Munich Cancer Registry

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ICD-10 C73: Thyroid cancer

Incidence and Mortality

Year of diagnosis	1998-2019
Patients	8,883
Diseases	8,945
Creation date	01/26/2021
Database export	01/07/2021
Population	4.92 m

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

https://www.tumorregister-muenchen.de/en/facts/base/bC73__E-ICD-10-C73-Thyroid-cancer-incidence-and-mortality.pdf

Index of figures and tables

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

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	213	9	4.2	8.5	10.1	39.0	92.0
1999	205	4	2.0	7.2	9.9	24.9	89.8
2000	240	6	2.5	9.1	9.5	30.0	91.3
2001	200	6	3.0	9.2	9.2	27.0	91.0
2002	315	14	4.4	9.5	9.0	34.0	93.3 #
2003	303	8	2.6	9.6	8.6	27.1	92.4
2004	356	9	2.5	9.0	8.3	21.3	89.0
2005	373	8	2.1	9.2	8.1	23.9	88.5
2006	424	9	2.1	9.1	7.6	19.8	83.0
2007	584	7	1.2	9.2	7.0	19.5	80.1 #
2008	664	13	2.0	8.9	6.5	15.8	95.8
2009	629	4	0.6	9.3	5.9	15.1	96.3
2010	525	17	3.2	9.5	5.3	15.4	95.2
2011	472	8	1.7	9.8	4.6	16.1	94.1
2012	464	2	0.4	9.8	4.0	14.7	93.1
2013	478	13	2.7	9.9	3.4	14.4	96.4
2014	431	9	2.1	9.9	2.8	10.0	89.3
2015	439	8	1.8	10.2	2.4	11.4	87.9
2016	463	9	1.9	10.2	1.9	7.8	97.8
2017	434	2	0.5	10.3	1.6	5.8	99.1
2018	433			10.2	1.5	3.0	99.3
2019	300			10.1	1.0	2.3	80.0 ##
1998–2019	8945	165	1.8	10.1	10.1	16.5	92.0

8,945 cases diagnosed 1998-2019 are related to a total of 8,883 patients. Currently, in 1,707 (19.2 %) of these 8,883 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 1,366 / 259 / 82 (15.4 % / 2.9 % / 0.9 %) 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 434 cases has been diagnosed, of which 10.3 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 1.6 % of cases, at least one new malignancy has occurred during the follow-up period (all numbers refer to the date of the database export, see cover sheet).

Table 1a

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

Year of diagnosis	Males n	Males %	DCO cases n	Prop. DCO %	Prop. at least 1 further malign. prior + synchron. %	Prop. at least 1 further malign. after %	Prop. deaths %	Prop. actively followed %
1998	43	20.2	2	4.7	9.3	10.7	44.2	93.0
1999	53	25.9	3	5.7	6.3	10.3	47.2	90.6
2000	63	26.3	2	3.2	10.7	10.0	38.1	90.5
2001	55	27.5	2	3.6	11.2	9.8	38.2	92.7
2002	80	25.4	4	5.0	10.9	9.5	40.0	95.0 #
2003	84	27.7	5	6.0	10.6	9.2	38.1	95.2
2004	107	30.1	3	2.8	10.1	9.1	29.9	91.6
2005	82	22.0			10.4	8.9	35.4	95.1
2006	118	27.8	3	2.5	10.1	8.5	23.7	84.7
2007	174	29.8	3	1.7	10.2	7.9	27.6	82.2 #
2008	173	26.1	5	2.9	10.7	6.8	19.1	98.3
2009	180	28.6			11.4	5.9	17.2	96.7
2010	120	22.9	4	3.3	11.6	5.7	26.7	95.0
2011	141	29.9	3	2.1	11.9	4.7	22.0	95.0
2012	146	31.5	1	0.7	12.2	4.3	26.0	93.2
2013	185	38.7	5	2.7	12.3	3.5	16.2	95.7
2014	132	30.6	2	1.5	12.6	3.4	15.9	89.4
2015	140	31.9	5	3.6	12.8	2.7	19.3	91.4
2016	146	31.5	4	2.7	12.8	1.5	8.9	98.6
2017	118	27.2			13.0	1.6	9.3	100.0
2018	122	28.2			12.8	1.0	4.1	100.0
2019	82	27.3			12.8	0.0	3.7	82.9 ##
1998-2019	2544	28.4	56	2.2	12.8	10.7	22.2	93.3

2,544 cases diagnosed 1998-2019 are related to a total of 2,519 patients. Currently, in 564 (22.4 %) of these 2,519 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 448 / 81 / 35 (17.8 % / 3.2 % / 1.4 %) 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 118 cases has been diagnosed, of which 13.0 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 1.6 % of cases, at least one new malignancy has occurred during the follow-up period (all numbers refer to the date of the database export, see cover sheet).

Table 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	170	79.8	7	4.1	8.2	9.9	37.6	91.8	
1999	152	74.1	1	0.7	7.5	9.7	17.1	89.5	
2000	177	73.8	4	2.3	8.6	9.3	27.1	91.5	
2001	145	72.5	4	2.8	8.5	9.0	22.8	90.3	
2002	235	74.6	10	4.3	9.0	8.8	31.9	92.8	#
2003	219	72.3	3	1.4	9.2	8.3	22.8	91.3	
2004	249	69.9	6	2.4	8.5	8.1	17.7	88.0	
2005	291	78.0	8	2.7	8.8	7.8	20.6	86.6	
2006	306	72.2	6	2.0	8.7	7.2	18.3	82.4	
2007	410	70.2	4	1.0	8.8	6.6	16.1	79.3	#
2008	491	73.9	8	1.6	8.3	6.3	14.7	94.9	
2009	449	71.4	4	0.9	8.6	5.9	14.3	96.2	
2010	405	77.1	13	3.2	8.8	5.2	12.1	95.3	
2011	331	70.1	5	1.5	9.0	4.6	13.6	93.7	
2012	318	68.5	1	0.3	8.9	3.9	9.4	93.1	
2013	293	61.3	8	2.7	8.9	3.3	13.3	96.9	
2014	299	69.4	7	2.3	8.9	2.6	7.4	89.3	
2015	299	68.1	3	1.0	9.1	2.4	7.7	86.3	
2016	317	68.5	5	1.6	9.1	2.1	7.3	97.5	
2017	316	72.8	2	0.6	9.2	1.5	4.4	98.7	
2018	311	71.8			9.2	1.7	2.6	99.0	
2019	218	72.7			9.1	1.4	1.8	78.9	##
1998-2019	6401	71.6	109	1.7	9.1	9.9	14.3	91.4	

6,401 cases diagnosed 1998-2019 are related to a total of 6,364 patients. Currently, in 1,143 (18.0 %) of these 6,364 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 918 / 178 / 47 (14.4 % / 2.8 % / 0.7 %) patients exist having 2 / 3 / 4+ malignancies.

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

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

How to interpret:
In 2017, a subgroup of 316 cases has been diagnosed, of which 9.2 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 1.5 % 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	43	170	3.9	14.5	2.7	9.9	3.5	12.4	4.0	13.7
1999	53	152	4.7	12.8	3.2	9.5	4.3	11.5	5.2	12.3
2000	63	177	5.5	14.7	3.7	10.7	5.0	13.1	5.8	13.7
2001	55	145	4.7	11.9	3.2	8.1	4.3	10.2	4.6	10.9
2002	80	235	4.3	12.0	3.0	8.6	3.8	10.6	4.2	11.5
2003	84	219	4.5	11.1	2.9	8.1	3.9	9.9	4.4	10.5
2004	107	249	5.7	12.6	3.9	9.0	5.0	11.1	5.7	11.9
2005	82	291	4.3	14.6	2.8	10.1	3.7	12.7	4.2	13.5
2006	118	306	6.2	15.2	4.1	10.6	5.3	13.4	5.8	14.2
2007	174	410	7.9	17.8	5.3	12.6	6.8	15.7	7.4	16.6
2008	173	491	7.8	21.2	5.4	14.6	6.9	18.3	7.5	19.6
2009	180	449	8.1	19.3	5.6	14.1	7.1	17.3	7.6	18.4
2010	120	405	5.3	17.3	3.3	12.2	4.4	15.0	5.0	16.1
2011	141	331	6.3	14.2	4.2	10.0	5.3	12.2	5.8	13.2
2012	146	318	6.4	13.5	4.3	10.1	5.4	12.2	6.0	12.8
2013	185	293	8.0	12.3	5.5	8.4	7.0	10.5	7.5	11.3
2014	132	299	5.7	12.4	3.7	9.5	4.8	11.2	5.3	11.7
2015	140	299	5.9	12.3	4.0	9.4	5.0	11.1	5.5	11.8
2016	146	317	6.1	12.9	4.2	9.9	5.2	11.7	5.6	12.4
2017	118	316	4.9	12.8	3.4	9.8	4.3	11.7	4.6	12.4
2018	122	311	5.0	12.5	3.7	9.5	4.5	11.3	4.8	12.0
2019	82	218	3.4	8.8	2.4	6.8	2.9	8.2	3.2	8.5
1998-2019	2544	6401	5.8	14.0	3.9	10.1	5.0	12.3	5.4	13.1

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	213	54.9	16.2	13.0	89.6	33.4	43.0	54.4	67.3	76.9
1999	205	52.9	15.9	16.7	88.4	30.0	42.2	53.6	62.2	75.7
2000	240	53.5	16.8	11.3	93.7	32.1	41.7	54.7	65.2	75.6
2001	200	54.2	14.8	17.6	95.4	35.4	42.7	54.8	65.0	73.2
2002	315	55.2	16.3	7.8	91.2	34.5	44.6	55.9	66.6	75.0
2003	303	54.2	16.0	7.6	100	33.6	43.1	55.1	64.7	73.5
2004	356	53.5	15.9	14.8	91.6	31.8	41.8	53.2	64.7	75.1
2005	373	55.0	15.6	13.5	98.2	36.2	43.3	54.8	66.0	74.2
2006	424	54.2	14.6	15.1	94.9	34.9	43.4	55.1	65.0	73.1
2007	584	52.8	14.8	9.3	92.0	34.2	41.9	52.4	63.9	72.2
2008	664	54.3	15.1	12.7	97.7	34.5	43.0	54.9	65.0	73.6
2009	629	52.6	15.7	12.7	93.1	31.9	41.9	52.9	63.6	72.3
2010	525	54.3	16.0	14.3	94.5	34.6	42.9	54.1	65.8	76.2
2011	472	53.7	16.6	10.1	91.5	32.3	41.0	53.1	67.1	75.1
2012	464	52.1	15.7	5.7	91.7	31.8	41.0	51.2	64.0	72.9
2013	478	54.0	16.3	11.6	93.9	32.8	41.6	53.7	66.0	75.9
2014	431	52.3	16.7	6.4	93.1	30.9	41.3	51.1	63.9	73.7
2015	439	51.9	17.1	6.4	97.7	29.2	39.1	50.7	64.5	74.4
2016	463	51.3	16.1	12.6	97.7	30.9	39.3	50.6	63.3	73.7
2017	434	50.9	15.4	13.1	89.3	30.9	39.6	50.4	61.6	72.7
2018	433	50.8	15.7	10.3	97.4	30.0	39.1	49.6	61.6	72.0
2019	300	49.5	15.2	10.1	90.5	30.0	38.4	49.1	57.6	72.4
1998–2019	8945	53.0	15.9	5.7	100	32.6	41.6	52.9	64.4	74.0

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	43	54.7	13.9	27.2	81.5	37.2	46.2	55.2	66.2	76.2
1999	53	58.1	15.9	17.5	88.4	34.1	50.1	58.3	71.0	78.0
2000	63	57.6	17.9	15.9	93.7	32.7	45.9	56.7	69.9	79.8
2001	55	54.8	12.3	29.9	78.5	39.7	44.4	55.4	65.0	71.3
2002	80	54.9	16.8	7.8	88.6	34.8	43.0	56.5	65.8	75.4
2003	84	58.7	14.1	24.0	87.9	36.2	50.6	59.7	67.5	77.0
2004	107	55.9	15.4	16.1	88.1	36.4	45.2	57.4	66.5	75.8
2005	82	58.6	14.2	20.1	91.3	41.7	48.3	58.2	68.7	78.2
2006	118	56.2	13.9	19.6	93.4	37.4	46.6	57.8	65.4	72.3
2007	174	53.9	14.0	23.1	84.6	36.5	43.3	53.5	65.0	72.6
2008	173	55.2	14.5	12.7	89.5	35.0	46.6	57.0	64.7	72.7
2009	180	54.6	15.0	13.4	84.7	33.5	46.2	57.6	66.0	71.2
2010	120	58.1	14.9	20.5	88.5	37.9	47.4	57.4	70.4	76.3
2011	141	54.5	15.5	17.3	86.7	35.7	42.8	54.0	67.8	74.5
2012	146	55.8	15.3	19.6	91.7	36.8	44.3	57.3	66.8	74.3
2013	185	54.5	15.2	11.6	89.9	34.2	44.2	55.2	64.9	73.5
2014	132	56.3	16.6	14.3	92.3	35.7	44.9	57.3	67.4	77.6
2015	140	55.4	16.7	10.5	90.8	33.1	44.4	54.6	69.0	76.9
2016	146	53.6	15.6	13.0	85.9	34.1	41.9	52.2	64.9	76.2
2017	118	53.6	14.2	20.6	86.9	35.4	43.9	53.8	63.8	73.9
2018	122	52.5	15.3	13.8	86.5	32.7	42.8	52.9	63.5	71.6
2019	82	53.0	16.1	17.8	86.0	33.1	43.8	53.3	65.1	74.9
1998–2019	2544	55.2	15.2	7.8	93.7	35.1	44.7	55.7	66.2	74.7

Table 3b

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

Year of diagnosis	Cases n	Mean	Std. dev.	Min.	Max.	10%	25%	Median 50%	75%	90%
1998	170	54.9	16.7	13.0	89.6	32.9	42.2	54.4	67.7	77.1
1999	152	51.1	15.6	16.7	86.8	28.5	40.2	52.3	61.5	72.7
2000	177	52.0	16.2	11.3	91.0	31.9	40.7	53.2	63.6	72.4
2001	145	54.0	15.7	17.6	95.4	34.4	40.7	54.7	65.0	74.3
2002	235	55.3	16.2	10.0	91.2	34.3	46.3	55.7	66.8	75.0
2003	219	52.4	16.4	7.6	100	32.8	40.2	53.4	63.2	73.5
2004	249	52.4	16.0	14.8	91.6	31.5	40.0	52.6	63.6	74.3
2005	291	54.0	15.8	13.5	98.2	34.2	42.3	54.0	65.3	73.4
2006	306	53.4	14.8	15.1	94.9	34.7	42.1	54.5	63.7	73.2
2007	410	52.3	15.1	9.3	92.0	33.2	41.4	51.6	63.9	72.1
2008	491	54.0	15.3	16.2	97.7	34.3	42.3	54.2	65.2	73.8
2009	449	51.9	15.9	12.7	93.1	31.6	39.9	51.4	62.6	73.0
2010	405	53.2	16.2	14.3	94.5	33.9	41.3	52.5	63.9	76.1
2011	331	53.3	17.1	10.1	91.5	30.4	40.7	52.8	67.0	75.3
2012	318	50.4	15.6	5.7	90.3	30.3	39.0	50.1	61.8	70.4
2013	293	53.6	17.0	16.4	93.9	32.0	40.8	53.0	67.4	77.7
2014	299	50.6	16.5	6.4	93.1	30.0	39.4	49.3	61.9	71.8
2015	299	50.2	17.0	6.4	97.7	28.4	37.5	48.7	62.0	72.4
2016	317	50.2	16.3	12.6	97.7	28.9	37.9	49.9	62.3	72.1
2017	316	50.0	15.8	13.1	89.3	30.0	37.4	49.6	61.2	72.7
2018	311	50.1	15.9	10.3	97.4	29.7	38.0	48.5	60.2	72.0
2019	218	48.1	14.6	10.1	90.5	29.3	37.3	47.2	56.4	69.2
1998–2019	6401	52.1	16.1	5.7	100	31.7	40.4	51.8	63.6	73.6

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	6	0.1	0.1			0.0	6	0.1	0.1
10-14	34	0.5	0.6	10	0.5	0.5	24	0.5	0.7
15-19	46	0.7	1.4	13	0.7	1.2	33	0.7	1.4
20-24	154	2.4	3.8	34	1.8	3.1	120	2.7	4.1
25-29	243	3.8	7.6	52	2.8	5.9	191	4.3	8.4
30-34	402	6.4	14.0	84	4.5	10.4	318	7.1	15.5
35-39	568	9.0	23.0	129	6.9	17.3	439	9.8	25.4
40-44	671	10.6	33.6	178	9.6	26.9	493	11.1	36.4
45-49	727	11.5	45.1	200	10.8	37.7	527	11.8	48.3
50-54	738	11.7	56.8	235	12.6	50.3	503	11.3	59.5
55-59	654	10.4	67.2	211	11.4	61.6	443	9.9	69.5
60-64	608	9.6	76.8	205	11.0	72.7	403	9.0	78.5
65-69	499	7.9	84.7	181	9.7	82.4	318	7.1	85.7
70-74	432	6.8	91.5	158	8.5	90.9	274	6.1	91.8
75-79	264	4.2	95.7	96	5.2	96.1	168	3.8	95.6
80-84	152	2.4	98.1	48	2.6	98.7	104	2.3	97.9
85+	118	1.9	100.0	25	1.3	100.0	93	2.1	100.0
All ages	6316	100.0		1859	100.0		4457	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=32 %	Females DCO rate n=60 %	Males Prop.all cancers n=143063 %	Females Prop.all cancers n=144724 %
0- 4								
5- 9		6		0.4				6.5
10-14	10	24	0.7	1.7		4.2	7.5	20.5
15-19	13	33	0.8	2.2			4.3	13.4
20-24	34	120	1.8	6.8			5.8	25.3
25-29	52	191	2.5	9.2			5.9	17.2
30-34	84	316	3.9	15.0			7.0	15.9
35-39	127	435	5.9	20.7			7.4	13.3
40-44	175	492	7.5	21.7	0.6		6.7	8.5
45-49	197	522	7.8	21.5			4.1	5.9
50-54	234	503	10.0	21.8			3.0	4.3
55-59	209	439	10.8	22.0			1.8	3.6
60-64	203	398	12.4	22.7	1.0	1.0	1.2	2.7
65-69	177	316	11.6	18.8	2.3		0.8	1.8
70-74	156	272	11.1	16.9	4.5	0.4	0.6	1.5
75-79	96	166	8.7	12.1	8.3	3.6	0.4	0.9
80-84	47	104	7.2	10.7	12.8	16.3	0.3	0.7
85+	25	93	5.9	9.6	16.0	33.3	0.3	0.6
All ages	1839	4430			1.7	1.4	1.3	3.1
Incidence								
Raw			6.1	14.2				
WS			4.1	10.4				
ES			5.2	12.6				
BRD-S			5.7	13.4				

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).

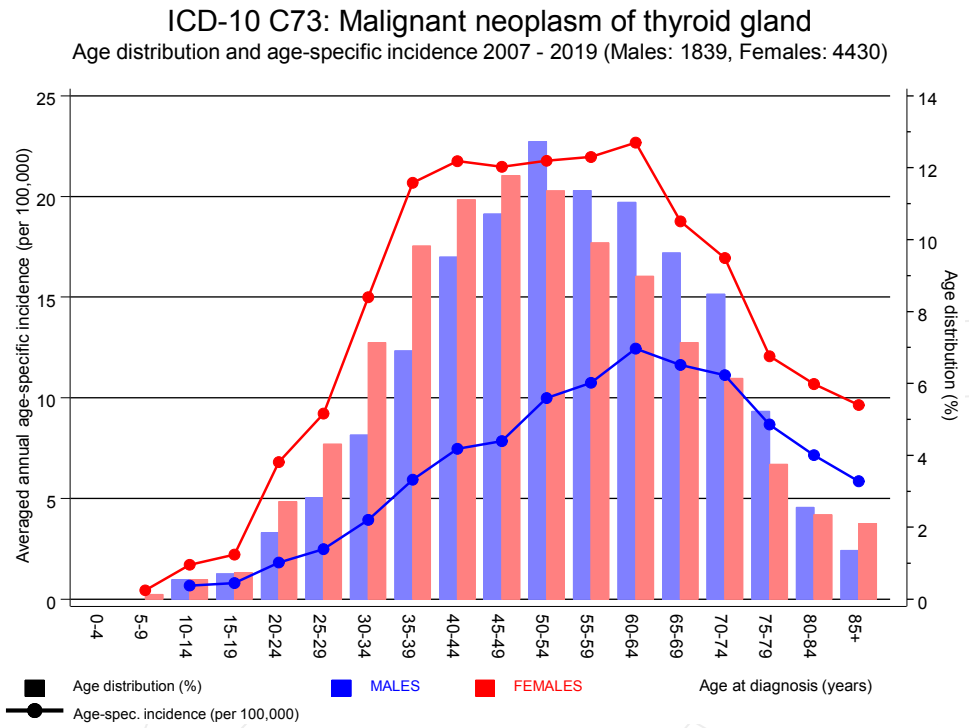


Figure 6. Age distribution (males: mean=54.7 yrs, median=54.8 yrs; females: mean=51.6 yrs, median=50.7 yrs) and age-specific incidence.

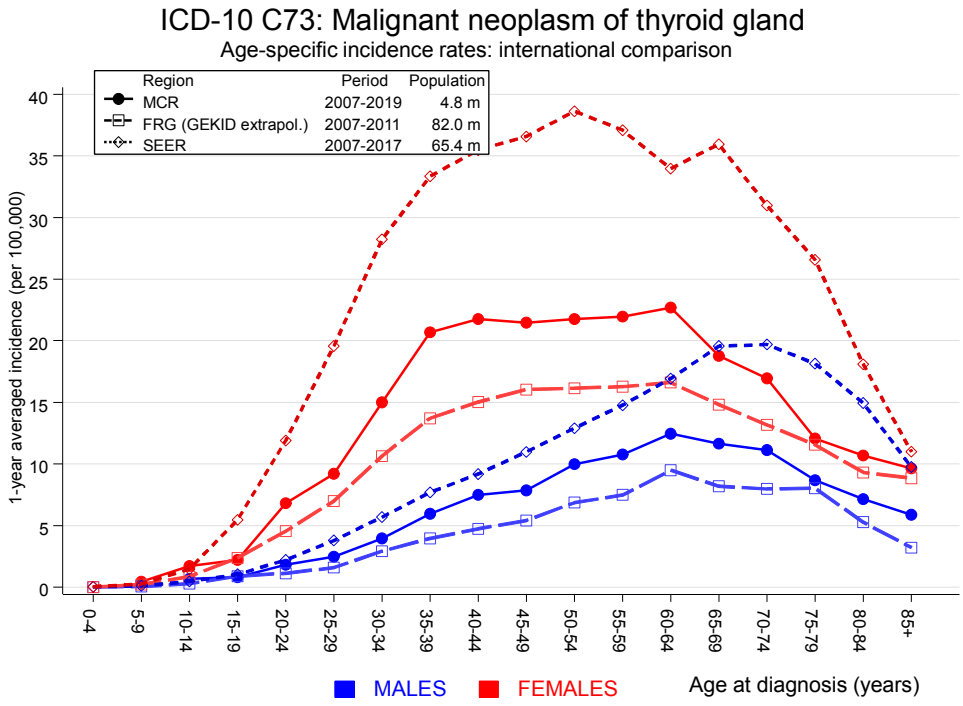


Figure 6a. Age-specific incidence in MCR registry areas compared to Germany (FRG, GEKID extrapolation) and SEER (Surveillance, Epidemiology, and End Results, USA).

Reference:

Extrapolated age-specific patient population of Germany, data status middle of 2010. Association of Population-based Cancer Registries in Germany (GEKID e.V.). Berlin, 2014. http://www.gekid.de. Last access: 02/11/2015
Surveillance, Epidemiology, and End Results (SEER) Program SEER*Stat Database: Incidence - SEER 18 Regs Research Data, released April 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	3	1.1	2.8	0.6	8.2		2.1	
C07–C08 Salivary gland	1	0.2	4.9	0.1	27.3		0.9	
C09–C10 Oropharynx	2	1.4	1.5	0.2	5.3		0.7	
C12–C13 Hypopharynx	1	0.7	1.4	0.0	7.8		0.3	
C15 Oesophagus	11	2.1	5.2	2.6	9.3	#	9.5	
C16 Stomach	9	3.5	2.6	1.2	4.9	#	5.9	
C17 Small intestine	1	0.6	1.7	0.0	9.2		0.4	
C18 Colon	18	8.5	2.1	1.3	3.4	#	10.2	
C19–C20 Rectum	21	5.3	4.0	2.5	6.1	#	16.9	
C21 Anus/canal	2	0.3	7.6	0.9	27.5		1.9	
C22 Liver	6	2.8	2.1	0.8	4.6		3.4	16.7
C23–C24 Bile	1	0.9	1.1	0.0	6.0		0.1	
C25 Pancreas	11	3.5	3.1	1.5	5.5	#	8.0	9.1
C32 Larynx	5	1.1	4.5	1.5	10.5	#	4.2	
C33–C34 Lung	25	11.5	2.2	1.4	3.2	#	14.5	8.0
C37 Thymus	1	0.1	15.0	0.4	83.5		1.0	
C38,C45 Mesothelioma	2	0.6	3.3	0.4	11.7		1.5	
C43 Malign. melanoma	12	4.7	2.5	1.3	4.4	#	7.8	
C46,C49 Soft tissue	7	0.6	12.5	5.0	25.7	#	6.9	
C50 Breast	2	0.3	7.6	0.9	27.3		1.9	
C61 Prostate	54	26.5	2.0	1.5	2.7	#	29.5	
C62 Testis	1	0.7	1.4	0.0	7.8		0.3	
C64 Kidney	11	3.5	3.1	1.5	5.5	#	8.0	
C65 Renal pelvis	2	0.4	5.2	0.6	18.7		1.7	
C66 Ureter	2	0.2	9.1	1.1	32.8	#	1.9	
C67 Bladder	10	3.9	2.6	1.2	4.8	#	6.6	10.0
C68 Urethra	1	0.1	11.7	0.3	65.3		1.0	
C69 Eye melanoma	1	0.1	9.1	0.2	50.4		1.0	
C70–C72 CNS cancer	6	1.4	4.3	1.6	9.4	#	4.9	
C73 Thyroid	24	0.9	26.4	16.9	39.3	#	24.8	
C76–C79 CUP	8	1.5	5.2	2.2	10.3	#	6.9	
C82–C85 NHL	14	4.0	3.5	1.9	5.9	#	10.7	
C90 Mult. myeloma	5	1.2	4.2	1.4	9.7	#	4.1	
C91–C96 Leukaemia	5	1.4	3.7	1.2	8.6	#	3.9	
Not observed	0	1.6	0.0	0.0	2.3		−1.7	
All further malignancies	285	97.1	2.9	2.6	3.3	#	201.7	1.8

Patients	2410
Median age at next malignancy (years)	67.6
Person-years	9319
Mean observation time (years)	3.9
Median observation time (years)	1.9

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	1.2	1.7	0.2	6.1		0.3	
C07–C08	Salivary gland	5	0.3	17.1	5.5	39.8	#	1.8	
C09–C10	Oropharynx	3	1.0	3.1	0.6	9.0		0.8	33.3
C15	Oesophagus	5	1.2	4.2	1.4	9.8	#	1.5	
C16	Stomach	12	5.0	2.4	1.2	4.2	#	2.8	
C18	Colon	33	14.4	2.3	1.6	3.2	#	7.3	3.0
C19–C20	Rectum	16	6.6	2.4	1.4	3.9	#	3.7	
C22	Liver	3	2.0	1.5	0.3	4.5		0.4	33.3
C23–C24	Bile	5	2.0	2.5	0.8	5.8		1.2	
C25	Pancreas	16	6.8	2.3	1.3	3.8	#	3.6	
C32	Larynx	2	0.4	5.3	0.6	19.0		0.6	50.0
C33–C34	Lung	47	14.2	3.3	2.4	4.4	#	12.9	6.4
C37	Thymus	2	0.1	16.0	1.9	57.9	#	0.7	
C38,C45	Mesothelioma	5	0.3	16.8	5.5	39.2	#	1.8	
C40–C41	Bone	2	0.2	10.6	1.3	38.1	#	0.7	
C43	Malign. melanoma	22	8.4	2.6	1.6	4.0	#	5.3	4.5
C46,C49	Soft tissue	5	1.1	4.7	1.5	10.9	#	1.5	
C48	Peritoneal	4	0.8	5.3	1.4	13.5	#	1.3	25.0
C50	Breast	200	65.0	3.1	2.7	3.5	#	53.0	0.5
C51	Vulva	4	1.7	2.4	0.7	6.2		0.9	
C53	Cervix uteri	7	3.6	1.9	0.8	4.0		1.3	
C54	Corpus uteri	26	10.5	2.5	1.6	3.6	#	6.1	
C56	Ovary	17	7.5	2.3	1.3	3.6	#	3.7	
C64	Kidney	17	4.0	4.3	2.5	6.8	#	5.1	5.9
C66	Ureter	2	0.2	8.2	1.0	29.6		0.7	
C67	Bladder	9	2.7	3.3	1.5	6.2	#	2.5	
C70–C72	CNS cancer	7	2.6	2.7	1.1	5.6	#	1.7	
C73	Thyroid	37	4.9	7.5	5.3	10.4	#	12.6	
C74–C80	Cancer others	5	0.4	12.0	3.9	28.0	#	1.8	
C76–C79	CUP	14	2.6	5.3	2.9	8.9	#	4.5	7.1
C82–C85	NHL	23	6.6	3.5	2.2	5.2	#	6.4	
C90	Mult. myeloma	3	2.0	1.5	0.3	4.4		0.4	33.3
C91–C96	Leukaemia	22	2.4	9.0	5.7	13.7	#	7.7	13.6
Others, specified		7	3.6	1.9	0.8	4.0		1.3	
Not observed		0	1.4	0.0	0.0	2.6		−0.6	
All further malignancies		589	187.7	3.1	2.9	3.4	#	157.7	2.7

Patients	6089
Median age at next malignancy (years)	65.3
Person-years	25451
Mean observation time (years)	4.2
Median observation time (years)	2.0

The occurrence of further specified malignancy is statistically significant.

Further observed malignancies with count 1 are pooled in category “Others, specified”.

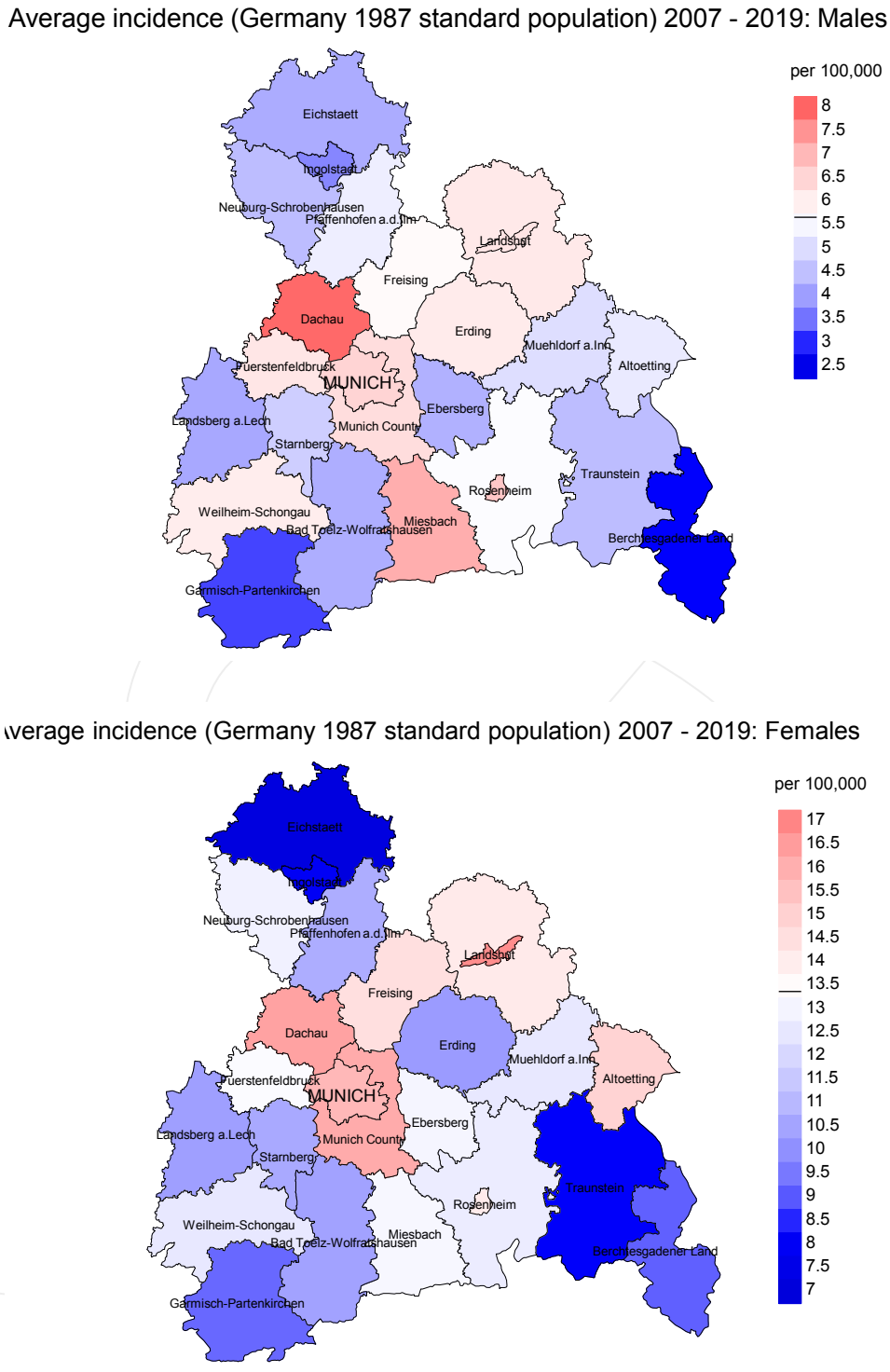
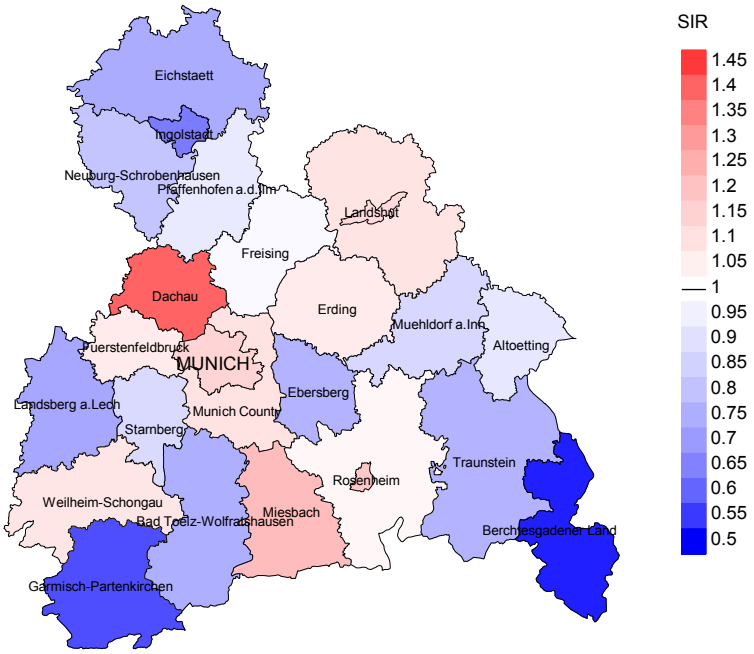


Figure 8a. Map of cancer incidence (german standard population, incl. DCO cases) by county averaged for period 2007 to 2019. According to their individual incidence rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (males 5.7/100,000 WS N=1,839, females 13.4/100,000 WS N=4,430).

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 121 women were identified with newly diagnosed thyroid cancer. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 13.0/100,000 (german standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 10.1 and 16.5/100,000.

Standardized incidence ratio (SIR) 2007 - 2019: Males



Standardized incidence ratio (SIR) 2007 - 2019: Females

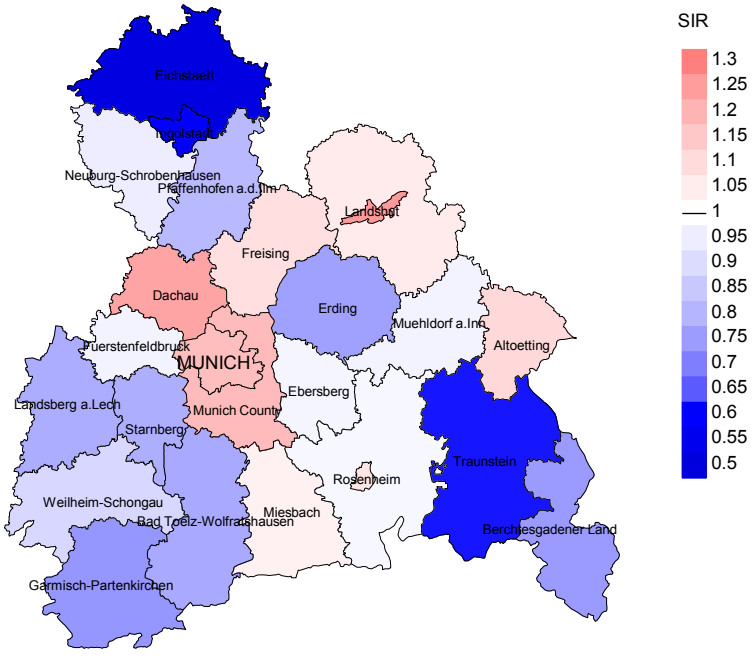


Figure 8b. Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2007 to 2019. According to their individual SIR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (males N=1,839, females N=4,430).

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 121 women were identified with newly diagnosed thyroid cancer. Therefore, the mean standardized incidence ratio (SIR) for this cancer type in this area can be calculated at 0.97. Though, the value of this parameter may vary with an underlying probability of 99% between 0.76 and 1.22, 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	213	92.0	4.2	83	39.0	92.8
1999	205	89.8	2.0	51	24.9	94.1
2000	240	91.3	2.5	72	30.0	95.8
2001	200	91.0	3.0	54	27.0	96.3
2002	315	93.3	4.4	107	34.0	92.5
2003	303	92.4	2.6	82	27.1	93.9
2004	356	89.0	2.5	76	21.3	97.4
2005	373	88.5	2.1	89	23.9	89.9
2006	424	83.0	2.1	84	19.8	91.7
2007	584	80.1	1.2	114	19.5	90.4
2008	664	95.8	2.0	105	15.8	91.4
2009	629	96.3	0.6	95	15.1	89.5
2010	525	95.2	3.2	81	15.4	92.6
2011	472	94.1	1.7	76	16.1	86.8
2012	464	93.1	0.4	68	14.7	92.6
2013	478	96.4	2.7	69	14.4	95.7
2014	431	89.3	2.1	43	10.0	95.3
2015	439	87.9	1.8	50	11.4	82.0
2016	463	97.8	1.9	36	7.8	83.3
2017	434	99.1	0.5	25	5.8	88.0
2018	433	99.3		13	3.0	23.1
2019	300	80.0		7	2.3	71.4
1998-2019	8945	92.0	1.8	1480	16.5	91.1

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	213	53	96.2	18	8.5
1999	205	45	88.9	11	5.4
2000	240	48	91.7	13	5.4
2001	200	38	86.8	13	6.5
2002	315	69	98.6	26	8.3
2003	303	80	95.0	18	5.9
2004	356	69	95.7	20	5.6
2005	373	84	100.0	20	5.4
2006	424	100	98.0	18	4.2
2007	584	92	93.5	24	4.1
2008	664	73	98.6	24	3.6
2009	629	88	96.6	19	3.0
2010	525	114	98.2	30	5.7
2011	472	134	100.0	32	6.8
2012	464	119	95.8	17	3.7
2013	478	123	99.2	28	5.9
2014	431	135	99.3	29	6.7
2015	439	121	98.3	17	3.9
2016	463	148	97.3	21	4.5
2017	434	121	96.7	12	2.8
2018	433	86	27.9	7	1.6
2019	300	82	39.0	3	1.0
1998–2019	8945	2022	91.7	420	4.7

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	53	79.2	20.8	94.1
1999	45	71.1	28.9	87.5
2000	48	77.1	22.9	88.6
2001	38	68.4	31.6	87.9
2002	69	84.1	15.9	98.5
2003	80	67.5	32.5	84.2
2004	69	71.0	29.0	81.8
2005	84	76.2	23.8	77.4
2006	100	71.0	29.0	82.7
2007	92	73.9	26.1	83.7
2008	73	68.5	31.5	87.5
2009	88	73.9	26.1	87.1
2010	114	71.9	28.1	75.9
2011	134	67.2	32.8	80.6
2012	119	62.2	37.8	66.7
2013	123	61.8	38.2	70.5
2014	135	72.6	27.4	81.3
2015	121	58.7	41.3	68.9
2016	148	65.5	34.5	75.7
2017	121	63.6	36.4	63.2
2018	86	29.1	70.9	29.2
2019	82	34.1	65.9	40.6
1998-2019	2022	66.0	34.0	77.6

Table 10a

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

Year of death	Deaths n	Age at death (all causes) Years	Age at death (cancer-related) Years	Age at death (non-cancer-related) Years	Age at death (according to death certificate) Years
1998	18	73.3	73.3	59.1	73.3
1999	18	68.9	69.2	63.7	70.5
2000	22	76.8	78.0	74.0	76.8
2001	14	72.2	70.7	75.0	71.1
2002	21	74.8	74.7	87.0	75.5
2003	26	74.8	74.9	73.2	74.9
2004	28	71.8	72.3	71.3	70.7
2005	29	79.1	79.4	68.6	76.6
2006	36	72.2	71.1	80.1	71.5
2007	35	73.3	73.3	66.6	73.3
2008	19	77.1	77.7	70.8	77.7
2009	26	73.0	68.7	79.2	70.6
2010	41	72.3	71.5	81.1	71.6
2011	44	71.6	68.0	77.3	70.4
2012	46	75.3	75.1	75.6	75.0
2013	49	76.1	69.0	80.9	72.3
2014	57	70.3	70.3	75.4	70.3
2015	41	76.1	75.2	79.7	75.9
2016	58	75.2	75.5	74.9	75.5
2017	37	76.1	75.8	79.1	75.8
2018	32	76.4	78.7	74.6	83.0
2019	32	78.2	67.3	80.6	69.9
1998–2019	729	74.5	73.1	77.0	73.5

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

Table 10b

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

Year of death	Deaths n	Age at death (all causes) Years	Age at death (cancer-related) Years	Age at death (non-cancer-related) Years	Age at death (according to death certificate) Years
1998	35	78.1	77.4	79.8	79.3
1999	27	74.7	72.0	76.9	71.7
2000	26	77.0	71.2	89.6	76.5
2001	24	79.1	67.3	80.0	78.9
2002	48	76.6	76.7	75.2	76.6
2003	54	77.5	77.7	76.5	78.4
2004	41	79.4	78.4	80.3	76.5
2005	55	78.0	76.1	83.6	76.1
2006	64	76.6	75.3	83.5	75.4
2007	57	78.0	78.0	75.9	78.1
2008	54	76.6	73.0	81.2	76.2
2009	62	76.9	76.9	79.4	80.0
2010	73	77.0	72.3	82.8	73.4
2011	90	78.5	78.1	81.3	78.1
2012	73	79.3	78.7	80.0	77.7
2013	74	78.6	77.1	79.4	77.3
2014	78	77.0	76.2	78.7	75.9
2015	80	78.7	77.7	81.5	77.6
2016	90	77.2	76.3	80.6	75.4
2017	84	76.9	73.6	81.6	73.6
2018	54	78.4	73.7	78.8	71.0
2019	50	81.9	81.6	82.5	81.8
1998–2019	1293	78.1	76.5	80.3	76.6

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	16	1.4	0.37	0.8	0.30	1.3	0.37	1.9	0.48
1999	13	1.2	0.25	0.7	0.21	1.0	0.24	1.4	0.27
2000	19	1.7	0.31	0.9	0.24	1.5	0.31	2.2	0.40
2001	10	0.9	0.18	0.5	0.15	0.8	0.18	1.0	0.22
2002	18	1.0	0.23	0.5	0.16	0.8	0.21	1.1	0.27
2003	20	1.1	0.24	0.5	0.19	0.9	0.22	1.2	0.28
2004	21	1.1	0.20	0.6	0.15	0.9	0.18	1.3	0.23
2005	22	1.2	0.27	0.6	0.20	0.9	0.24	1.3	0.31
2006	29	1.5	0.25	0.8	0.18	1.2	0.22	1.6	0.27
2007	26	1.2	0.15	0.6	0.11	0.9	0.13	1.2	0.17
2008	14	0.6	0.08	0.3	0.05	0.5	0.07	0.7	0.09
2009	19	0.9	0.11	0.4	0.08	0.6	0.09	0.8	0.11
2010	32	1.4	0.27	0.7	0.20	1.0	0.23	1.3	0.26
2011	31	1.4	0.22	0.7	0.17	1.0	0.20	1.3	0.22
2012	36	1.6	0.25	0.7	0.17	1.1	0.21	1.5	0.26
2013	29	1.3	0.16	0.6	0.12	0.9	0.14	1.2	0.16
2014	45	1.9	0.34	0.9	0.25	1.4	0.29	1.8	0.34
2015	28	1.2	0.20	0.5	0.14	0.8	0.17	1.1	0.20
2016	42	1.7	0.30	0.8	0.19	1.1	0.22	1.6	0.29
2017	24	1.0	0.21	0.4	0.12	0.6	0.15	0.9	0.19
2018	8	0.3	0.07	0.1	0.04	0.2	0.05	0.3	0.06
2019	11	0.5	0.13	0.2	0.10	0.3	0.12	0.4	0.13
1998-2019	513	1.2	0.20	0.6	0.14	0.8	0.17	1.1	0.21

Table 11b

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

Year of death	Deaths n	Mort. raw	MI-Index raw	Mort. WS	MI-Index WS	Mort. ES	MI-Index ES	Mort. BRD-S	MI-Index BRD-S
1998	26	2.2	0.15	0.8	0.08	1.3	0.10	1.9	0.14
1999	19	1.6	0.13	0.7	0.08	1.1	0.09	1.4	0.12
2000	18	1.5	0.10	0.8	0.07	1.1	0.08	1.3	0.09
2001	16	1.3	0.11	0.6	0.07	0.8	0.08	1.0	0.10
2002	40	2.0	0.17	0.8	0.09	1.2	0.12	1.7	0.15
2003	34	1.7	0.16	0.7	0.08	1.0	0.10	1.3	0.13
2004	28	1.4	0.11	0.5	0.06	0.8	0.07	1.1	0.09
2005	42	2.1	0.14	0.8	0.08	1.2	0.10	1.6	0.12
2006	42	2.1	0.14	0.8	0.07	1.3	0.09	1.7	0.12
2007	42	1.8	0.10	0.7	0.05	1.0	0.07	1.4	0.09
2008	36	1.6	0.07	0.6	0.04	0.9	0.05	1.2	0.06
2009	46	2.0	0.10	0.7	0.05	1.1	0.06	1.3	0.07
2010	50	2.1	0.12	0.8	0.07	1.3	0.08	1.6	0.10
2011	59	2.5	0.18	0.8	0.08	1.3	0.11	1.8	0.14
2012	38	1.6	0.12	0.6	0.05	0.9	0.07	1.2	0.09
2013	47	2.0	0.16	0.7	0.09	1.1	0.10	1.5	0.13
2014	53	2.2	0.18	0.8	0.08	1.2	0.11	1.6	0.14
2015	43	1.8	0.15	0.6	0.06	0.9	0.08	1.3	0.11
2016	55	2.2	0.17	0.9	0.09	1.3	0.11	1.7	0.13
2017	53	2.2	0.17	0.9	0.09	1.3	0.11	1.6	0.13
2018	17	0.7	0.05	0.3	0.03	0.4	0.03	0.5	0.04
2019	17	0.7	0.08	0.1	0.02	0.3	0.03	0.4	0.05
1998-2019	821	1.8	0.13	0.7	0.07	1.0	0.08	1.3	0.10

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	1	0.1	0.1			0.0	1	0.2	0.2
15-19	0	0.0	0.1			0.0			0.2
20-24	0	0.0	0.1			0.0			0.2
25-29	3	0.3	0.4	1	0.3	0.3	2	0.4	0.5
30-34	3	0.3	0.8	2	0.6	0.9	1	0.2	0.7
35-39	6	0.7	1.4	4	1.2	2.0	2	0.4	1.1
40-44	5	0.6	2.0	1	0.3	2.3	4	0.7	1.8
45-49	20	2.2	4.2	7	2.0	4.3	13	2.3	4.1
50-54	24	2.7	6.9	11	3.2	7.5	13	2.3	6.5
55-59	40	4.4	11.3	12	3.5	11.0	28	5.0	11.5
60-64	95	10.5	21.9	52	15.1	26.1	43	7.7	19.2
65-69	108	12.0	33.9	49	14.2	40.3	59	10.6	29.9
70-74	145	16.1	49.9	60	17.4	57.7	85	15.3	45.1
75-79	159	17.6	67.6	71	20.6	78.3	88	15.8	61.0
80-84	139	15.4	83.0	39	11.3	89.6	100	18.0	79.0
85+	153	17.0	100.0	36	10.4	100.0	117	21.0	100.0
All ages	901	100.0		345	100.0		556	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		1			0.1	0.04		4.3
15-19								
20-24								
25-29	1	2	0.0	0.02	0.1	0.01	1.2	2.2
30-34	2	1	0.1	0.02	0.0	0.00	1.6	0.6
35-39	4	2	0.2	0.03	0.1	0.00	1.6	0.5
40-44	1	4	0.0	0.01	0.2	0.01	0.2	0.5
45-49	7	13	0.3	0.04	0.5	0.02	0.5	0.8
50-54	11	13	0.5	0.05	0.6	0.03	0.4	0.5
55-59	12	28	0.6	0.06	1.4	0.06	0.3	0.8
60-64	52	43	3.2	0.26	2.4	0.11	0.9	0.9
65-69	49	59	3.2	0.28	3.5	0.19	0.6	0.9
70-74	60	85	4.3	0.38	5.3	0.31	0.5	1.0
75-79	71	88	6.4	0.74	6.4	0.53	0.6	1.0
80-84	39	100	5.9	0.83	10.3	0.96	0.4	1.2
85+	36	117	8.4	1.44	12.1	1.26	0.4	1.1
All ages	345	556					0.5	1.0
Mortality								
Raw			1.1	0.19	1.8	0.13		
WS			0.5	0.13	0.6	0.06		
ES			0.8	0.15	1.0	0.08		
BRD-S			1.1	0.19	1.3	0.10		
PYLL-70								
per 100,000			4.9		6.5			
ES			4.2		5.5			
AYLL-70			9.3		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	8	2.7	2	25.0	3	37.5	3	37.5
C09–C10	Oropharynx	7	2.3	3	42.9			4	57.1
C11	Nasopharynx	1	0.3					1	100.0
C12–C13	Hypopharynx	2	0.7	1	50.0	1	50.0		
C15	Oesophagus	12	4.0	4	33.3	1	8.3	7	58.3
C16	Stomach	6	2.0					6	100.0
C17	Small intestine	1	0.3	1	100.0				
C18	Colon	18	6.0	8	44.4	2	11.1	8	44.4
C19–C20	Rectum	9	3.0	2	22.2			7	77.8
C21	Anus/canal	2	0.7	1	50.0			1	50.0
C22	Liver	8	2.7	1	12.5			7	87.5
C23–C24	Bile	1	0.3					1	100.0
C25	Pancreas	10	3.3	1	10.0			9	90.0
C32	Larynx	8	2.7	5	62.5	1	12.5	2	25.0
C33–C34	Lung	40	13.3	5	12.5	3	7.5	32	80.0
C37	Thymus	1	0.3	1	100.0				
C38,C45	Mesothelioma	1	0.3					1	100.0
C43	Malign. melanoma	13	4.3	10	76.9			3	23.1
C44	Skin others	13	4.3	6	46.2	2	15.4	5	38.5
C46,C49	Soft tissue	5	1.7	1	20.0			4	80.0
C48	Peritoneal	1	0.3					1	100.0
C60	Penis	1	0.3					1	100.0
C61	Prostate	45	15.0	32	71.1			13	28.9
C62	Testis	2	0.7	2	100.0				
C64	Kidney	17	5.7	10	58.8			7	41.2
C65	Renal pelvis	1	0.3					1	100.0
C66	Ureter	1	0.3					1	100.0
C67	Bladder	16	5.3	4	25.0			12	75.0
C69	Eye melanoma	2	0.7	2	100.0				
C70–C72	CNS cancer	8	2.7	1	12.5			7	87.5
C73	Thyroid	4	1.3			3	75.0	1	25.0
C74–C80	Cancer others	1	0.3	1	100.0				
C76–C79	CUP	13	4.3	2	15.4	1	7.7	10	76.9
C81	Hodgkin lymphoma	1	0.3	1	100.0				
C82–C85	NHL	9	3.0	3	33.3			6	66.7
C90	Mult. myeloma	5	1.7	2	40.0			3	60.0
C91–C96	Leukaemia	7	2.3	1	14.3			6	85.7
All further malignancies		300	100.0	113	37.7	17	5.7	170	56.7

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 ←%
C07–C08	Salivary gland	2	0.4	1	50.0			1	50.0
C09–C10	Oropharynx	4	0.8			1	25.0	3	75.0
C12–C13	Hypopharynx	2	0.4	1	50.0			1	50.0
C15	Oesophagus	5	1.0					5	100.0
C16	Stomach	14	2.7	4	28.6			10	71.4
C18	Colon	30	5.7	13	43.3	2	6.7	15	50.0
C19–C20	Rectum	16	3.1	3	18.8	1	6.3	12	75.0
C21	Anus/canal	3	0.6	2	66.7			1	33.3
C22	Liver	8	1.5	2	25.0	1	12.5	5	62.5
C23–C24	Bile	4	0.8					4	100.0
C25	Pancreas	22	4.2	1	4.5			21	95.5
C32	Larynx	2	0.4			1	50.0	1	50.0
C33–C34	Lung	57	10.9	7	12.3	8	14.0	42	73.7
C38,C45	Mesothelioma	4	0.8					4	100.0
C40–C41	Bone	2	0.4					2	100.0
C43	Malign. melanoma	16	3.1	12	75.0			4	25.0
C44	Skin others	17	3.2	8	47.1	1	5.9	8	47.1
C46,C49	Soft tissue	6	1.1	2	33.3			4	66.7
C48	Peritoneal	2	0.4					2	100.0
C50	Breast	136	26.0	61	44.9	3	2.2	72	52.9
C53	Cervix uteri	9	1.7	7	77.8			2	22.2
C54	Corpus uteri	14	2.7	7	50.0			7	50.0
C56	Ovary	27	5.2	5	18.5			22	81.5
C64	Kidney	29	5.5	16	55.2	2	6.9	11	37.9
C66	Ureter	2	0.4					2	100.0
C67	Bladder	11	2.1	2	18.2	1	9.1	8	72.7
C69	Eye melanoma	2	0.4	1	50.0			1	50.0
C70–C72	CNS cancer	11	2.1					11	100.0
C73	Thyroid	5	1.0			4	80.0	1	20.0
C74–C80	Cancer others	2	0.4			2	100.0		
C76–C79	CUP	16	3.1	1	6.3			15	93.8
C81	Hodgkin lymphoma	2	0.4	2	100.0				
C82–C85	NHL	14	2.7	4	28.6			10	71.4
C90	Mult. myeloma	4	0.8	1	25.0			3	75.0
C91–C96	Leukaemia	19	3.6			1	5.3	18	94.7
Others, specified		5	1.0	1	20.0			4	80.0
All further malignancies		524	100.0	164	31.3	28	5.3	332	63.4

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

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

Table 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		2			0.1	0.01		2.3
30-34	2	1	0.1	0.03	0.0	0.00	1.6	0.7
35-39	4	1	0.2	0.03	0.0	0.00	1.8	0.3
40-44	1	3	0.0	0.01	0.1	0.01	0.2	0.4
45-49	5	11	0.2	0.03	0.5	0.02	0.4	0.8
50-54	8	10	0.3	0.04	0.4	0.02	0.4	0.5
55-59	12	20	0.6	0.07	1.0	0.05	0.3	0.7
60-64	44	33	2.7	0.26	1.9	0.09	0.9	0.9
65-69	32	50	2.1	0.25	3.0	0.19	0.5	1.0
70-74	45	69	3.2	0.40	4.3	0.32	0.5	1.1
75-79	48	63	4.3	0.75	4.6	0.49	0.6	0.9
80-84	28	80	4.3	0.90	8.2	1.11	0.4	1.2
85+	23	86	5.4	1.53	8.9	1.37	0.4	1.0
All ages	252	429					0.5	0.9
Mortality								
Raw			0.8	0.16	1.4	0.11		
WS			0.4	0.11	0.5	0.05		
ES			0.6	0.13	0.7	0.06		
BRD-S			0.8	0.16	1.0	0.08		
PYLL-70								
per 100,000			3.9		4.9			
ES			3.4		4.1			
AYLL-70			9.7		9.8			

* 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		2			0.1	0.01		2.4
30-34	2	1	0.1	0.03	0.0	0.00	1.6	0.7
35-39	3		0.1	0.03			1.3	
40-44	1	1	0.0	0.01	0.0	0.00	0.2	0.1
45-49	4	4	0.2	0.02	0.2	0.01	0.3	0.3
50-54	7	5	0.3	0.04	0.2	0.01	0.3	0.2
55-59	9	9	0.5	0.05	0.5	0.02	0.3	0.3
60-64	26	13	1.6	0.18	0.7	0.04	0.5	0.4
65-69	18	27	1.2	0.16	1.6	0.12	0.3	0.5
70-74	32	31	2.3	0.32	1.9	0.16	0.4	0.5
75-79	34	32	3.1	0.60	2.3	0.28	0.4	0.5
80-84	17	53	2.6	0.59	5.4	0.80	0.3	0.8
85+	16	66	3.8	1.14	6.8	1.10	0.3	0.8
All ages	169	244					0.4	0.6
Mortality								
Raw			0.6	0.12	0.8	0.06		
WS			0.3	0.08	0.3	0.03		
ES			0.4	0.09	0.4	0.04		
BRD-S			0.5	0.12	0.5	0.05		
PYLL-70								
per 100,000			2.9		2.3			
ES			2.5		1.9			
AYLL-70			10.9		9.8			

* See corresponding tables with multiple malignancies.

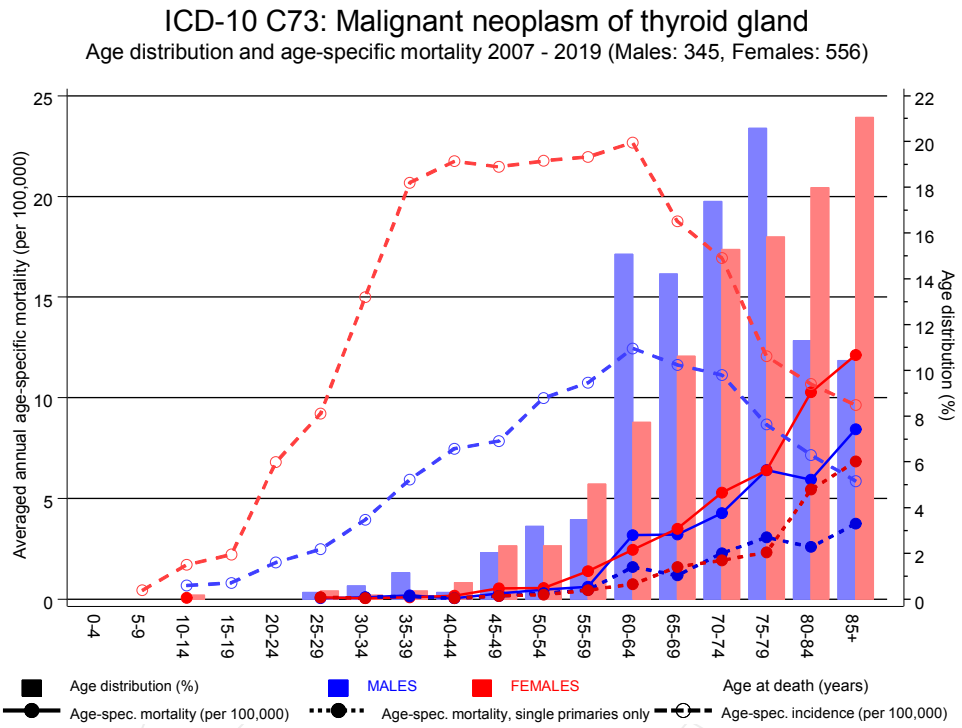


Figure 17. Distribution of age at death (bars; males: mean=64.9 yrs, median=65.9 yrs; females: mean=66.2 yrs, median=68.4 yrs) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

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

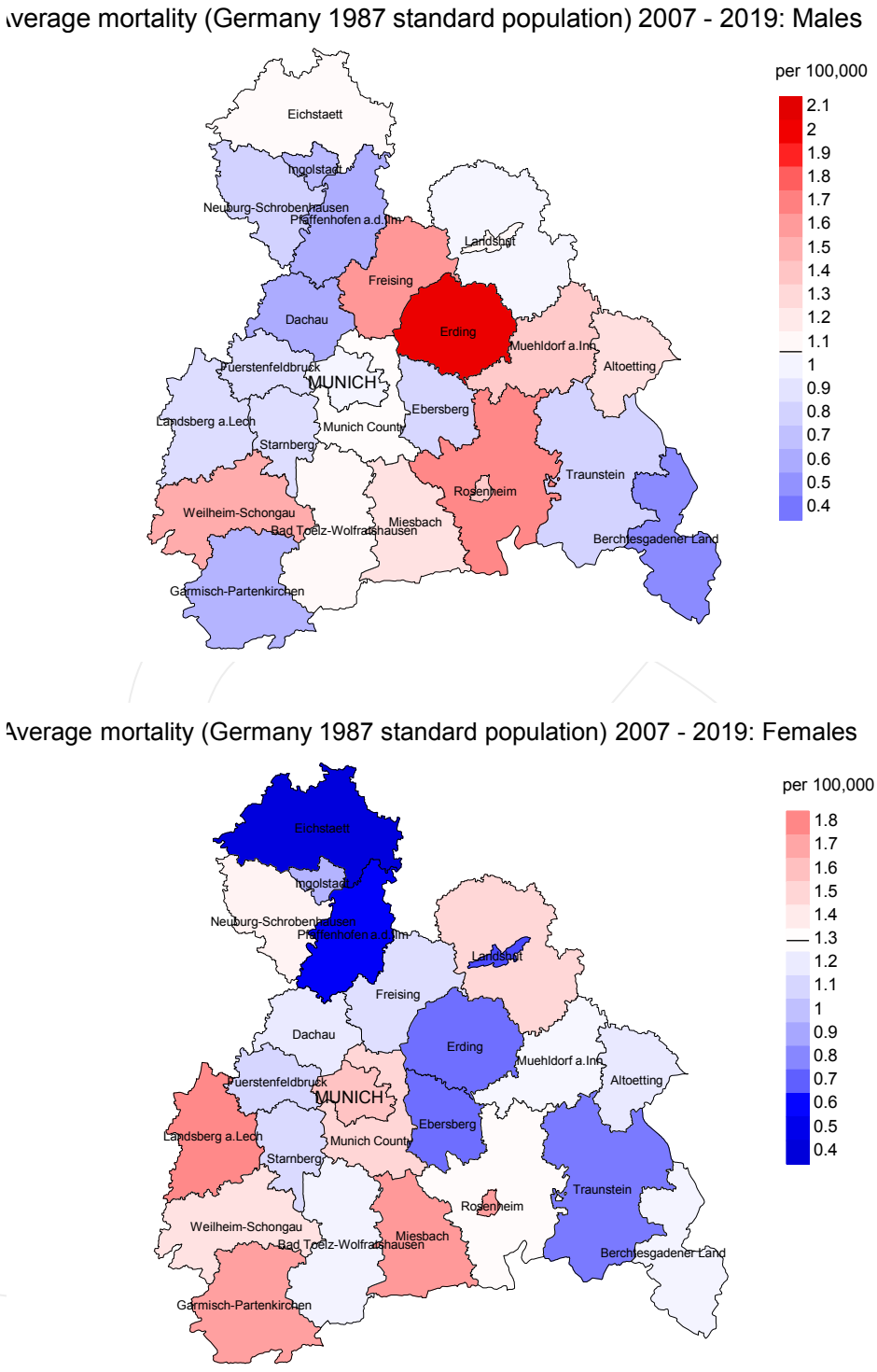
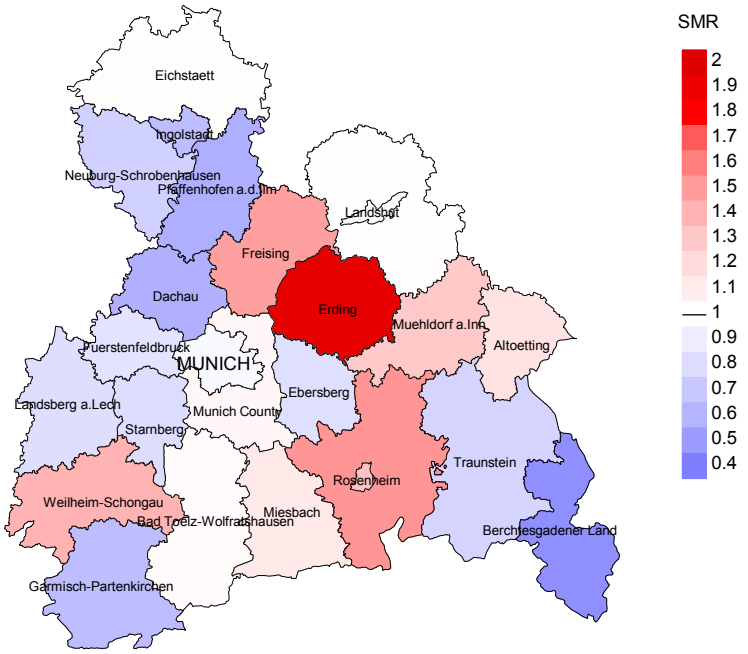


Figure 18a. Map of cancer mortality (german standard population) by county averaged for period 2007 to 2019. According to their individual mortality rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (males 1.1/100,000 WS N=345, females 1.3/100,000 WS N=556).

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 9 women died from thyroid cancer. Therefore, the mean mortality rate for this cancer type in this area can be calculated at 0.7/100,000 (german standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 0.2 and 1.7/100,000.

Standardized mortality ratio (SMR) 2007 - 2019: Males



Standardized mortality ratio (SMR) 2007 - 2019: Females

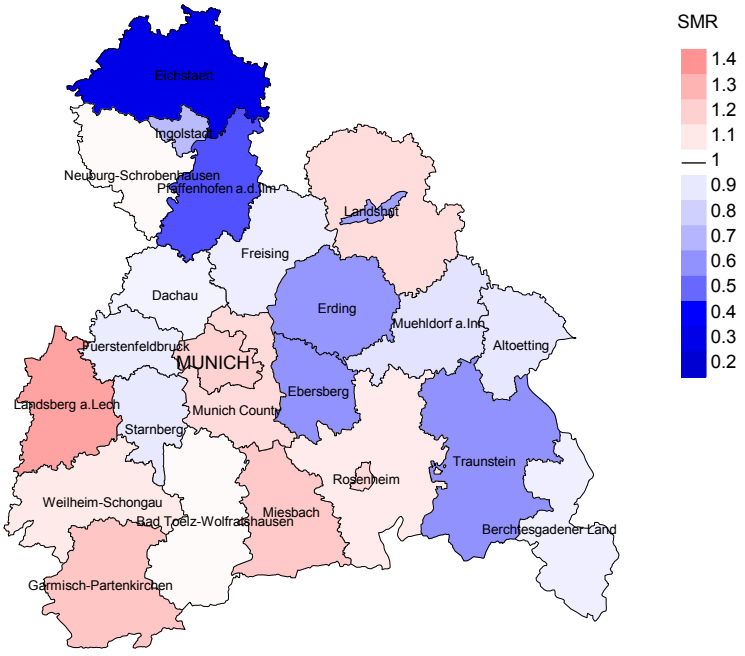


Figure 18b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2007 to 2019. According to their individual SMR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (males N=345, females N=556).

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 9 women died from thyroid cancer. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 0.60. Though, the value of this parameter may vary with an underlying probability of 99% between 0.21 and 1.34, 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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