Munich Cancer Registry

- Survival
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- *Deutsch*

ICD-10 C73: Medullary thyroid ca.

Incidence and Mortality

Year of diagnosis	1998-2020
Patients	435
Diseases	435
Creation date	12/21/2021
Database export	12/20/2021
Population	4.95 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/bC73M_E-ICD-10-C73-Medullary-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, December 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
8345/3	Medullary carcinoma with amyloid stroma
8510/3	Medullary carcinoma, NOS

INCIDENCE

Table 1

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

Year of diagnosis	All cases n	DCO cases n	Prop. DCO %	Prop. at least 1 further malign. prior + synchron. %	Prop. at least 1 further malign. after %	Prop. deaths %	Prop. actively followed %
1998	8			0.0	9.2	12.5	100.0
1999	7			0.0	8.7	42.9	100.0
2000	10			0.0	8.6	30.0	100.0
2001	9			2.9	8.3	33.3	88.9
2002	23			7.0	7.7	21.7	95.7 #
2003	14			7.0	7.6	35.7	92.9
2004	13			7.1	7.9	30.8	84.6
2005	26			10.0	7.3	30.8	100.0
2006	21			10.7	6.3	14.3	85.7
2007	22			11.1	6.4	27.3	77.3 #
2008	19			12.8	5.9	21.1	100.0
2009	14			12.4	5.9	7.1	92.9
2010	34			13.2	5.8	20.6	97.1
2011	18			13.9	4.8	38.9	94.4
2012	33			13.7	3.6	24.2	97.0
2013	19			13.1	4.4	10.5	84.2
2014	20			12.6	4.3	5.0	95.0
2015	25			12.2	4.9	8.0	92.0
2016	32			12.5	2.0	15.6	96.9
2017	30			13.1	1.5	6.7	96.7
2018	19			13.0	0.0	10.5	100.0
2019	11			12.9	0.0	9.1	100.0
2020	8			13.3	0.0	12.5	100.0 ##
1998-2020	435			13.3	9.2	19.3	94.3

435 cases diagnosed 1998-2020 are related to a total of 435 patients. Currently, in 99 (22.8 %) of these 435 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 77 / 11 / 11 (17.7 % / 2.5 % / 2.5 %) 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 2018, a subgroup of 19 cases has been diagnosed, of which 13.0 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 0.0 % of cases, at least one new malignancy has occurred during the follow-up period (all numbers refer to the date of the database export, see cover sheet).

Table 1a

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

Year of diagnosis	Males n	Males %	DCO cases n	Prop. DCO %	Prop. at least 1 further malign. prior + synchron. %	Prop. at least 1 further malign. after %	Prop. deaths %	Prop. actively followed %	
1998	2	25.0			0.0	7.8	50.0	100.0	
1999	3	42.9			0.0	7.3	66.7	100.0	
2000	8	80.0			0.0	6.9	37.5	100.0	
2001	3	33.3			6.3	6.0	100.0	100.0	
2002	7	30.4			13.0	4.9	42.9	100.0	#
2003	5	35.7			10.7	5.1	40.0	100.0	
2004	6	46.2			11.8	5.3	50.0	83.3	
2005	8	30.8			11.9	4.8	37.5	100.0	
2006	9	42.9			9.8	5.1		77.8	
2007	12	54.5			11.1	5.5	50.0	75.0	#
2008	11	57.9			12.2	4.3	27.3	100.0	
2009	5	35.7			11.4	4.8	20.0	100.0	
2010	7	20.6			12.8	5.0	57.1	100.0	
2011	8	44.4			13.8	4.3	50.0	100.0	
2012	18	54.5			14.3	3.5	27.8	94.4	
2013	9	47.4			14.0	4.5	22.2	88.9	
2014	6	30.0			13.4	5.2		100.0	
2015	9	36.0			13.2	5.8	11.1	100.0	
2016	17	53.1			13.1	2.3	11.8	94.1	
2017	15	50.0			14.9	3.7	13.3	100.0	
2018	6	31.6			14.4	0.0	16.7	100.0	
2019	5	45.5			14.5	0.0		100.0	
2020	2	25.0			14.4	0.0		100.0	##
1998-2020	181	41.6			14.4	7.8	28.2	95.0	

181 cases diagnosed 1998-2020 are related to a total of 181 patients. Currently, in 40 (22.1 %) of these 181 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 34 / 2 / 4 (18.8 % / 1.1 % / 2.2 %) patients exist having 2 / 3 / 4+ malignancies.

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

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

How to interpret:
In 2018, a subgroup of 6 cases has been diagnosed, of which 14.4 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 0.0 % of cases, at least one new malignancy has occurred during the follow-up period (all numbers refer to the date of the database export, see cover sheet).

Table 1b

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

Year of diagnosis	Females n	Females %	DCO cases n	Prop. DCO %	Prop. at least 1 further malign. prior + synchron. %	Prop. at least 1 further malign. after %	Prop. deaths %	Prop. actively followed %	
1998	6	75.0			0.0	10.2		100.0	
1999	4	57.1			0.0	9.7	25.0	100.0	
2000	2	20.0			0.0	9.8		100.0	
2001	6	66.7			0.0	9.9		83.3	
2002	16	69.6			2.9	9.7	12.5	93.8	#
2003	9	64.3			4.7	9.5	33.3	88.9	
2004	7	53.8			4.0	9.9	14.3	85.7	
2005	18	69.2			8.8	9.1	27.8	100.0	
2006	12	57.1			11.3	7.3	25.0	91.7	
2007	10	45.5			11.1	7.2		80.0	#
2008	8	42.1			13.3	7.0	12.5	100.0	
2009	9	64.3			13.1	6.7		88.9	
2010	27	79.4			13.4	6.4	11.1	96.3	
2011	10	55.6			13.9	5.2	30.0	90.0	
2012	15	45.5			13.2	3.7	20.0	100.0	
2013	10	52.6			12.4	4.3		80.0	
2014	14	70.0			12.0	3.6	7.1	92.9	
2015	16	64.0			11.6	4.3	6.3	87.5	
2016	15	46.9			12.1	1.8	20.0	100.0	
2017	15	50.0			11.8	0.0		93.3	
2018	13	68.4			12.0	0.0	7.7	100.0	
2019	6	54.5			11.7	0.0	16.7	100.0	
2020	6	75.0			12.6	0.0	16.7	100.0	##
1998-2020	254	58.4			12.6	10.2	13.0	93.7	

254 cases diagnosed 1998-2020 are related to a total of 254 patients. Currently, in 59 (23.2 %) of these 254 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 43 / 9 / 7 (16.9 % / 3.5 % / 2.8 %) 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 2018, a subgroup of 13 cases has been diagnosed, of which 12.0 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 0.0 % of cases, at least one new malignancy has occurred during the follow-up period (all numbers refer to the date of the database export, see cover sheet).

Table 2

Incidence measures by year of diagnosis including DCO cases
(with respect to registry area expansion from 2.65 to 4.10 m as of 2002,
and from 4.10 to 4.94 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	2	6	0.2	0.5	0.2	0.5	0.2	0.5	0.2	0.5
1999	3	4	0.3	0.3	0.1	0.3	0.2	0.4	0.2	0.4
2000	8	2	0.7	0.2	0.6	0.1	0.7	0.2	0.7	0.2
2001	3	6	0.3	0.5	0.2	0.5	0.2	0.5	0.3	0.5
2002	7	16	0.4	0.8	0.4	0.8	0.4	0.8	0.3	0.8
2003	5	9	0.3	0.5	0.2	0.4	0.2	0.5	0.3	0.5
2004	6	7	0.3	0.4	0.2	0.2	0.3	0.3	0.3	0.3
2005	8	18	0.4	0.9	0.3	0.6	0.4	0.8	0.4	0.9
2006	9	12	0.5	0.6	0.5	0.4	0.5	0.5	0.5	0.5
2007	12	10	0.5	0.4	0.3	0.3	0.4	0.4	0.5	0.4
2008	11	8	0.5	0.3	0.4	0.2	0.5	0.3	0.4	0.3
2009	5	9	0.2	0.4	0.1	0.3	0.2	0.4	0.2	0.4
2010	7	27	0.3	1.2	0.2	0.9	0.2	1.1	0.3	1.1
2011	8	10	0.4	0.4	0.2	0.3	0.3	0.3	0.3	0.4
2012	18	15	0.8	0.6	0.6	0.4	0.7	0.5	0.7	0.6
2013	9	10	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.4
2014	6	14	0.3	0.6	0.2	0.5	0.2	0.5	0.2	0.6
2015	9	16	0.4	0.7	0.3	0.6	0.4	0.6	0.3	0.6
2016	17	15	0.7	0.6	0.4	0.3	0.6	0.4	0.7	0.5
2017	15	15	0.6	0.6	0.4	0.4	0.5	0.5	0.6	0.6
2018	6	13	0.2	0.5	0.2	0.3	0.2	0.4	0.2	0.5
2019	5	6	0.2	0.2	0.1	0.2	0.2	0.2	0.2	0.2
2020	2	6	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.2
1998–2020	181	254	0.4	0.5	0.3	0.4	0.3	0.5	0.4	0.5

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	8	47.4	12.7	19.2	61.1	19.2	45.5	48.9	55.1	61.1
1999	7	53.3	15.1	24.2	74.4	24.2	48.5	55.9	57.8	74.4
2000	10	53.0	21.2	15.9	93.7	23.8	45.8	52.1	61.3	83.3
2001	9	47.9	18.4	17.6	75.3	17.6	33.4	50.7	57.6	75.3
2002	23	41.4	18.3	7.8	74.7	14.7	34.5	39.1	54.7	67.6
2003	14	52.5	17.1	10.7	77.9	34.1	46.6	52.6	67.9	69.5
2004	13	57.8	14.4	37.3	84.8	40.9	44.5	60.1	68.5	71.0
2005	26	51.9	13.6	27.3	79.3	33.6	41.2	50.4	58.9	71.9
2006	21	51.5	15.4	19.6	85.9	29.7	45.4	50.8	60.1	65.3
2007	22	59.4	10.5	35.4	77.3	46.7	52.0	58.0	68.0	70.8
2008	19	50.9	18.0	12.7	74.3	16.3	38.0	53.2	66.6	73.5
2009	14	54.0	13.6	32.5	72.3	34.3	43.5	55.6	65.3	69.1
2010	34	52.9	17.6	17.2	78.7	20.5	42.8	56.7	66.9	73.4
2011	18	57.3	13.2	35.2	76.5	35.7	45.5	57.5	68.2	75.5
2012	33	53.8	15.9	23.1	79.6	28.6	43.8	50.5	66.8	73.0
2013	19	54.4	14.8	25.7	81.8	32.7	43.8	52.3	68.6	75.9
2014	20	50.4	16.6	19.9	81.1	27.0	40.8	47.2	64.9	70.3
2015	25	48.3	15.9	6.4	78.0	27.7	40.3	47.6	59.0	64.5
2016	32	63.8	13.0	37.1	84.2	47.0	53.4	64.8	73.6	80.9
2017	30	54.2	14.6	26.9	81.0	34.0	45.3	52.6	64.2	72.3
2018	19	56.9	15.0	37.0	89.2	38.0	42.8	55.3	70.5	79.1
2019	11	58.2	13.1	38.9	76.2	41.9	43.8	59.2	72.6	74.2
2020	8	68.9	12.0	41.9	80.5	41.9	66.4	72.8	75.3	80.5
1998–2020	435	53.8	15.9	6.4	93.7	34.1	43.8	54.7	66.1	73.4

Table 3a

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

Year of diagnosis	Cases n	Mean	Std. dev.	Min.	Max.	10%	25%	Median 50%	75%	90%
1998	2	47.8	0.9	47.1	48.4	47.1	47.1	47.8	48.4	48.4
1999	3	62.7	10.2	55.9	74.4	55.9	55.9	57.8	74.4	74.4
2000	8	54.2	23.9	15.9	93.7	15.9	39.6	55.3	67.0	93.7
2001	3	64.5	12.6	50.7	75.3	50.7	50.7	67.4	75.3	75.3
2002	7	38.2	19.6	7.8	68.3	7.8	21.7	39.1	50.8	68.3
2003	5	56.8	17.5	34.1	77.9	34.1	47.0	55.2	69.5	77.9
2004	6	60.8	16.0	40.9	84.8	40.9	49.0	60.8	68.5	84.8
2005	8	52.6	6.3	47.4	64.6	47.4	48.1	49.4	57.1	64.6
2006	9	42.2	15.1	19.6	60.4	19.6	29.7	45.8	50.4	60.4
2007	12	62.2	11.5	44.6	77.3	46.7	50.7	67.1	70.1	74.8
2008	11	42.7	18.2	12.7	71.4	16.3	36.5	43.9	53.2	68.0
2009	5	62.9	10.7	44.9	72.3	44.9	62.9	65.3	69.1	72.3
2010	7	61.4	18.4	20.5	72.6	20.5	62.7	69.2	70.2	72.6
2011	8	56.5	12.4	35.7	74.6	35.7	49.9	54.8	66.3	74.6
2012	18	53.5	16.4	23.1	77.9	26.1	43.8	55.2	66.8	73.0
2013	9	50.4	11.6	32.7	71.3	32.7	43.8	50.3	52.3	71.3
2014	6	52.5	13.7	38.9	71.9	38.9	42.1	47.6	66.8	71.9
2015	9	52.0	11.0	35.1	66.9	35.1	44.4	53.6	59.0	66.9
2016	17	61.2	13.3	37.1	82.4	40.4	51.8	64.7	70.0	81.5
2017	15	52.7	16.2	26.9	81.0	31.1	39.9	50.3	63.9	77.5
2018	6	58.1	12.8	42.8	72.0	42.8	43.0	60.2	70.5	72.0
2019	5	64.4	14.2	43.8	76.2	43.8	55.2	72.6	74.2	76.2
2020	2	57.7	22.3	41.9	73.5	41.9	41.9	57.7	73.5	73.5
1998-2020	181	54.5	15.7	7.8	93.7	35.6	44.6	53.5	68.0	72.6

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	6	47.3	15.0	19.2	61.1	19.2	43.9	51.2	57.2	61.1
1999	4	46.2	15.1	24.2	57.2	24.2	36.3	51.7	56.0	57.2
2000	2	48.0	3.2	45.8	50.3	45.8	45.8	48.0	50.3	50.3
2001	6	39.6	15.3	17.6	57.6	17.6	31.1	38.2	55.1	57.6
2002	16	42.7	18.2	10.0	74.7	14.7	34.6	43.4	55.0	67.6
2003	9	50.1	17.4	10.7	68.7	10.7	46.6	50.0	59.5	68.7
2004	7	55.3	13.7	37.3	71.0	37.3	42.4	60.1	69.5	71.0
2005	18	51.6	16.0	27.3	79.3	29.4	37.5	53.2	66.1	73.2
2006	12	58.5	11.9	44.0	85.9	45.4	48.3	58.3	65.1	68.3
2007	10	55.9	8.6	35.4	65.1	43.7	53.5	56.3	63.9	64.6
2008	8	62.1	10.6	41.5	74.3	41.5	57.0	63.3	70.0	74.3
2009	9	49.0	12.9	32.5	66.9	32.5	38.7	49.7	61.2	66.9
2010	27	50.8	17.0	17.2	78.7	20.5	41.3	51.5	62.1	74.9
2011	10	57.8	14.5	35.2	76.5	40.1	45.1	59.7	72.0	76.0
2012	15	54.1	15.8	23.9	79.6	38.1	42.9	50.0	69.6	78.2
2013	10	58.0	17.0	25.7	81.8	34.3	47.5	58.6	70.2	78.8
2014	14	49.5	18.0	19.9	81.1	23.4	40.0	47.2	63.0	68.8
2015	16	46.2	18.1	6.4	78.0	27.6	32.4	47.2	59.6	64.5
2016	15	66.8	12.4	47.4	84.2	49.3	55.1	66.4	78.7	80.9
2017	15	55.7	13.3	32.5	72.7	35.5	45.3	56.4	69.9	71.2
2018	13	56.3	16.4	37.0	89.2	38.0	41.2	54.6	62.8	79.1
2019	6	53.0	10.6	38.9	64.8	38.9	41.9	55.7	61.1	64.8
2020	6	72.7	5.8	64.9	80.5	64.9	67.9	72.8	77.1	80.5
1998-2020	254	53.3	16.0	6.4	89.2	33.4	42.9	54.8	64.3	73.5

Table 4

Age distribution by 5-year age group and sex for period 2007-2020
(incl. DCO)

Age at diagnosis Years	Cases n	%	Cum.%	Males n	%	Cum.%	Females n	%	Cum.%
0-4									
5-9	1	0.3	0.3			0.0	1	0.6	0.6
10-14	1	0.3	0.7	1	0.8	0.8			0.6
15-19	3	1.0	1.6	1	0.8	1.5	2	1.1	1.7
20-24	6	2.0	3.6	2	1.5	3.1	4	2.3	4.0
25-29	7	2.3	5.9	3	2.3	5.4	4	2.3	6.3
30-34	9	3.0	8.9	2	1.5	6.9	7	4.0	10.3
35-39	21	6.9	15.8	9	6.9	13.8	12	6.9	17.2
40-44	31	10.2	26.0	18	13.8	27.7	13	7.5	24.7
45-49	35	11.5	37.5	11	8.5	36.2	24	13.8	38.5
50-54	31	10.2	47.7	16	12.3	48.5	15	8.6	47.1
55-59	28	9.2	56.9	9	6.9	55.4	19	10.9	58.0
60-64	44	14.5	71.4	16	12.3	67.7	28	16.1	74.1
65-69	25	8.2	79.6	14	10.8	78.5	11	6.3	80.5
70-74	35	11.5	91.1	21	16.2	94.6	14	8.0	88.5
75-79	18	5.9	97.0	4	3.1	97.7	14	8.0	96.6
80-84	8	2.6	99.7	3	2.3	100.0	5	2.9	99.4
85+	1	0.3	100.0			100.0	1	0.6	100.0
All ages	304	100.0		130	100.0		174	100.0	

Table 5

Age-specific incidence, DCO rate and proportion of all cancers
for period 2007-2020

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=153686 %	Females Prop.all cancers n=155051 %
0- 4								
5- 9		1		0.1				1.0
10-14	1		0.1				0.7	
15-19	1	2	0.1	0.1			0.3	0.8
20-24	2	4	0.1	0.2			0.3	0.8
25-29	3	4	0.1	0.2			0.3	0.3
30-34	2	7	0.1	0.3			0.2	0.3
35-39	9	12	0.4	0.5			0.5	0.3
40-44	18	13	0.7	0.5			0.6	0.2
45-49	11	24	0.4	0.9			0.2	0.3
50-54	16	15	0.6	0.6			0.2	0.1
55-59	9	19	0.4	0.9			0.1	0.1
60-64	16	28	0.9	1.5			0.1	0.2
65-69	14	11	0.9	0.6			0.1	0.1
70-74	21	14	1.4	0.8			0.1	0.1
75-79	4	14	0.3	0.9			0.0	0.1
80-84	3	5	0.4	0.5			0.0	0.0
85+		1		0.1				0.0
All ages	130	174			0.0	0.0	0.1	0.1
Incidence								
Raw			0.4	0.5				
WS			0.3	0.4				
ES			0.3	0.4				
BRD-S			0.4	0.5				

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).

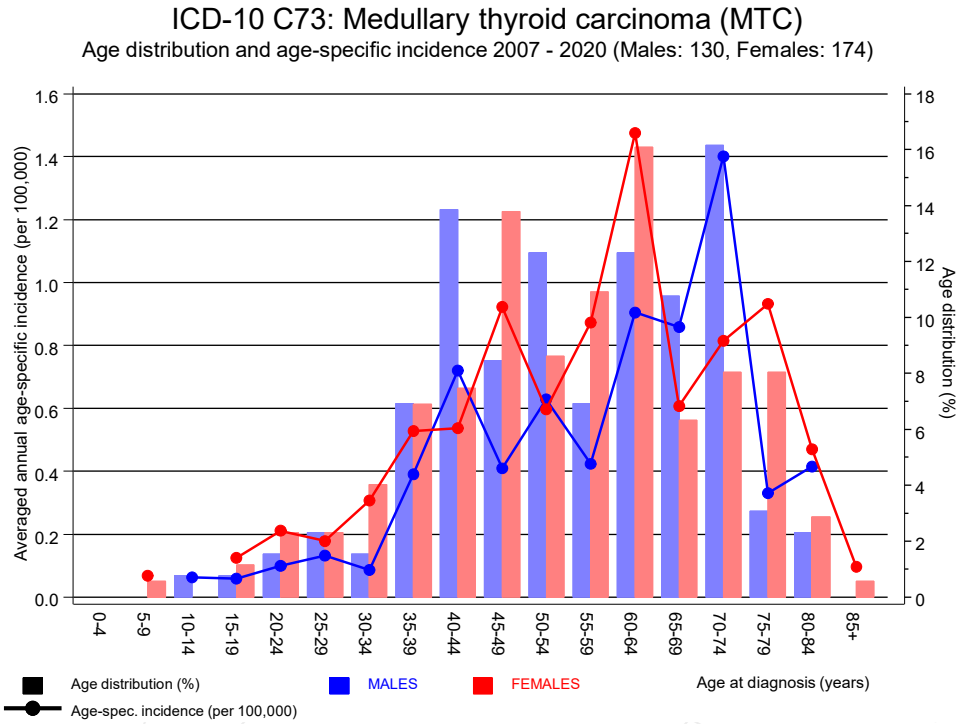


Figure 6. Age distribution (males: mean=55.6 yrs, median=57.0 yrs; females: mean=55.1 yrs, median=55.6 yrs) and age-specific incidence.

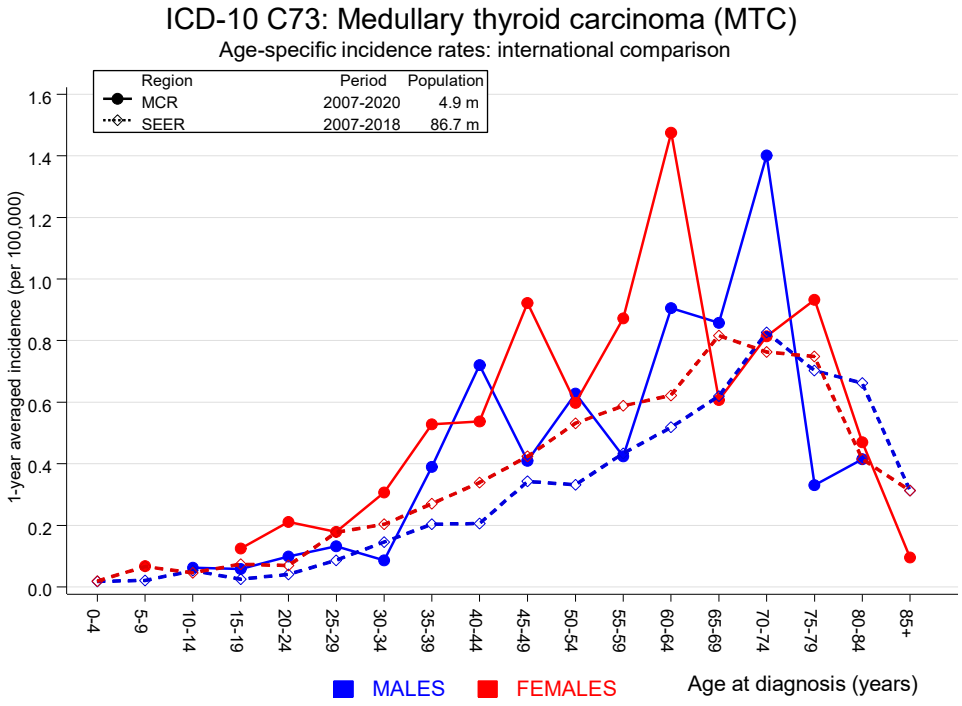


Figure 6a. Age-specific incidence in MCR registry areas compared to SEER (Surveillance, Epidemiology, and End Results, USA).

Reference:
Surveillance, Epidemiology, and End Results (SEER) Program SEER*Stat Database: Incidence - SEER 21 Regs Research Data, released April 2021, based on the November 2020 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 1998–2020

MALES

Diagnosis		Observed n	Expected n	SIR	CI 95%	CI 95%		EAR	DCO %
C16	Stomach	1	0.3	3.6	0.1	19.8		8.4	
C18	Colon	1	0.7	1.5	0.0	8.2		3.7	
C25	Pancreas	1	0.3	3.5	0.1	19.5		8.3	100.0
C33–C34	Lung	1	0.9	1.1	0.0	6.1		1.0	
C40–C41	Bone	1	0.0	108.1	2.7	602.0	#	11.6	
C46,C49	Soft tissue	1	0.0	21.9	0.6	122.2		11.1	
C61	Prostate	1	2.1	0.5	0.0	2.7		−12.6	
C66	Ureter	1	0.0	53.0	1.3	295.4	#	11.4	
C67	Bladder	1	0.3	3.2	0.1	17.8		8.0	
C73	Thyroid	6	0.1	79.0	29.0	171.9	#	69.1	
C76–C79	CUP	1	0.1	8.1	0.2	45.3		10.2	
C82–C85	NHL	1	0.3	3.1	0.1	17.4		7.9	
C91–C96	Leukaemia	1	0.1	9.1	0.2	50.5		10.4	
Not observed		0	2.5	0.0	0.0	1.5		−29.4	
All further malignancies		18	7.8	2.3	1.4	3.7	#	119.1	5.6

Patients	178
Median age at next malignancy (years)	70.3
Person-years	858
Mean observation time (years)	4.8
Median observation time (years)	3.4

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 1998–2020
FEMALES

Diagnosis		Observed n	Expected n	SIR	CI 95%	CI 95%		EAR	DCO %
C16	Stomach	1	0.2	4.5	0.1	25.0		5.7	
C18	Colon	3	0.7	4.5	0.9	13.1		17.0	
C33–C34	Lung	2	0.7	2.7	0.3	9.8		9.2	
C50	Breast	8	3.4	2.3	1.0	4.6	#	33.3	
C51	Vulva	1	0.1	11.9	0.3	66.2		6.7	
C54	Corpus uteri	2	0.5	3.8	0.5	13.7		10.7	
C56	Ovary	1	0.4	2.7	0.1	15.2		4.6	
C64	Kidney	1	0.2	5.3	0.1	29.5		5.9	
C67	Bladder	2	0.1	15.5	1.9	55.9	#	13.6	
C73	Thyroid	11	0.3	42.3	21.1	75.6	#	78.2	
C74–C80	Cancer others	2	0.0	122.5	14.8	442.7	#	14.4	
C82–C85	NHL	2	0.3	6.3	0.8	22.8		12.3	
C90	Mult. myeloma	1	0.1	10.9	0.3	60.5		6.6	
Not observed		0	2.4	0.0	0.0	1.5		-17.7	
All further malignancies		37	9.5	3.9	2.8	5.4	#	200.5	

Patients	248
Median age at next malignancy (years)	66.9
Person-years	1373
Mean observation time (years)	5.5
Median observation time (years)	4.0

The occurrence of further specified malignancy is statistically significant.

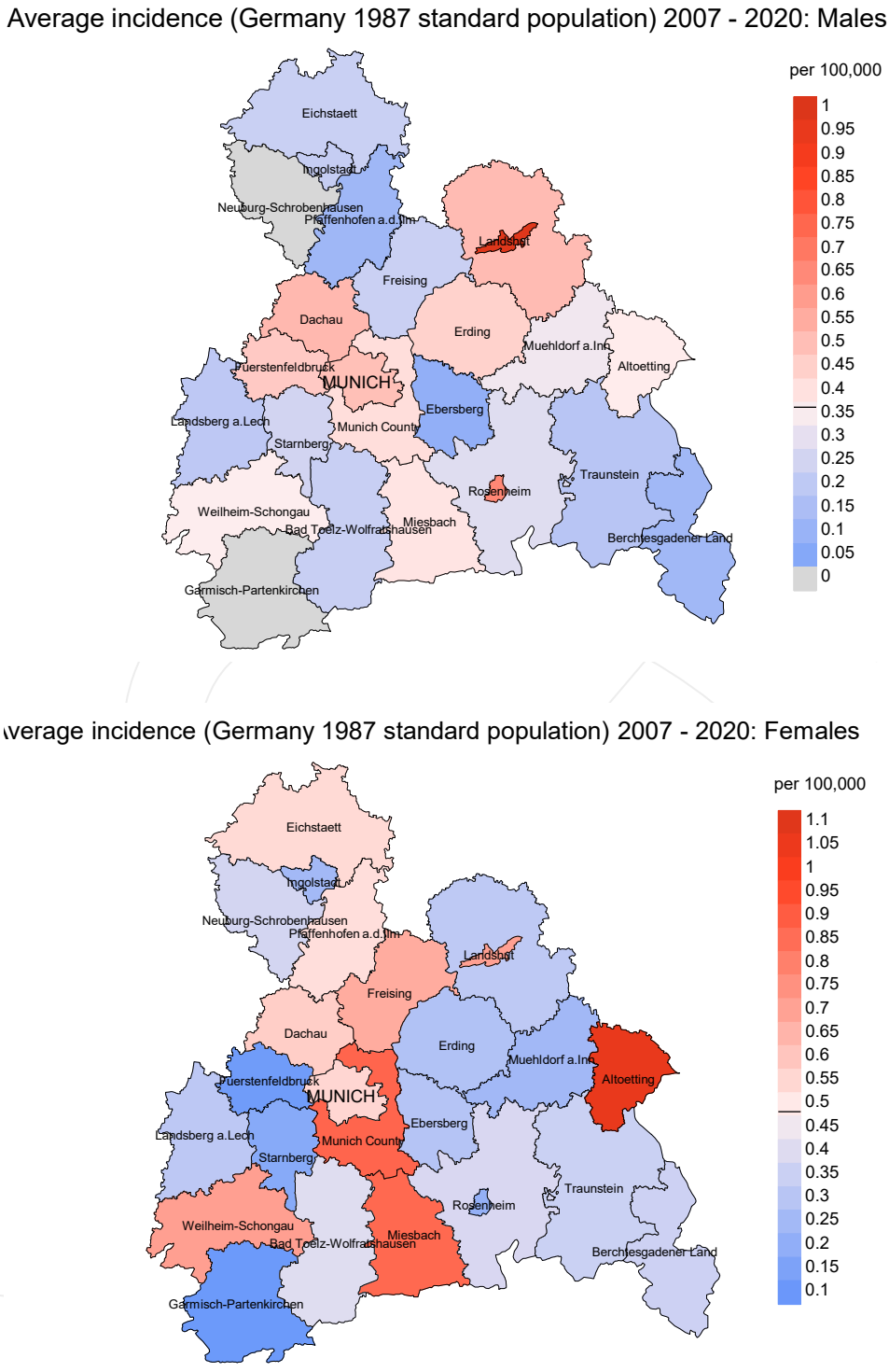
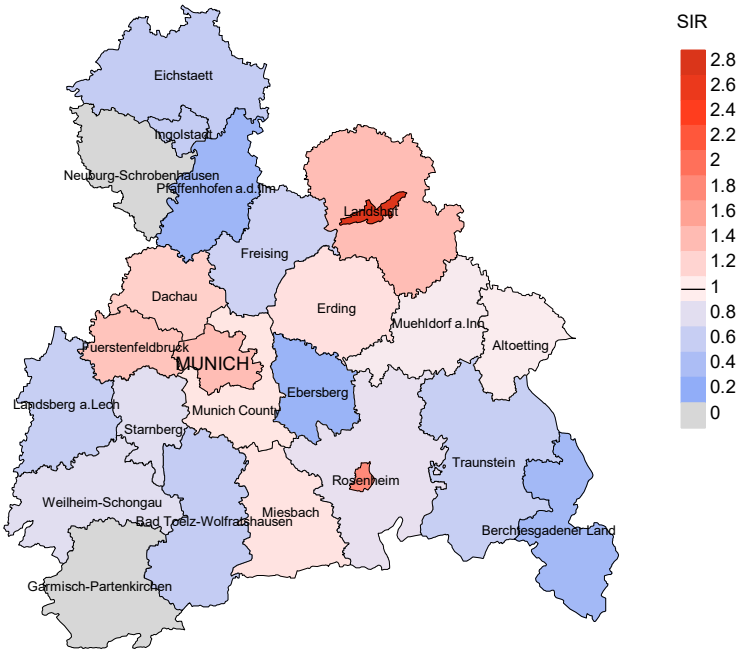


Figure 8a. Map of cancer incidence (german standard population, incl. DCO cases) by county averaged for period 2007 to 2020. According to their individual incidence rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (males 0.4/100,000 WS N=130, females 0.5/100,000 WS N=174).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 67,727 female residents (averaged) in the period from 2007 to 2020 a total of 3 women were identified with newly diagnosed medullary thyroid ca.. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 0.3/100,000 (german standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 0.0 and 1.1/100,000.

Standardized incidence ratio (SIR) 2007 - 2020: Males



Standardized incidence ratio (SIR) 2007 - 2020: Females

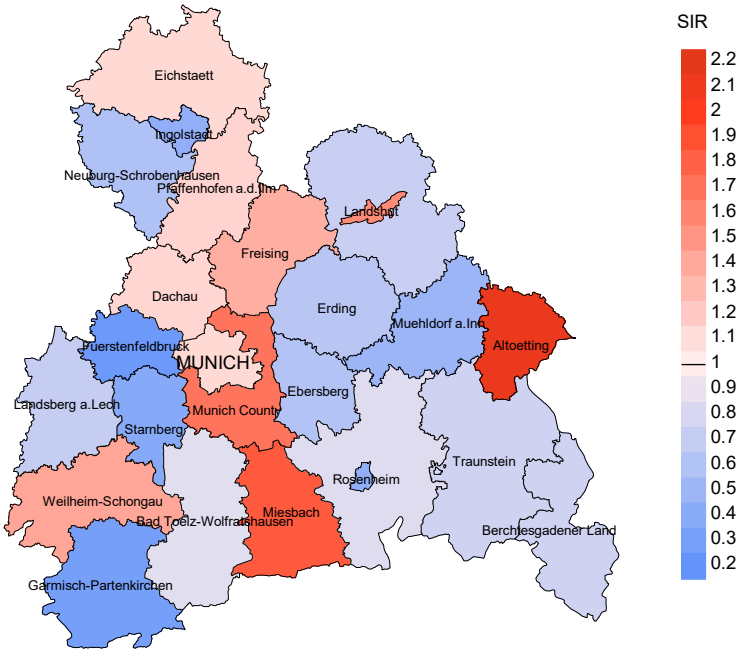


Figure 8b. Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2007 to 2020. According to their individual SIR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (males N=130, females N=174).

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 2020 a total of 3 women were identified with newly diagnosed medullary thyroid ca.. Therefore, the mean standardized incidence ratio (SIR) for this cancer type in this area can be calculated at 0.61. Though, the value of this parameter may vary with an underlying probability of 99% between 0.07 and 2.24, 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 4.94 m as of 2007, respectively)

Year of diagnosis	Incident cases n	Prop. actively followed %	Prop. DCO %	Deaths n	Prop. deaths %	Prop. deaths with death certific. %
1998	8	100.0		1	12.5	100.0
1999	7	100.0		3	42.9	100.0
2000	10	100.0		3	30.0	100.0
2001	9	88.9		3	33.3	100.0
2002	23	95.7		5	21.7	100.0
2003	14	92.9		5	35.7	100.0
2004	13	84.6		4	30.8	100.0
2005	26	100.0		8	30.8	62.5
2006	21	85.7		3	14.3	66.7
2007	22	77.3		6	27.3	100.0
2008	19	100.0		4	21.1	100.0
2009	14	92.9		1	7.1	100.0
2010	34	97.1		7	20.6	100.0
2011	18	94.4		7	38.9	85.7
2012	33	97.0		8	24.2	100.0
2013	19	84.2		2	10.5	100.0
2014	20	95.0		1	5.0	
2015	25	92.0		2	8.0	100.0
2016	32	96.9		5	15.6	80.0
2017	30	96.7		2	6.7	50.0
2018	19	100.0		2	10.5	
2019	11	100.0		1	9.1	100.0
2020	8	100.0		1	12.5	100.0
1998-2020	435	94.3		84	19.3	88.1

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 4.94 m as of 2007, respectively)

Year of diagnosis/ death	Incident cases n	Deaths n	Prop. deaths with death certific. %	Deaths in same year n	Prop. deaths in same year %
1998	8	3	100.0		
1999	7	1	100.0		
2000	10	4	100.0	1	10.0
2001	9				
2002	23	1	100.0		
2003	14	5	100.0		
2004	13	5	100.0		
2005	26	3	100.0		
2006	21	6	100.0		
2007	22	7	85.7		
2008	19	1	100.0		
2009	14	4	100.0		
2010	34	7	100.0	1	2.9
2011	18	8	100.0		
2012	33	11	90.9	2	6.1
2013	19	12	100.0		
2014	20	7	100.0		
2015	25	1	100.0		
2016	32	5	80.0	1	3.1
2017	30	8	100.0	1	3.3
2018	19	7	28.6	1	5.3
2019	11	5	40.0		
2020	8	10	100.0	1	12.5
1998–2020	435	121	90.9	8	1.8

Table 9c

Annual cohorts of deaths, proportion of cancer-related and non-cancer-related deaths, and cancer recorded on death certificates (incl. DCO)
(with respect to registry area expansion from 2.65 to 4.10 m as of 2002, and from 4.10 to 4.94 m as of 2007, respectively)

Year of death	Deaths n	Prop. cancer-related %	Prop. non-cancer-related %	Prop. cancer recorded on death certificate %
1998	3	100.0		100.0
1999	1	100.0		100.0
2000	4	100.0		100.0
2001				
2002	1	100.0		100.0
2003	5	80.0	20.0	80.0
2004	5	80.0	20.0	100.0
2005	3	100.0		100.0
2006	6	100.0		100.0
2007	7	85.7	14.3	83.3
2008	1	100.0		100.0
2009	4	75.0	25.0	100.0
2010	7	85.7	14.3	85.7
2011	8	87.5	12.5	87.5
2012	11	72.7	27.3	70.0
2013	12	58.3	41.7	58.3
2014	7	85.7	14.3	85.7
2015	1	100.0		100.0
2016	5	100.0		100.0
2017	8	62.5	37.5	62.5
2018	7	42.9	57.1	50.0
2019	5	60.0	40.0	100.0
2020	10	60.0	40.0	70.0
1998-2020	121	76.9	23.1	81.8

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	1	38.9	38.9		38.9
1999					
2000	3	72.9	72.9		72.9
2001					
2002					
2003	3	74.9	74.9		74.9
2004	3	63.0	61.9	70.7	63.0
2005	2	73.6	73.6		73.6
2006	5	68.4	68.4		68.4
2007	6	67.0	71.1	57.7	72.2
2008	1	83.7	83.7		83.7
2009	2	66.2	63.1	69.3	66.2
2010	5	70.1	70.1		70.1
2011	8	70.7	70.4	87.8	70.4
2012	2	71.5	71.5		71.5
2013	5	71.6	71.6	73.3	71.6
2014	5	66.0	66.0		66.0
2015					
2016	3	65.1	65.1		65.1
2017	2	74.8	74.8		74.8
2018	4	78.9	82.9	73.7	
2019	2	42.8	42.8		30.3
2020	6	83.6	81.3	84.1	82.7
1998–2020	68	70.8	70.1	75.4	70.2

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	2	82.1	82.1		82.1
1999	1	72.0	72.0		72.0
2000	1	70.5	70.5		70.5
2001					
2002	1	72.5	72.5		72.5
2003	2	69.6	52.4	86.8	52.4
2004	2	53.6	53.6		53.6
2005	1	43.6	43.6		43.6
2006	1	65.4	65.4		65.4
2007	1	79.7	79.7		79.7
2008					
2009	2	71.4	71.4		71.4
2010	2	79.9	70.6	89.2	70.6
2011					
2012	9	76.9	75.6	80.0	76.9
2013	7	78.8	70.3	78.8	70.3
2014	2	63.3	46.8	79.9	46.8
2015	1	67.5	67.5		67.5
2016	2	78.3	78.3		72.9
2017	6	81.6	81.5	81.7	81.5
2018	3	71.3	71.3	74.8	71.3
2019	3	89.8	93.8	85.5	93.8
2020	4	76.4	83.1	69.7	69.7
1998–2020	53	77.0	72.2	80.8	71.6

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	1	0.1	0.50	0.1	0.37	0.1	0.37	0.1	0.31
1999									
2000	3	0.3	0.38	0.1	0.26	0.2	0.35	0.3	0.38
2001									
2002									
2003	3	0.2	0.60	0.1	0.48	0.1	0.55	0.2	0.64
2004	2	0.1	0.33	0.1	0.33	0.1	0.31	0.1	0.28
2005	2	0.1	0.25	0.1	0.19	0.1	0.24	0.1	0.26
2006	5	0.3	0.56	0.1	0.30	0.2	0.42	0.3	0.55
2007	5	0.2	0.42	0.1	0.41	0.2	0.43	0.2	0.48
2008	1	0.0	0.09	0.0	0.03	0.0	0.06	0.1	0.13
2009	1	0.0	0.20	0.0	0.26	0.0	0.26	0.0	0.26
2010	5	0.2	0.71	0.1	0.57	0.2	0.69	0.2	0.65
2011	7	0.3	0.88	0.2	0.70	0.2	0.76	0.3	0.80
2012	2	0.1	0.11	0.0	0.08	0.1	0.10	0.1	0.12
2013	3	0.1	0.33	0.1	0.22	0.1	0.26	0.1	0.35
2014	5	0.2	0.83	0.1	0.70	0.2	0.76	0.2	0.90
2015									
2016	3	0.1	0.18	0.1	0.16	0.1	0.16	0.1	0.17
2017	2	0.1	0.13	0.0	0.07	0.0	0.10	0.1	0.13
2018	2	0.1	0.33	0.0	0.09	0.0	0.13	0.1	0.29
2019	2	0.1	0.40	0.1	0.50	0.1	0.46	0.1	0.39
2020	3	0.1	1.50	0.0	0.72	0.1	0.98	0.1	1.26
1998-2020	57	0.1	0.31	0.1	0.24	0.1	0.28	0.1	0.32

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	2	0.2	0.33	0.0	0.08	0.1	0.14	0.2	0.31
1999	1	0.1	0.25	0.0	0.13	0.1	0.17	0.1	0.20
2000	1	0.1	0.50	0.0	0.29	0.1	0.35	0.1	0.42
2001									
2002	1	0.1	0.06	0.0	0.03	0.0	0.05	0.0	0.06
2003	1	0.1	0.11	0.0	0.10	0.1	0.12	0.1	0.12
2004	2	0.1	0.29	0.1	0.36	0.1	0.37	0.1	0.39
2005	1	0.1	0.06	0.0	0.06	0.0	0.05	0.0	0.04
2006	1	0.0	0.08	0.0	0.06	0.0	0.06	0.0	0.06
2007	1	0.0	0.10	0.0	0.04	0.0	0.06	0.0	0.10
2008									
2009	2	0.1	0.22	0.0	0.13	0.1	0.15	0.1	0.17
2010	1	0.0	0.04	0.0	0.02	0.0	0.02	0.0	0.02
2011									
2012	6	0.3	0.40	0.1	0.25	0.2	0.32	0.2	0.37
2013	4	0.2	0.40	0.1	0.37	0.1	0.35	0.1	0.38
2014	1	0.0	0.07	0.0	0.06	0.0	0.06	0.0	0.07
2015	1	0.0	0.06	0.0	0.04	0.0	0.05	0.0	0.05
2016	2	0.1	0.13	0.0	0.08	0.0	0.10	0.1	0.12
2017	3	0.1	0.20	0.1	0.13	0.1	0.13	0.1	0.15
2018	1	0.0	0.08	0.0	0.05	0.0	0.06	0.0	0.07
2019	1	0.0	0.17	0.0	0.04	0.0	0.06	0.0	0.07
2020	3	0.1	0.50	0.0	0.34	0.1	0.36	0.1	0.43
1998-2020	36	0.1	0.14	0.0	0.09	0.0	0.10	0.1	0.12

Table 12

Age distribution of age at death (cancer-related) for period 2007-2020
(**incl. multiple malignancies**)

Age at death Years	Cases n	%	Cum.%	Males n	%	Cum.%	Females n	%	Cum.%
0-4									
5-9									
10-14									
15-19									
20-24									
25-29	1	1.5	1.5			0.0	1	3.8	3.8
30-34	3	4.5	6.0	2	4.9	4.9	1	3.8	7.7
35-39	2	3.0	9.0	2	4.9	9.8			7.7
40-44	1	1.5	10.4			9.8	1	3.8	11.5
45-49	1	1.5	11.9			9.8	1	3.8	15.4
50-54	2	3.0	14.9	2	4.9	14.6			15.4
55-59	6	9.0	23.9	5	12.2	26.8	1	3.8	19.2
60-64	6	9.0	32.8	5	12.2	39.0	1	3.8	23.1
65-69	6	9.0	41.8	3	7.3	46.3	3	11.5	34.6
70-74	16	23.9	65.7	11	26.8	73.2	5	19.2	53.8
75-79	10	14.9	80.6	5	12.2	85.4	5	19.2	73.1
80-84	9	13.4	94.0	5	12.2	97.6	4	15.4	88.5
85+	4	6.0	100.0	1	2.4	100.0	3	11.5	100.0
All ages	67	100.0		41	100.0		26	100.0	

Table 13

Age-specific mortality (cancer-related) and proportion of all cancers
for period 2007-2020
(**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	0.25		1.0
30-34	2	1	0.1	1.00	0.0	0.14	1.4	0.6
35-39	2		0.1	0.22			0.7	
40-44		1			0.0	0.08		0.1
45-49		1			0.0	0.04		0.1
50-54	2		0.1	0.13			0.1	
55-59	5	1	0.2	0.56	0.0	0.05	0.1	0.0
60-64	5	1	0.3	0.31	0.1	0.04	0.1	0.0
65-69	3	3	0.2	0.21	0.2	0.27	0.0	0.0
70-74	11	5	0.7	0.52	0.3	0.36	0.1	0.1
75-79	5	5	0.4	1.25	0.3	0.36	0.0	0.1
80-84	5	4	0.7	1.67	0.4	0.80	0.0	0.0
85+	1	3	0.2	1.00	0.3	3.00	0.0	0.0
All ages	41	26					0.1	0.0
Mortality								
Raw			0.1	0.32	0.1	0.15		
WS			0.1	0.24	0.0	0.09		
ES			0.1	0.27	0.0	0.10		
BRD-S			0.1	0.32	0.1	0.12		
PYLL-70								
per 100,000			1.0		0.6			
ES			0.9		0.5			
AYLL-70			14.9		17.5			

Table 14a

Further malignancies in deaths in period 1998–2020
MALES

Diagnosis	Total n	Total %↓	Pre n	Pre ←%	Syn-chron ±30d n	Syn-chron ±30d ←%	Post n	Post ←%
C03–C06 Oral cavity	1	3.3					1	100.0
C09–C10 Oropharynx	2	6.7					2	100.0
C18 Colon	2	6.7	1	50.0			1	50.0
C22 Liver	1	3.3	1	100.0				
C25 Pancreas	1	3.3					1	100.0
C33–C34 Lung	2	6.7					2	100.0
C37 Thymus	1	3.3	1	100.0				
C43 Malign. melanoma	1	3.3	1	100.0				
C44 Skin others	1	3.3	1	100.0				
C46,C49 Soft tissue	1	3.3					1	100.0
C61 Prostate	6	20.0	5	83.3			1	16.7
C62 Testis	1	3.3	1	100.0				
C64 Kidney	1	3.3	1	100.0				
C66 Ureter	1	3.3					1	100.0
C67 Bladder	3	10.0	1	33.3			2	66.7
C73 Thyroid	1	3.3					1	100.0
C76–C79 CUP	1	3.3					1	100.0
C81 Hodgkin lymphoma	1	3.3	1	100.0				
C82–C85 NHL	1	3.3	1	100.0				
C90 Mult. myeloma	1	3.3	1	100.0				
All further malignancies	30	100.0	16	53.3			14	46.7

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 1998–2020
FEMALES

Diagnosis		Total n	Total %↓	Pre n	Pre ←%	Syn-chron ±30d n	Syn-chron ±30d ←%	Post n	Post ←%
C15	Oesophagus	1	4.0					1	100.0
C18	Colon	5	20.0	1	20.0			4	80.0
C25	Pancreas	2	8.0					2	100.0
C33–C34	Lung	1	4.0			1	100.0		
C43	Malign. melanoma	2	8.0	1	50.0			1	50.0
C50	Breast	7	28.0	2	28.6	2	28.6	3	42.9
C64	Kidney	1	4.0					1	100.0
C73	Thyroid	1	4.0			1	100.0		
C74–C80	Cancer others	1	4.0			1	100.0		
C76–C79	CUP	3	12.0	1	33.3			2	66.7
C82–C85	NHL	1	4.0	1	100.0				
All further malignancies		25	100.0	6	24.0	5	20.0	14	56.0

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

Table 15

Age-specific mortality (cancer-related) and proportion of all cancers
for period 2007-2020
(**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		1			0.0	0.25		1.1
30-34	2	1	0.1	1.00	0.0	0.14	1.4	0.6
35-39	2		0.1	0.25			0.8	
40-44		1			0.0	0.08		0.1
45-49		1			0.0	0.05		0.1
50-54	1		0.0	0.07			0.0	
55-59	4	1	0.2	0.50	0.0	0.06	0.1	0.0
60-64	4		0.2	0.36			0.1	
65-69	1	2	0.1	0.08	0.1	0.22	0.0	0.0
70-74	8	2	0.5	0.50	0.1	0.25	0.1	0.0
75-79	2	5	0.2	2.00	0.3	0.45	0.0	0.1
80-84	3	2	0.4	3.00	0.2	1.00	0.0	0.0
85+	1	2	0.2	1.00	0.2	2.00	0.0	0.0
All ages	28	18					0.1	0.0
Mortality								
Raw			0.1	0.26	0.1	0.12		
WS			0.0	0.20	0.0	0.08		
ES			0.1	0.23	0.0	0.09		
BRD-S			0.1	0.26	0.0	0.11		
PYLL-70								
per 100,000			0.8		0.5			
ES			0.8		0.5			
AYLL-70			17.1		21.1			

* See corresponding tables with multiple malignancies.

Table 16

Age-specific mortality (cancer-related) and proportion of all cancers
for period 2007-2020
(**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		1			0.0	0.25		1.1
30-34	2	1	0.1	1.00	0.0	0.14	1.5	0.6
35-39	1		0.0	0.14			0.4	
40-44		1			0.0	0.08		0.1
45-49								
50-54	1		0.0	0.08			0.0	
55-59	4	1	0.2	0.50	0.0	0.07	0.1	0.0
60-64	3		0.2	0.30			0.1	
65-69		1			0.1	0.11		0.0
70-74	8	2	0.5	0.53	0.1	0.25	0.1	0.0
75-79		4			0.3	0.50		0.1
80-84	3	2	0.4	3.00	0.2	1.00	0.0	0.0
85+		1			0.1	1.00		0.0
All ages	22	14					0.0	0.0
Mortality								
Raw			0.1	0.22	0.0	0.10		
WS			0.0	0.17	0.0	0.06		
ES			0.1	0.19	0.0	0.07		
BRD-S			0.1	0.22	0.0	0.09		
PYLL-70								
per 100,000			0.7		0.4			
ES			0.6		0.4			
AYLL-70			18.0		24.5			

* See corresponding tables with multiple malignancies.

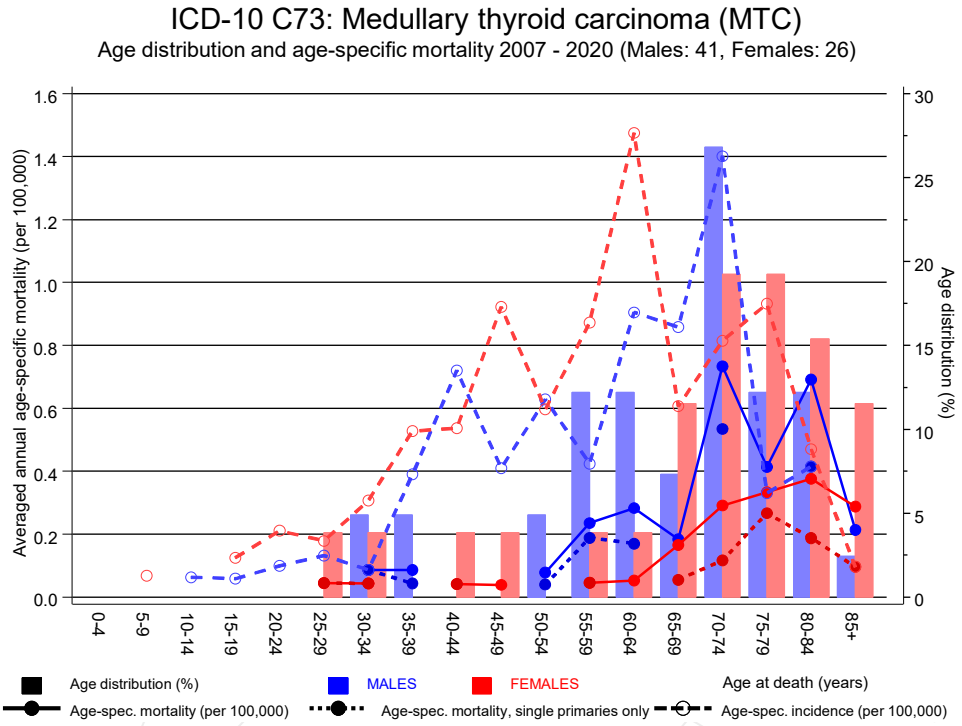


Figure 17. Distribution of age at death (bars; males: mean=60.9 yrs, median=64.4 yrs; females: mean=61.2 yrs, median=70.0 yrs) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

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

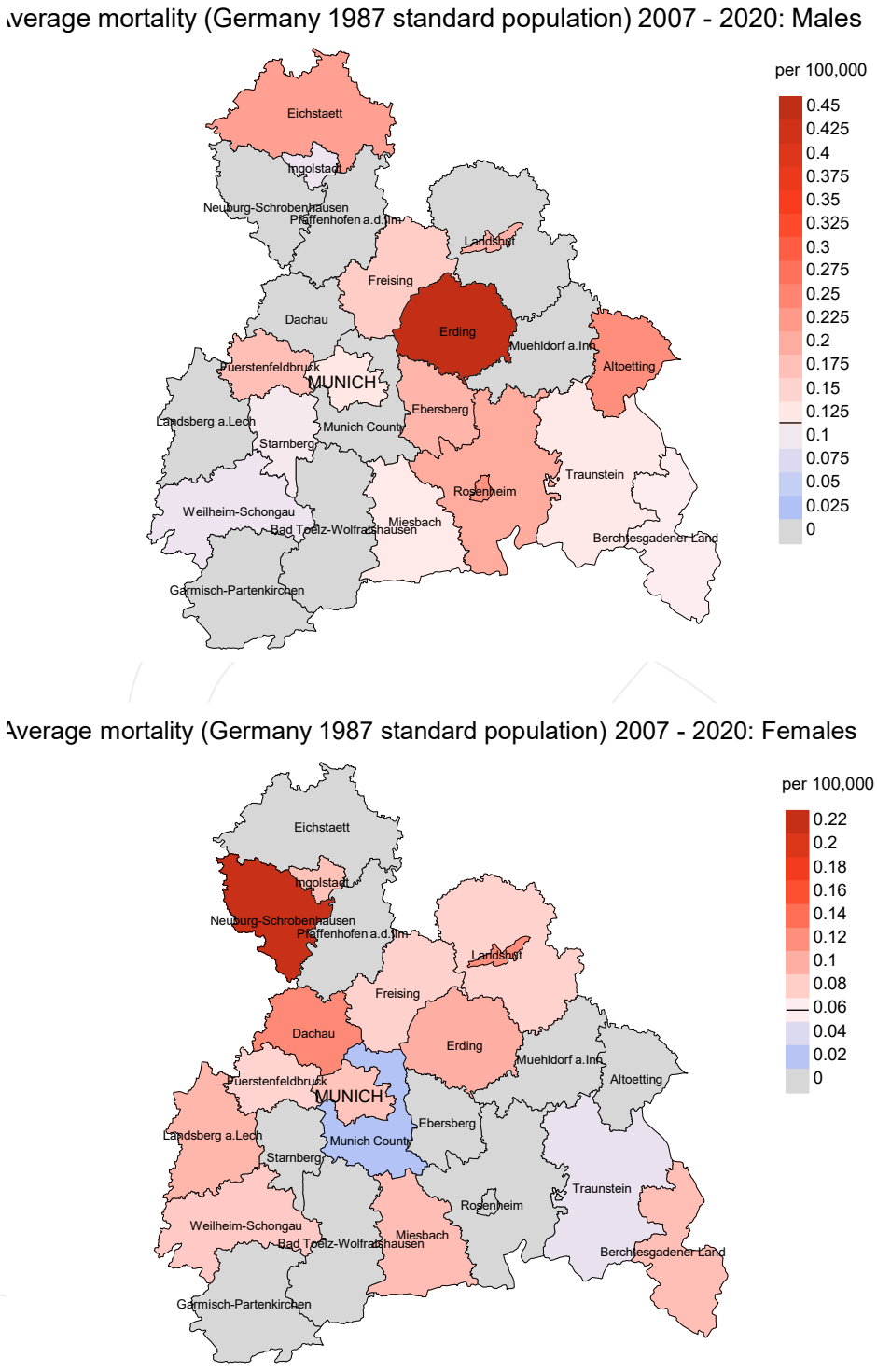
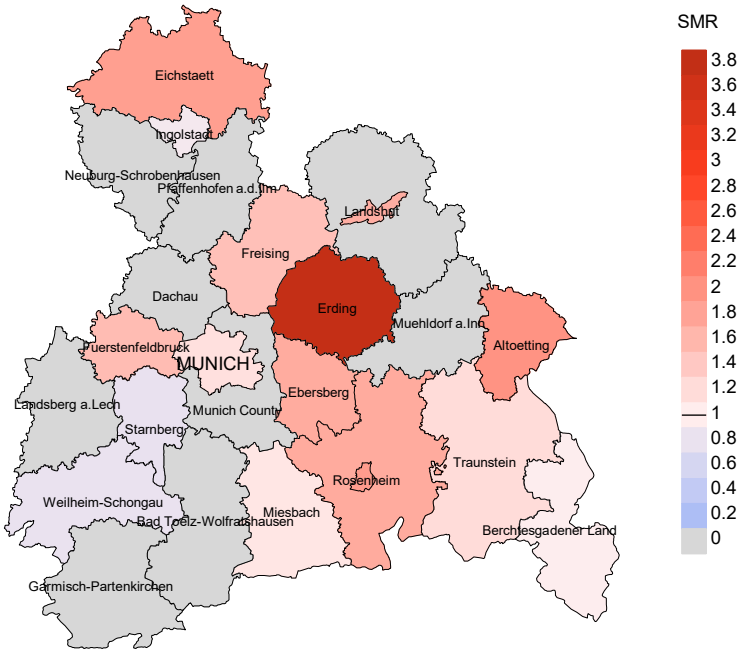


Figure 18a. Map of cancer mortality (german standard population) by county averaged for period 2007 to 2020. According to their individual mortality rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (males 0.1/100,000 WS N=41, females 0.1/100,000 WS N=26).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 67,727 female residents (averaged) in the period from 2007 to 2020 a total of 0 women died from medullary thyroid ca.. Therefore, the mean mortality rate for this cancer type in this area can be calculated at 0.0/100,000 (german standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 0.0 and 0.0/100,000.

Standardized mortality ratio (SMR) 2007 - 2020: Males



Standardized mortality ratio (SMR) 2007 - 2020: Females

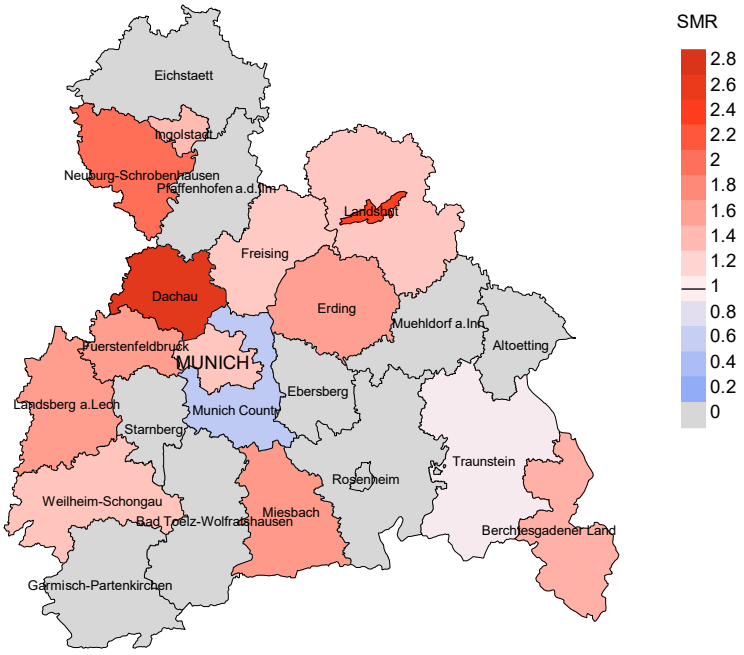


Figure 18b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2007 to 2020. According to their individual SMR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (males N=41, females N=26).

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 2020 a total of 0 women died from medullary thyroid ca.. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 0.00. Though, the value of this parameter may vary with an underlying probability of 99% between 0.00 and 7.58, 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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