	12.5	65.4
55-59	536	10.9	74.5	156	12.0	70.5	380	10.6	75.9
60-64	447	9.1	83.6	132	10.1	80.7	315	8.8	84.7
65-69	346	7.1	90.7	109	8.4	89.0	237	6.6	91.3
70-74	249	5.1	95.8	77	5.9	94.9	172	4.8	96.1
75-79	138	2.8	98.6	43	3.3	98.2	95	2.6	98.7
80-84	42	0.9	99.4	16	1.2	99.5	26	0.7	99.4
85+	27	0.6	100.0	7	0.5	100.0	20	0.6	100.0
All ages	4898	100.0		1303	100.0		3595	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		2		0.1				2.2
10-14	8	23	0.5	1.6			6.0	19.7
15-19	12	28	0.8	1.9			4.0	11.3
20-24	26	101	1.4	5.7			4.4	21.3
25-29	44	178	2.1	8.6			5.0	16.1
30-34	76	283	3.6	13.4			6.3	14.3
35-39	109	392	5.1	18.6			6.4	12.0
40-44	139	439	5.9	19.4			5.4	7.6
45-49	161	454	6.4	18.7			3.4	5.2
50-54	188	448	8.0	19.4			2.4	3.9
55-59	156	380	8.0	19.0			1.3	3.1
60-64	132	314	8.1	17.9			0.8	2.2
65-69	109	236	7.2	14.0			0.5	1.3
70-74	77	172	5.5	10.7			0.3	0.9
75-79	43	95	3.9	6.9			0.2	0.5
80-84	16	26	2.4	2.7			0.1	0.2
85+	7	20	1.6	2.1			0.1	0.1
All ages	1303	3591			0.0	0.0	0.9	2.5
Incidence								
Raw			4.3	11.5				
WS			3.1	8.9				
ES			3.8	10.6				
BRD-S			4.0	11.1				

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).

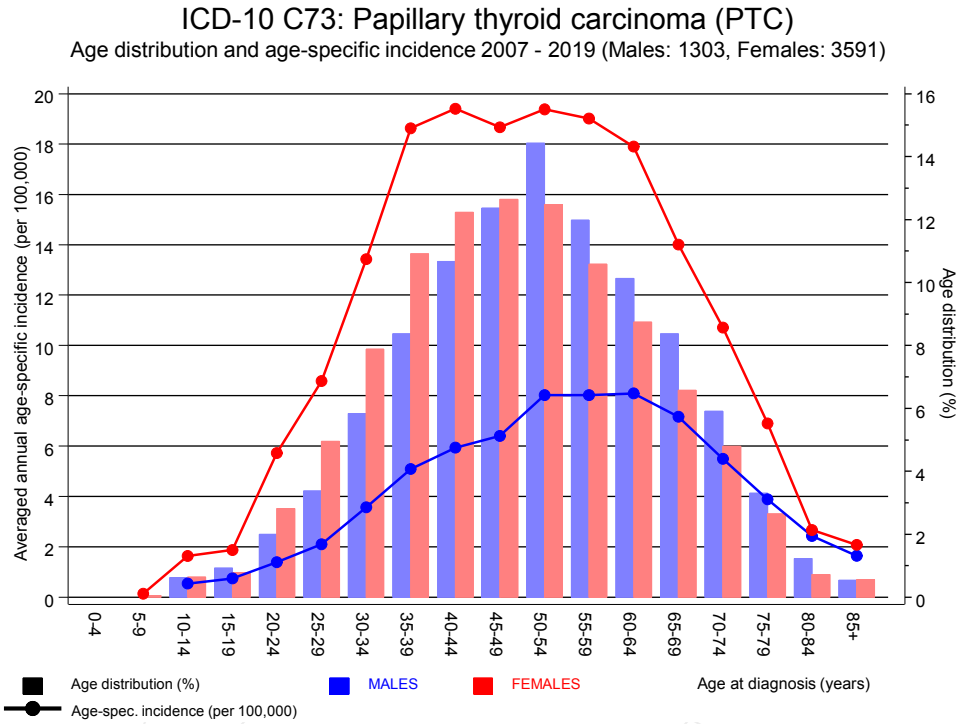


Figure 6. Age distribution (males: mean=51.8 yrs, median=51.8 yrs; females: mean=49.2 yrs, median=48.9 yrs) and age-specific incidence.

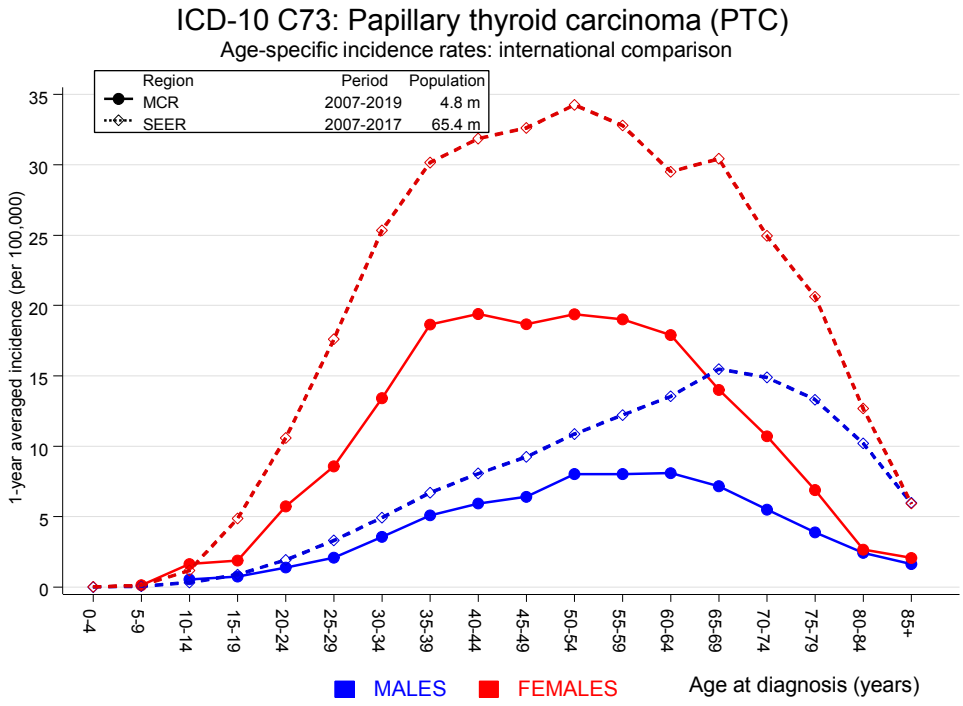


Figure 6a. Age-specific incidence in MCR registry areas compared to SEER (Surveillance, Epidemiology, and End Results, USA).

Reference:
Surveillance, Epidemiology, and End Results (SEER) Program SEER*Stat Database: Incidence - SEER 18 Regs Research Data, released April 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	2	0.7	2.7	0.3	9.9		1.9	
C07–C08	Salivary gland	1	0.1	7.6	0.2	42.3		1.3	
C09–C10	Oropharynx	1	0.9	1.1	0.0	6.0		0.1	
C15	Oesophagus	9	1.4	6.4	2.9	12.2	#	11.4	
C16	Stomach	4	2.2	1.8	0.5	4.6		2.7	
C17	Small intestine	1	0.4	2.5	0.1	13.8		0.9	
C18	Colon	12	5.4	2.2	1.2	3.9	#	9.9	
C19–C20	Rectum	11	3.5	3.2	1.6	5.7	#	11.3	
C21	Anus/canal	1	0.2	5.6	0.1	31.5		1.2	
C22	Liver	4	1.8	2.2	0.6	5.6		3.2	25.0
C23–C24	Bile	1	0.6	1.7	0.0	9.4		0.6	
C25	Pancreas	6	2.3	2.6	1.0	5.7		5.6	
C32	Larynx	4	0.7	5.5	1.5	14.0	#	4.9	
C33–C34	Lung	19	7.5	2.5	1.5	4.0	#	17.3	5.3
C37	Thymus	1	0.0	21.7	0.5	120.7		1.4	
C38,C45	Mesothelioma	2	0.4	5.1	0.6	18.3		2.4	
C43	Malign. melanoma	12	3.2	3.8	2.0	6.6	#	13.2	
C46,C49	Soft tissue	5	0.4	13.5	4.4	31.4	#	6.9	
C50	Breast	1	0.2	5.8	0.1	32.2		1.2	
C61	Prostate	42	17.1	2.5	1.8	3.3	#	37.3	
C62	Testis	1	0.6	1.8	0.0	9.9		0.7	
C64	Kidney	6	2.3	2.6	0.9	5.6		5.5	
C65	Renal pelvis	1	0.2	4.1	0.1	22.6		1.1	
C66	Ureter	1	0.1	7.2	0.2	39.9		1.3	
C67	Bladder	6	2.4	2.5	0.9	5.4		5.4	
C70–C72	CNS cancer	4	0.9	4.3	1.2	11.0	#	4.6	
C73	Thyroid	18	0.6	28.3	16.8	44.7	#	26.0	
C76–C79	CUP	5	1.0	5.1	1.6	11.8	#	6.0	
C82–C85	NHL	12	2.6	4.6	2.4	8.0	#	14.1	
C90	Mult. myeloma	3	0.8	3.9	0.8	11.4		3.3	
C91–C96	Leukaemia	2	0.9	2.3	0.3	8.3		1.7	
Not observed		0	1.7	0.0	0.0	2.2		−2.5	
All further malignancies		198	63.1	3.1	2.7	3.6	#	202.0	1.0

Patients	1682
Median age at next malignancy (years)	67.1
Person-years	6679
Mean observation time (years)	4.0
Median observation time (years)	2.1

The occurrence of further specified malignancy is statistically significant.

Table 7b

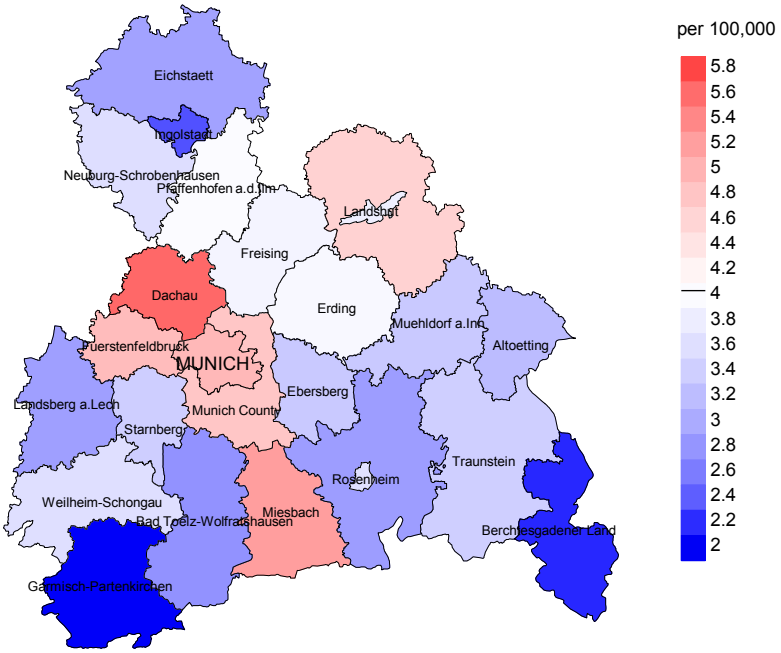
Standardized incidence ratio (SIR, with 95% confidence limits), excess absolute risk (EAR) and DCO rate of further malignancies for period 1998–2019
FEMALES

Diagnosis		Observed n	Expected n	SIR	CI 95%	CI 95%		EAR	DCO %
C03–C06	Oral cavity	2	0.9	2.2	0.3	8.0		0.5	
C07–C08	Salivary gland	3	0.2	13.9	2.9	40.6	#	1.4	
C09–C10	Oropharynx	2	0.8	2.6	0.3	9.5		0.6	
C15	Oesophagus	2	0.9	2.2	0.3	8.1		0.6	
C16	Stomach	7	3.4	2.1	0.8	4.2		1.8	
C18	Colon	20	10.0	2.0	1.2	3.1	#	5.0	5.0
C19–C20	Rectum	10	4.7	2.1	1.0	3.9	#	2.6	
C21	Anus/canal	1	0.8	1.2	0.0	6.9		0.1	
C22	Liver	3	1.4	2.2	0.4	6.3		0.8	33.3
C23–C24	Bile	4	1.4	2.9	0.8	7.5		1.3	
C25	Pancreas	13	4.7	2.7	1.5	4.7	#	4.1	
C26	GI cancer	1	0.1	8.3	0.2	46.3		0.4	
C30–C31	Sinuses	1	0.2	5.2	0.1	28.9		0.4	
C32	Larynx	1	0.3	3.5	0.1	19.3		0.4	
C33–C34	Lung	31	10.6	2.9	2.0	4.2	#	10.1	9.7
C37	Thymus	1	0.1	10.4	0.3	58.1		0.4	
C38,C45	Mesothelioma	3	0.2	14.3	2.9	41.8	#	1.4	
C40–C41	Bone	2	0.1	14.0	1.7	50.6	#	0.9	
C43	Malign. melanoma	20	6.5	3.1	1.9	4.8	#	6.7	5.0
C46,C49	Soft tissue	4	0.8	5.1	1.4	12.9	#	1.6	
C48	Peritoneal	4	0.6	7.1	1.9	18.1	#	1.7	25.0
C50	Breast	165	49.5	3.3	2.8	3.9	#	57.3	
C53	Cervix uteri	7	2.9	2.4	1.0	5.0		2.0	
C54	Corpus uteri	19	7.8	2.4	1.5	3.8	#	5.6	
C56	Ovary	13	5.5	2.4	1.3	4.0	#	3.7	
C64	Kidney	9	2.9	3.2	1.4	6.0	#	3.1	
C66	Ureter	1	0.2	5.9	0.2	33.1		0.4	
C67	Bladder	4	1.9	2.1	0.6	5.5		1.1	
C70–C72	CNS cancer	5	1.9	2.6	0.8	6.1		1.5	
C73	Thyroid	32	3.9	8.1	5.5	11.4	#	13.9	
C74–C80	Cancer others	3	0.3	11.3	2.3	33.1	#	1.4	
C76–C79	CUP	14	1.8	7.6	4.2	12.8	#	6.0	7.1
C81	Hodgkin lymphoma	1	0.4	2.7	0.1	14.8		0.3	
C82–C85	NHL	15	4.8	3.1	1.8	5.2	#	5.1	
C90	Mult. myeloma	1	1.4	0.7	0.0	4.0		−0.2	100.0
C91–C96	Leukaemia	17	1.8	9.7	5.7	15.5	#	7.6	17.6
Not observed		0	3.4	0.0	0.0	1.1		−1.7	
All further malignancies		441	138.7	3.2	2.9	3.5	#	150.0	2.7

Patients	4849
Median age at next malignancy (years)	64.2
Person-years	20153
Mean observation time (years)	4.2
Median observation time (years)	2.0

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

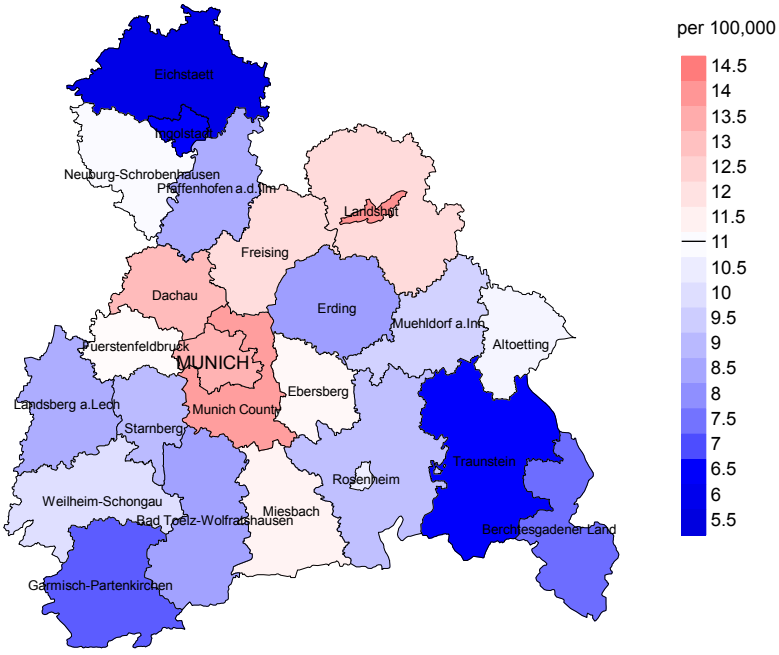
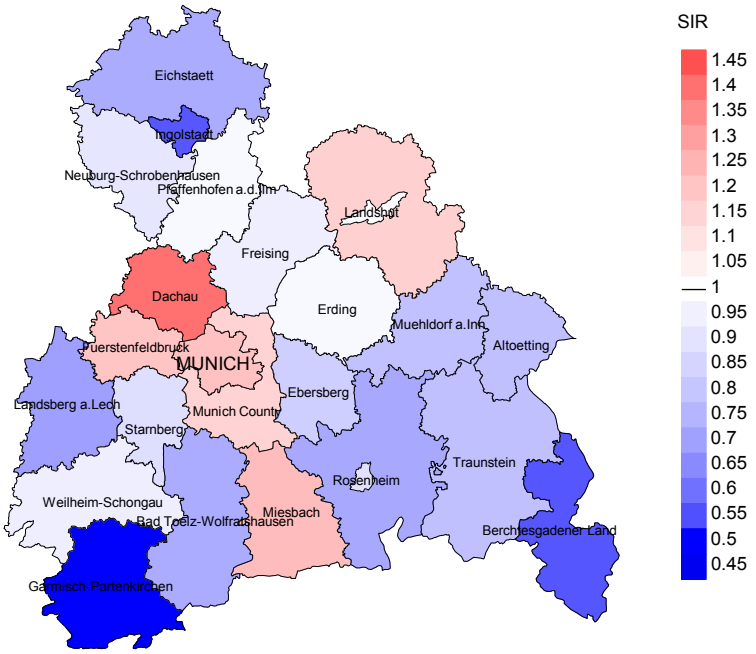


Figure 8a. Map of cancer incidence (german standard population, incl. DCO cases) by county averaged for period 2007 to 2019. According to their individual incidence rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (males 4.0/100,000 WS N=1,303, females 11.1/100,000 WS N=3,591).

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 104 women were identified with newly diagnosed papillary thyroid ca.. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 11.3/100,000 (german standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 8.6 and 14.6/100,000.

Standardized incidence ratio (SIR) 2007 - 2019: Males



Standardized incidence ratio (SIR) 2007 - 2019: Females

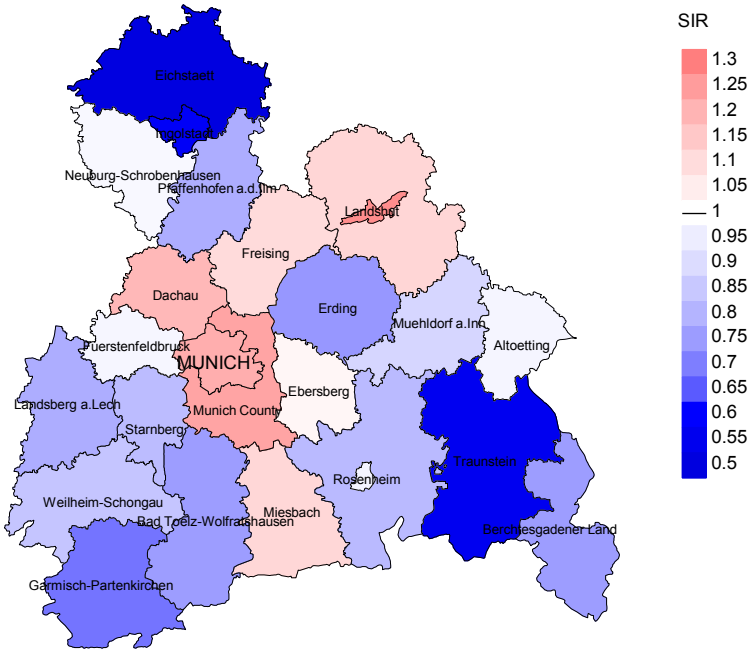


Figure 8b. Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2007 to 2019. According to their individual SIR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (males N=1,303, females N=3,591).

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 104 women were identified with newly diagnosed papillary thyroid ca.. 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 0.79 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 4.92 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	136	89.7		34	25.0	88.2
1999	139	87.1		15	10.8	86.7
2000	167	88.6		34	20.4	94.1
2001	130	90.0		17	13.1	100.0
2002	198	91.9		46	23.2	87.0
2003	220	90.9		39	17.7	92.3
2004	262	87.4		30	11.5	93.3
2005	270	86.3		33	12.2	87.9
2006	319	80.6		39	12.2	89.7
2007	436	77.1		46	10.6	87.0
2008	532	95.7		46	8.6	84.8
2009	510	96.3		44	8.6	77.3
2010	402	94.8		25	6.2	92.0
2011	362	93.6		22	6.1	68.2
2012	354	93.2		22	6.2	95.5
2013	362	97.0		21	5.8	85.7
2014	331	87.6		11	3.3	100.0
2015	319	86.2		9	2.8	55.6
2016	356	97.8		9	2.5	66.7
2017	339	100.0		8	2.4	87.5
2018	350	99.4		5	1.4	20.0
2019	245	78.4		2	0.8	100.0
1998-2019	6739	91.1		557	8.3	86.5

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	136	14	92.9		
1999	139	13	76.9	1	0.7
2000	167	7	100.0	1	0.6
2001	130	9	88.9	1	0.8
2002	198	14	100.0	1	0.5
2003	220	29	89.7	1	0.5
2004	262	22	95.5		
2005	270	30	100.0	1	0.4
2006	319	42	100.0	1	0.3
2007	436	32	90.6	3	0.7
2008	532	23	100.0	3	0.6
2009	510	29	100.0	1	0.2
2010	402	36	97.2		
2011	362	54	100.0	2	0.6
2012	354	55	98.2	1	0.3
2013	362	48	97.9	3	0.8
2014	331	54	98.1	3	0.9
2015	319	64	98.4	1	0.3
2016	356	66	97.0	1	0.3
2017	339	75	96.0	1	0.3
2018	350	45	28.9	3	0.9
2019	245	52	40.4	1	0.4
1998–2019	6739	813	89.5	30	0.4

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	14	71.4	28.6	84.6
1999	13	46.2	53.8	60.0
2000	7	100.0		100.0
2001	9	55.6	44.4	75.0
2002	14	64.3	35.7	92.9
2003	29	41.4	58.6	61.5
2004	22	72.7	27.3	81.0
2005	30	66.7	33.3	63.3
2006	42	57.1	42.9	73.8
2007	32	56.3	43.8	69.0
2008	23	65.2	34.8	69.6
2009	29	72.4	27.6	79.3
2010	36	52.8	47.2	51.4
2011	54	55.6	44.4	75.9
2012	55	50.9	49.1	61.1
2013	48	54.2	45.8	61.7
2014	54	63.0	37.0	75.5
2015	64	43.8	56.3	60.3
2016	66	51.5	48.5	60.9
2017	75	58.7	41.3	59.7
2018	45	20.0	80.0	15.4
2019	52	21.2	78.8	38.1
1998-2019	813	52.4	47.6	65.4

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	5	72.3	74.7	43.8	74.7
1999	4	66.2	68.6	63.7	68.6
2000	2	70.6	70.6		70.6
2001	2	64.9	57.7	72.1	57.7
2002	3	61.4	72.0	60.3	72.0
2003	9	74.9	73.2	74.9	75.0
2004	5	70.3	70.3	70.2	70.3
2005	10	73.6	66.1	84.2	64.1
2006	19	70.9	69.5	80.1	70.4
2007	13	71.3	71.3	69.1	70.4
2008	6	69.4	71.4	67.5	71.4
2009	9	72.7	66.8	82.8	66.8
2010	11	70.9	68.6	78.7	68.6
2011	17	74.4	67.3	76.0	68.0
2012	21	72.8	68.8	74.7	70.2
2013	20	77.1	75.1	78.6	77.1
2014	23	68.9	69.8	64.2	68.3
2015	20	76.0	75.8	77.9	75.8
2016	24	75.2	75.0	75.2	75.0
2017	22	75.9	77.1	75.6	76.1
2018	15	67.7	78.7	66.7	83.0
2019	22	78.5	68.6	79.1	78.0
1998–2019	282	74.0	71.1	75.7	71.3

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	9	78.1	78.4	78.0	78.8
1999	9	74.7	70.5	76.9	57.0
2000	5	59.7	59.7		59.7
2001	7	78.9	74.5	78.9	78.9
2002	11	80.7	80.7	71.8	80.7
2003	20	74.6	75.8	74.0	75.9
2004	17	80.8	80.6	82.9	80.7
2005	20	78.8	74.2	83.0	71.3
2006	23	81.4	76.1	83.5	75.6
2007	19	73.5	73.4	77.2	69.3
2008	17	73.8	71.7	76.9	71.9
2009	20	74.2	74.2	71.8	74.2
2010	25	74.6	68.5	84.9	69.8
2011	37	75.3	74.7	75.3	73.4
2012	34	80.7	69.8	82.8	69.8
2013	28	72.5	73.6	71.2	72.2
2014	31	74.4	69.8	75.9	69.9
2015	44	76.6	68.2	78.2	69.5
2016	42	74.2	72.4	77.4	71.0
2017	53	73.4	72.1	79.9	72.1
2018	30	77.7	72.0	78.5	60.9
2019	30	81.9	81.3	82.3	81.8
1998–2019	531	76.2	73.4	78.7	73.1

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	4	0.4	0.15	0.2	0.12	0.3	0.17	0.6	0.26
1999	3	0.3	0.11	0.2	0.08	0.2	0.10	0.3	0.11
2000	2	0.2	0.06	0.1	0.05	0.1	0.06	0.2	0.09
2001	1	0.1	0.03	0.1	0.03	0.1	0.03	0.1	0.03
2002	2	0.1	0.05	0.0	0.03	0.1	0.04	0.1	0.06
2003	4	0.2	0.08	0.1	0.06	0.2	0.07	0.3	0.10
2004	3	0.2	0.04	0.1	0.03	0.1	0.04	0.2	0.04
2005	6	0.3	0.11	0.2	0.09	0.3	0.11	0.3	0.12
2006	12	0.6	0.15	0.3	0.11	0.5	0.14	0.6	0.16
2007	7	0.3	0.06	0.2	0.04	0.3	0.06	0.3	0.07
2008	3	0.1	0.02	0.1	0.02	0.1	0.02	0.1	0.03
2009	7	0.3	0.05	0.2	0.04	0.2	0.04	0.3	0.05
2010	6	0.3	0.07	0.1	0.06	0.2	0.06	0.2	0.07
2011	10	0.4	0.10	0.2	0.07	0.3	0.09	0.4	0.10
2012	13	0.6	0.14	0.3	0.10	0.4	0.12	0.6	0.14
2013	8	0.3	0.06	0.2	0.04	0.2	0.05	0.3	0.06
2014	17	0.7	0.18	0.4	0.13	0.5	0.15	0.7	0.18
2015	10	0.4	0.11	0.2	0.07	0.3	0.09	0.4	0.10
2016	12	0.5	0.13	0.2	0.08	0.3	0.10	0.4	0.12
2017	12	0.5	0.15	0.2	0.07	0.3	0.10	0.4	0.14
2018	2	0.1	0.02	0.0	0.01	0.0	0.01	0.1	0.02
2019	5	0.2	0.08	0.1	0.05	0.1	0.06	0.2	0.07
1998-2019	149	0.3	0.09	0.2	0.06	0.3	0.07	0.3	0.09

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	6	0.5	0.05	0.2	0.02	0.3	0.03	0.4	0.05
1999	3	0.3	0.03	0.1	0.02	0.2	0.02	0.2	0.03
2000	5	0.4	0.04	0.3	0.04	0.4	0.04	0.4	0.04
2001	4	0.3	0.04	0.1	0.02	0.2	0.03	0.3	0.03
2002	7	0.4	0.05	0.1	0.01	0.2	0.02	0.3	0.03
2003	8	0.4	0.05	0.2	0.03	0.3	0.03	0.3	0.04
2004	13	0.7	0.07	0.3	0.04	0.4	0.04	0.5	0.05
2005	14	0.7	0.07	0.3	0.04	0.5	0.05	0.6	0.05
2006	12	0.6	0.05	0.2	0.02	0.3	0.03	0.5	0.04
2007	11	0.5	0.03	0.2	0.02	0.3	0.03	0.4	0.03
2008	12	0.5	0.03	0.2	0.02	0.3	0.02	0.4	0.03
2009	14	0.6	0.04	0.2	0.02	0.4	0.03	0.5	0.03
2010	13	0.6	0.04	0.3	0.03	0.4	0.03	0.4	0.03
2011	20	0.9	0.08	0.3	0.04	0.5	0.05	0.7	0.06
2012	15	0.6	0.06	0.3	0.03	0.4	0.04	0.5	0.05
2013	18	0.8	0.08	0.3	0.04	0.4	0.05	0.6	0.06
2014	17	0.7	0.07	0.3	0.04	0.5	0.05	0.6	0.06
2015	18	0.7	0.08	0.3	0.05	0.5	0.06	0.6	0.07
2016	22	0.9	0.08	0.4	0.05	0.6	0.06	0.7	0.07
2017	32	1.3	0.12	0.6	0.07	0.8	0.08	1.0	0.10
2018	7	0.3	0.03	0.1	0.01	0.2	0.02	0.2	0.02
2019	6	0.2	0.03	0.1	0.01	0.1	0.01	0.2	0.02
1998-2019	277	0.6	0.06	0.3	0.03	0.4	0.04	0.5	0.05

Table 12

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

Age at death	Cases			Males			Females		
Years	n	%	Cum.%	n	%	Cum.%	n	%	Cum.%
0-4									
5-9									
10-14									
15-19									
20-24									
25-29	1	0.3	0.3	1	0.9	0.9			0.0
30-34	0	0.0	0.3			0.9			0.0
35-39	3	0.9	1.3	1	0.9	1.8	2	1.0	1.0
40-44	4	1.3	2.5	1	0.9	2.7	3	1.5	2.4
45-49	7	2.2	4.7			2.7	7	3.4	5.9
50-54	11	3.5	8.2	3	2.7	5.4	8	3.9	9.8
55-59	25	7.9	16.1	5	4.5	9.8	20	9.8	19.5
60-64	40	12.6	28.7	21	18.8	28.6	19	9.3	28.8
65-69	48	15.1	43.8	17	15.2	43.8	31	15.1	43.9
70-74	50	15.8	59.6	17	15.2	58.9	33	16.1	60.0
75-79	51	16.1	75.7	23	20.5	79.5	28	13.7	73.7
80-84	39	12.3	88.0	11	9.8	89.3	28	13.7	87.3
85+	38	12.0	100.0	12	10.7	100.0	26	12.7	100.0
All ages	317	100.0		112	100.0		205	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	1		0.0	0.02			1.2	
30-34								
35-39	1	2	0.0	0.01	0.1	0.01	0.4	0.5
40-44	1	3	0.0	0.01	0.1	0.01	0.2	0.4
45-49		7			0.3	0.02		0.4
50-54	3	8	0.1	0.02	0.3	0.02	0.1	0.3
55-59	5	20	0.3	0.03	1.0	0.05	0.1	0.6
60-64	21	19	1.3	0.16	1.1	0.06	0.4	0.4
65-69	17	31	1.1	0.16	1.8	0.13	0.2	0.5
70-74	17	33	1.2	0.22	2.1	0.19	0.2	0.4
75-79	23	28	2.1	0.53	2.0	0.29	0.2	0.3
80-84	11	28	1.7	0.69	2.9	1.08	0.1	0.3
85+	12	26	2.8	1.71	2.7	1.30	0.1	0.2
All ages	112	205					0.2	0.4
Mortality								
Raw			0.4	0.09	0.7	0.06		
WS			0.2	0.06	0.3	0.03		
ES			0.3	0.07	0.4	0.04		
BRD-S			0.3	0.09	0.5	0.05		
PYLL-70								
per 100,000			1.6		3.5			
ES			1.4		2.9			
AYLL-70			8.5		10.2			

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	2	1.5			1	50.0	1	50.0
C09–C10 Oropharynx	3	2.2	2	66.7			1	33.3
C11 Nasopharynx	1	0.7					1	100.0
C12–C13 Hypopharynx	1	0.7			1	100.0		
C15 Oesophagus	9	6.6	3	33.3	1	11.1	5	55.6
C16 Stomach	2	1.5					2	100.0
C17 Small intestine	1	0.7	1	100.0				
C18 Colon	7	5.1	3	42.9	1	14.3	3	42.9
C19–C20 Rectum	4	2.9	2	50.0			2	50.0
C22 Liver	4	2.9					4	100.0
C23–C24 Bile	1	0.7					1	100.0
C25 Pancreas	5	3.6					5	100.0
C32 Larynx	3	2.2	1	33.3			2	66.7
C33–C34 Lung	26	19.0	4	15.4	1	3.8	21	80.8
C43 Malign. melanoma	7	5.1	4	57.1			3	42.9
C44 Skin others	3	2.2	2	66.7	1	33.3		
C46,C49 Soft tissue	1	0.7					1	100.0
C61 Prostate	20	14.6	12	60.0			8	40.0
C62 Testis	1	0.7	1	100.0				
C64 Kidney	3	2.2	2	66.7			1	33.3
C67 Bladder	7	5.1	1	14.3			6	85.7
C70–C72 CNS cancer	3	2.2					3	100.0
C73 Thyroid	3	2.2			2	66.7	1	33.3
C74–C80 Cancer others	1	0.7	1	100.0				
C76–C79 CUP	7	5.1			1	14.3	6	85.7
C82–C85 NHL	7	5.1	2	28.6			5	71.4
C90 Mult. myeloma	2	1.5	1	50.0			1	50.0
C91–C96 Leukaemia	3	2.2	1	33.3			2	66.7
All further malignancies	137	100.0	43	31.4	9	6.6	85	62.0

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 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 ←%
C03–C06	Oral cavity	1	0.4					1	100.0
C09–C10	Oropharynx	3	1.2			1	33.3	2	66.7
C12–C13	Hypopharynx	1	0.4					1	100.0
C15	Oesophagus	2	0.8					2	100.0
C16	Stomach	6	2.3	1	16.7			5	83.3
C18	Colon	11	4.3	3	27.3			8	72.7
C19–C20	Rectum	9	3.5	1	11.1			8	88.9
C21	Anus/canal	3	1.2	2	66.7			1	33.3
C22	Liver	4	1.6	1	25.0			3	75.0
C23–C24	Bile	4	1.6					4	100.0
C25	Pancreas	13	5.0					13	100.0
C26	GI cancer	1	0.4					1	100.0
C32	Larynx	1	0.4					1	100.0
C33–C34	Lung	26	10.1	1	3.8	4	15.4	21	80.8
C38,C45	Mesothelioma	3	1.2					3	100.0
C40–C41	Bone	2	0.8					2	100.0
C43	Malign. melanoma	8	3.1	5	62.5			3	37.5
C44	Skin others	9	3.5	5	55.6			4	44.4
C46,C49	Soft tissue	4	1.6	1	25.0			3	75.0
C48	Peritoneal	2	0.8					2	100.0
C50	Breast	59	22.9	24	40.7	1	1.7	34	57.6
C53	Cervix uteri	4	1.6	3	75.0			1	25.0
C54	Corpus uteri	5	1.9	2	40.0			3	60.0
C55,C57	Fem. genitals un	1	0.4	1	100.0				
C56	Ovary	17	6.6	3	17.6			14	82.4
C64	Kidney	7	2.7	2	28.6	1	14.3	4	57.1
C67	Bladder	6	2.3	1	16.7	1	16.7	4	66.7
C69	Eye melanoma	2	0.8	1	50.0			1	50.0
C70–C72	CNS cancer	8	3.1					8	100.0
C73	Thyroid	5	1.9			4	80.0	1	20.0
C74–C80	Cancer others	1	0.4			1	100.0		
C76–C79	CUP	10	3.9					10	100.0
C81	Hodgkin lymphoma	1	0.4	1	100.0				
C82–C85	NHL	7	2.7	1	14.3			6	85.7
C90	Mult. myeloma	2	0.8					2	100.0
C91–C96	Leukaemia	10	3.9					10	100.0
All further malignancies		258	100.0	59	22.9	13	5.0	186	72.1

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

Table 15

Age-specific mortality (cancer-related) and proportion of all cancers
for period 2007-2019
(**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	1	0.0	0.01	0.0	0.00	0.4	0.3
40-44	1	2	0.0	0.01	0.1	0.00	0.2	0.3
45-49		6			0.2	0.01		0.4
50-54	1	6	0.0	0.01	0.3	0.01	0.0	0.3
55-59	5	12	0.3	0.04	0.6	0.03	0.1	0.4
60-64	17	13	1.0	0.15	0.7	0.05	0.3	0.3
65-69	11	24	0.7	0.14	1.4	0.12	0.2	0.5
70-74	11	26	0.8	0.21	1.6	0.19	0.1	0.4
75-79	12	20	1.1	0.44	1.5	0.26	0.1	0.3
80-84	9	23	1.4	0.90	2.4	1.44	0.1	0.3
85+	7	21	1.6	1.75	2.2	1.62	0.1	0.2
All ages	75	154					0.2	0.3
Mortality								
Raw			0.2	0.07	0.5	0.05		
WS			0.1	0.04	0.2	0.02		
ES			0.2	0.05	0.3	0.03		
BRD-S			0.2	0.07	0.4	0.04		
PYLL-70								
per 100,000			1.1		2.4			
ES			1.0		2.0			
AYLL-70			8.2		9.9			

* 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	0.01			0.4	
40-44	1		0.0	0.01			0.2	
45-49		2			0.1	0.00		0.1
50-54		2			0.1	0.01		0.1
55-59	3	2	0.2	0.02	0.1	0.01	0.1	0.1
60-64	5	1	0.3	0.05	0.1	0.00	0.1	0.0
65-69	3	6	0.2	0.04	0.4	0.03	0.0	0.1
70-74	5	5	0.4	0.11	0.3	0.04	0.1	0.1
75-79	7	4	0.6	0.32	0.3	0.06	0.1	0.1
80-84	5	10	0.8	0.56	1.0	0.77	0.1	0.2
85+	5	12	1.2	1.25	1.2	1.09	0.1	0.1
All ages	35	44					0.1	0.1
Mortality								
Raw			0.1	0.03	0.1	0.01		
WS			0.1	0.02	0.0	0.01		
ES			0.1	0.03	0.1	0.01		
BRD-S			0.1	0.03	0.1	0.01		
PYLL-70								
per 100,000			0.5		0.5			
ES			0.5		0.4			
AYLL-70			11.0		9.8			

* See corresponding tables with multiple malignancies.

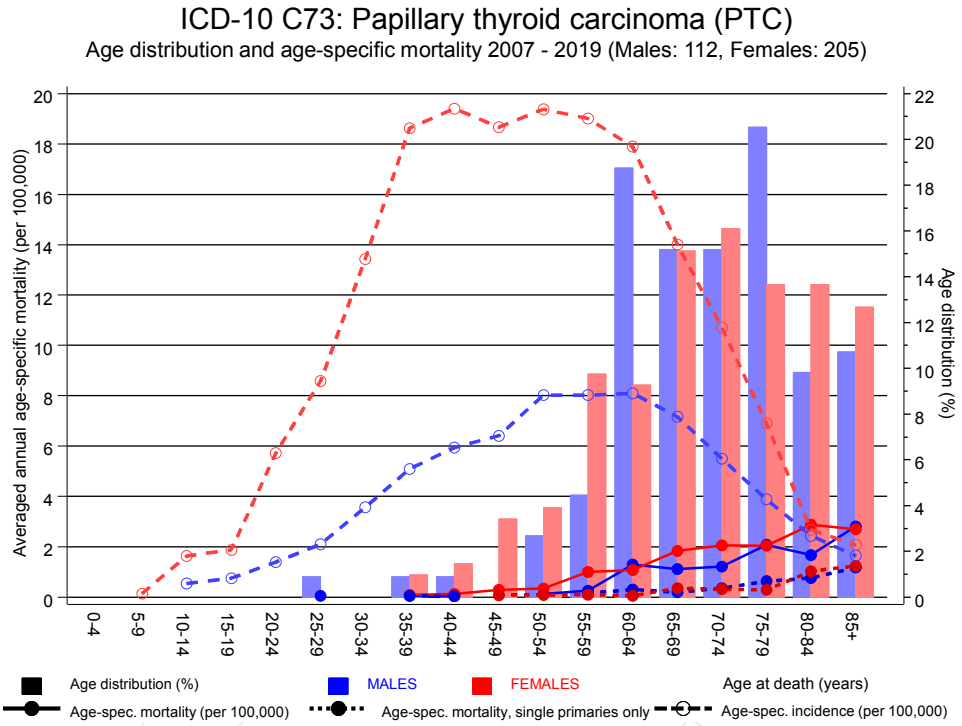


Figure 17. Distribution of age at death (bars; males: mean=62.0 yrs, median=63.8 yrs; females: mean=60.9 yrs, median=62.2 yrs) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

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

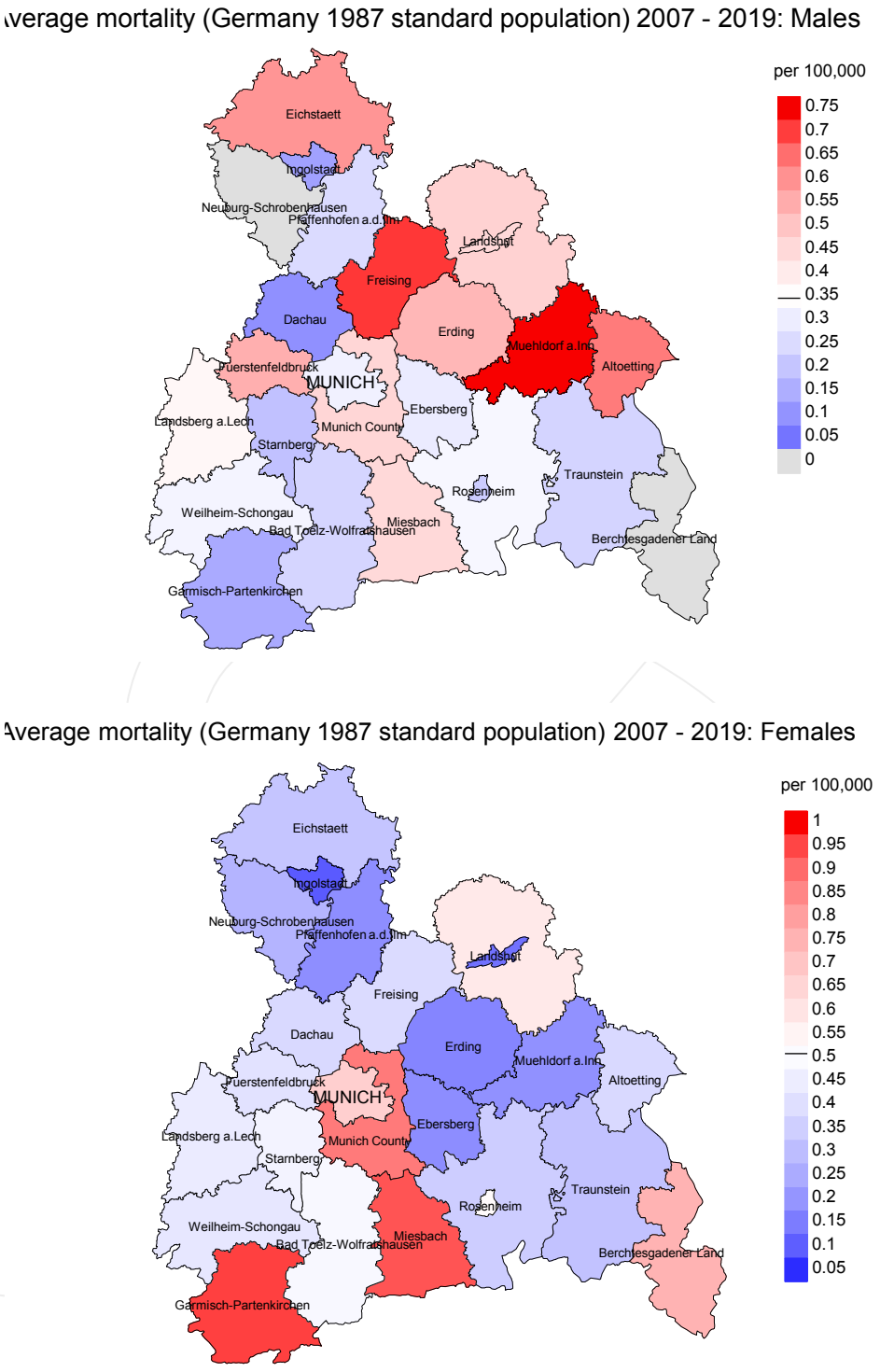
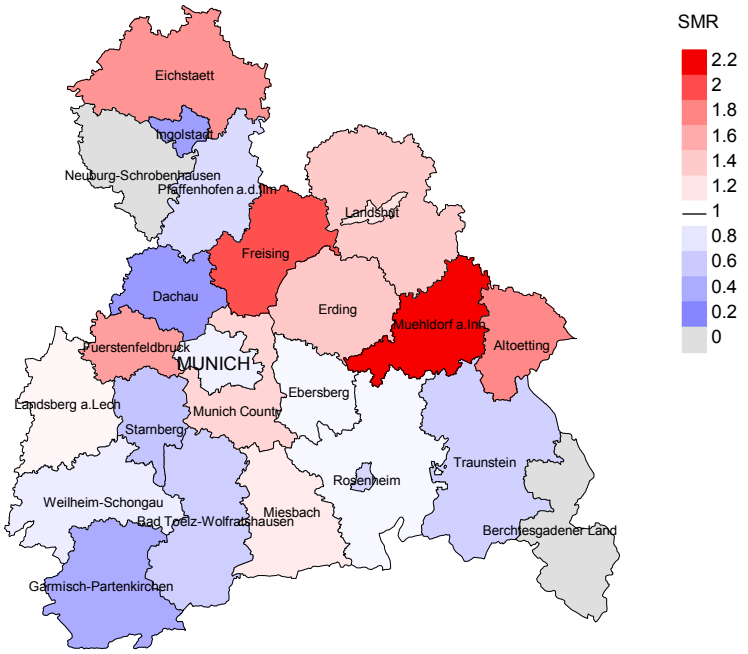


Figure 18a. Map of cancer mortality (german standard population) by county averaged for period 2007 to 2019. According to their individual mortality rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (males 0.3/100,000 WS N=112, females 0.5/100,000 WS N=205).

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 2 women died from papillary thyroid ca.. Therefore, the mean mortality rate for this cancer type in this area can be calculated at 0.2/100,000 (german standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 0.0 and 0.9/100,000.

Standardized mortality ratio (SMR) 2007 - 2019: Males



Standardized mortality ratio (SMR) 2007 - 2019: Females

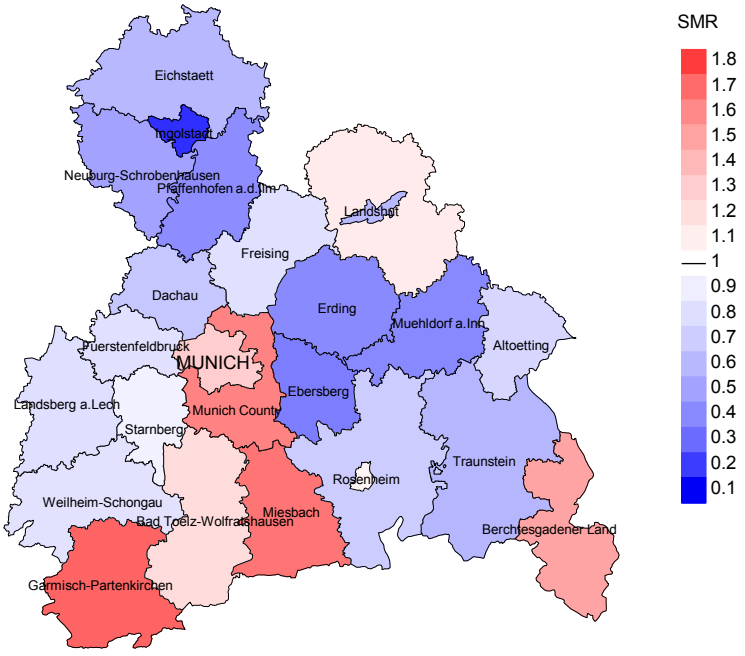


Figure 18b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2007 to 2019. According to their individual SMR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (males N=112, females N=205).

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 2 women died from papillary thyroid ca.. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 0.36. Though, the value of this parameter may vary with an underlying probability of 99% between 0.02 and 1.66, 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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