Munich Cancer Registry

ICD-10 C88,C90: Immunoprolif. disease

Incidence and Mortality

Year of diagnosis	1998-2020
Patients	6,489
Diseases	6,510
Creation date	12/21/2021
Database export	12/20/2021
Population	4.95 m

BERLIN

GERMANY

BAVARIA

MUNICH

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

https://www.tumorregister-muenchen.de/en/facts/base/bC8890E-ICD-10-C88-C90-Immunoprolif.-disease-incidence-and-mortality.pdf

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**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 currency 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.

Some remarks regarding this cancer type

The results for immunoproliferative and plasma cell neosplasms should be interpreted with caution. As with other primarily non-surgically or non-radiologically treated cancer diseases, the MCR hardly manages to obtain even the simplest information on this cancer. The proportion of DCO cases indicates a situation that is far away from a satisfying cooperation. In the group of institutions that potentially participate in reporting are a few hospitals that refuse any contribution to MCR.

ICD-10 codes (ICD-10 2015) used for specifying cancer site

Code	Description
C88.-	Malignant immunoproliferative diseases
C88.0	Waldenström macroglobulinaemia
C88.2	Other heavy chain disease
C88.3	Immunoproliferative small intestinal disease
C88.4	Extranodal marginal zone B-cell lymphoma of mucosa-associated lymphoid tissue [MALT-lyphoma]
C88.7	Other malignant immunoproliferative diseases
C88.9	Malignant immunoproliferative disease, unspecified
C90.-	Multiple myeloma and malignant plasma cell neoplasms
C90.0	Multiple myeloma
C90.1	Plasma cell leukaemia
C90.2	Extramedullary plasmacytoma
C90.3	Solitary plasmacytoma

INCIDENCE

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                            Table 1

                 Cases by year of diagnosis, proportions of
      DCO, further malignancies, deaths, and active follow-up (ALL PATIENTS)
                            (incl. DCO)
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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	145	32	22.1	9.0	11.1	87.6	97.2
1999	154	30	19.5	12.7	11.0	92.2	98.1
2000	156	48	30.8	12.1	11.1	95.5	98.7
2001	154	34	22.1	12.3	11.1	87.7	98.1
2002	285	79	27.7	13.0	10.9	87.4	98.6 #
2003	292	59	20.2	13.0	10.9	85.6	97.9
2004	287	66	23.0	13.2	10.6	84.7	98.3
2005	287	46	16.0	14.1	10.5	85.4	97.6
2006	310	47	15.2	14.6	10.3	81.0	97.4
2007	386	68	17.6	14.9	9.9	82.4	97.2 #
2008	392	60	15.3	14.9	9.8	79.3	99.0
2009	340	45	13.2	15.2	9.4	75.6	98.8
2010	370	54	14.6	15.7	9.1	73.0	98.4
2011	405	65	16.0	16.1	8.8	68.9	96.8
2012	354	49	13.8	17.0	8.4	66.7	97.5
2013	365	52	14.2	17.4	8.0	66.6	98.1
2014	351	38	10.8	18.0	7.4	58.4	97.2
2015	367	54	14.7	18.2	7.3	65.7	97.3
2016	320	59	18.4	18.4	7.4	57.8	99.1
2017	269	44	16.4	18.7	7.0	46.8	100.0
2018	219	27	12.3	19.0	5.7	48.9	97.3
2019	158	5	3.2	19.3	4.1	31.6	100.0
2020	144			19.5	4.3	17.4	99.3 ##
1998–2020	6510	1061	16.3	19.5	11.1	71.3	98.1

6,510 cases diagnosed 1998-2020 are related to a total of 6,489 patients. Currently, in 1,904 (29.3 %) of these 6,489 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 1,466 / 334 / 104 (22.6 % / 5.1 % / 1.6 %) patients exist having 2 / 3 / 4+ malignancies.

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

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

How to interpret:
In 2018, a subgroup of 219 cases has been diagnosed, of which 19.0 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 5.7 % 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 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	84	57.9	14	16.7	10.7	12.7	86.9	98.8
1999	79	51.3	14	17.7	13.5	12.6	91.1	98.7
2000	91	58.3	32	35.2	13.0	12.6	95.6	98.9
2001	73	47.4	14	19.2	14.1	12.6	87.7	98.6
2002	149	52.3	36	24.2	15.1	12.3	85.2	98.7 #
2003	170	58.2	34	20.0	14.6	12.3	84.1	97.1
2004	142	49.5	30	21.1	14.5	12.0	85.2	99.3
2005	148	51.6	21	14.2	14.9	11.9	86.5	98.0
2006	155	50.0	21	13.5	15.2	11.6	79.4	97.4
2007	202	52.3	40	19.8	15.7	11.0	82.2	96.5 #
2008	219	55.9	35	16.0	15.5	10.9	79.9	98.6
2009	170	50.0	22	12.9	15.7	10.3	75.9	98.2
2010	220	59.5	24	10.9	16.5	10.0	73.6	99.1
2011	210	51.9	24	11.4	17.2	9.4	71.4	98.1
2012	196	55.4	24	12.2	17.9	9.2	65.3	96.4
2013	205	56.2	30	14.6	18.3	8.8	67.3	98.5
2014	187	53.3	19	10.2	18.8	8.1	58.3	97.3
2015	197	53.7	29	14.7	18.6	7.6	62.9	96.4
2016	193	60.3	29	15.0	19.2	7.8	58.5	99.0
2017	146	54.3	21	14.4	19.7	6.8	45.2	100.0
2018	136	62.1	16	11.8	20.0	6.0	50.7	96.3
2019	94	59.5	3	3.2	20.2	4.2	28.7	100.0
2020	79	54.9			20.5	5.3	19.0	98.7 ##
1998–2020	3545	54.5	532	15.0	20.5	12.7	70.8	98.1

3,545 cases diagnosed 1998-2020 are related to a total of 3,537 patients. Currently, in 1,125 (31.8 %) of these 3,537 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 846 / 197 / 82 (23.9 % / 5.6 % / 2.3 %) patients exist having 2 / 3 / 4+ malignancies.

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

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

How to interpret:
In 2018, a subgroup of 136 cases has been diagnosed, of which 20.0 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 6.0 % 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 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	61	42.1	18	29.5	6.6	9.3	88.5	95.1
1999	75	48.7	16	21.3	11.8	9.2	93.3	97.3
2000	65	41.7	16	24.6	10.9	9.3	95.4	98.5
2001	81	52.6	20	24.7	10.3	9.4	87.7	97.5
2002	136	47.7	43	31.6	10.5	9.2	89.7	98.5 #
2003	122	41.8	25	20.5	11.1	9.2	87.7	99.2
2004	145	50.5	36	24.8	11.8	8.9	84.1	97.2
2005	139	48.4	25	18.0	13.3	8.7	84.2	97.1
2006	155	50.0	26	16.8	13.9	8.6	82.6	97.4
2007	184	47.7	28	15.2	14.1	8.6	82.6	97.8 #
2008	173	44.1	25	14.5	14.1	8.4	78.6	99.4
2009	170	50.0	23	13.5	14.5	8.2	75.3	99.4
2010	150	40.5	30	20.0	14.7	8.0	72.0	97.3
2011	195	48.1	41	21.0	15.0	8.0	66.2	95.4
2012	158	44.6	25	15.8	16.0	7.5	68.4	98.7
2013	160	43.8	22	13.8	16.3	7.0	65.6	97.5
2014	164	46.7	19	11.6	17.0	6.5	58.5	97.0
2015	170	46.3	25	14.7	17.7	6.9	68.8	98.2
2016	127	39.7	30	23.6	17.5	6.8	56.7	99.2
2017	123	45.7	23	18.7	17.4	7.2	48.8	100.0
2018	83	37.9	11	13.3	17.8	5.2	45.8	98.8
2019	64	40.5	2	3.1	18.2	3.9	35.9	100.0
2020	65	45.1			18.4	3.1	15.4	100.0 ##
1998–2020	2965	45.5	529	17.8	18.4	9.3	72.0	98.0

2,965 cases diagnosed 1998-2020 are related to a total of 2,952 patients. Currently, in 779 (26.4 %) of these 2,952 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 620 / 137 / 22 (21.0 % / 4.6 % / 0.7 %) patients exist having 2 / 3 / 4+ malignancies.

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

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

How to interpret:
In 2018, a subgroup of 83 cases has been diagnosed, of which 17.8 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 5.2 % 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	84	61	7.6	5.2	4.7	2.5	6.8	3.6	8.4	4.4
1999	79	75	7.1	6.3	4.3	2.6	6.4	4.0	8.8	5.3
2000	91	65	8.0	5.4	4.5	2.3	7.1	3.5	9.9	4.6
2001	73	81	6.3	6.7	3.7	3.2	5.6	4.6	7.5	5.8
2002	149	136	8.0	6.9	4.5	2.9	6.8	4.4	8.7	5.7
2003	170	122	9.1	6.2	5.1	2.8	7.4	4.1	9.5	5.2
2004	142	145	7.5	7.3	4.2	3.1	6.3	4.6	7.9	6.0
2005	148	139	7.8	7.0	4.1	2.9	6.2	4.3	8.1	5.8
2006	155	155	8.1	7.7	4.3	3.2	6.3	4.8	8.1	6.2
2007	202	184	9.1	8.0	4.7	3.4	7.1	4.9	9.4	6.4
2008	219	173	9.8	7.5	5.0	3.0	7.4	4.6	9.5	6.2
2009	170	170	7.6	7.3	3.7	3.0	5.5	4.5	7.1	5.7
2010	220	150	9.8	6.4	5.0	2.7	7.3	3.9	9.3	5.0
2011	210	195	9.4	8.3	4.5	3.6	6.6	5.3	8.7	6.7
2012	196	158	8.6	6.7	4.1	2.7	6.1	4.0	7.8	5.3
2013	205	160	8.9	6.7	4.0	2.8	6.1	4.2	8.2	5.4
2014	187	164	8.0	6.8	3.7	2.9	5.6	4.3	7.2	5.4
2015	197	170	8.3	7.0	3.8	2.7	5.7	4.1	7.5	5.4
2016	193	127	8.0	5.2	3.5	1.9	5.4	2.9	7.2	3.9
2017	146	123	6.1	5.0	2.9	2.0	4.2	2.9	5.4	3.8
2018	136	83	5.6	3.3	2.5	1.3	3.7	1.9	4.9	2.5
2019	94	64	3.9	2.6	1.8	1.0	2.7	1.5	3.4	1.9
2020	79	65	3.2	2.6	1.6	1.3	2.3	1.8	2.9	2.1
1998-2020	3545	2965	7.6	6.1	3.8	2.6	5.7	3.8	7.3	4.9

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	145	66.7	13.2	26.1	94.0	50.1	58.4	67.1	75.7	84.8
1999	154	69.6	12.7	23.9	92.8	53.5	60.1	71.1	79.1	84.1
2000	156	71.2	12.2	23.0	94.4	55.7	63.6	72.3	79.5	85.8
2001	154	68.4	10.9	36.1	93.7	51.7	60.3	69.4	76.6	81.0
2002	285	70.0	12.5	30.3	93.5	54.9	61.4	70.9	79.5	86.2
2003	292	68.4	11.5	27.3	99.0	54.1	61.7	68.2	76.8	82.8
2004	287	69.3	12.3	29.1	93.4	52.5	62.1	70.2	78.5	84.0
2005	287	70.5	12.1	25.2	102	54.4	63.9	71.4	79.2	84.5
2006	310	70.3	12.2	22.7	95.3	54.6	63.7	71.0	79.0	85.1
2007	386	70.4	11.8	16.4	95.2	55.2	64.1	71.1	79.4	83.8
2008	392	70.6	11.8	33.8	97.9	55.1	63.9	70.8	79.3	85.1
2009	340	70.7	11.6	34.7	94.6	54.6	64.4	71.1	79.0	85.3
2010	370	69.5	13.2	5.0	97.2	51.0	62.6	71.1	78.8	85.2
2011	405	69.7	13.4	9.2	97.5	50.5	61.5	72.2	78.4	85.0
2012	354	70.5	12.5	8.5	97.5	52.3	63.6	72.3	78.9	84.8
2013	365	70.9	12.0	29.8	93.1	54.0	63.0	73.2	79.8	84.8
2014	351	70.4	11.9	34.2	99.6	54.2	62.4	72.0	79.3	84.8
2015	367	71.5	12.2	27.7	95.2	53.2	63.5	73.8	80.1	85.7
2016	320	71.7	12.2	22.4	99.9	54.8	65.0	74.8	79.8	84.9
2017	269	71.2	12.5	30.8	96.6	53.8	64.6	72.9	79.5	85.7
2018	219	71.4	11.6	38.2	92.7	53.2	63.2	74.3	79.4	84.7
2019	158	69.7	12.8	29.8	93.5	51.6	60.7	72.4	79.4	84.1
2020	144	68.3	11.9	34.6	91.4	52.3	60.3	68.5	78.0	83.2
1998-2020	6510	70.2	12.3	5.0	102	53.5	62.7	71.6	79.1	84.8

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	84	64.6	13.5	26.1	92.3	48.0	56.0	64.7	73.8	82.0
1999	79	67.3	13.1	23.9	91.7	48.5	59.4	68.4	77.3	83.7
2000	91	70.5	12.2	23.0	92.3	56.5	61.4	71.8	79.4	85.4
2001	73	67.4	10.6	44.4	87.8	50.9	59.4	68.4	76.0	79.5
2002	149	68.2	12.0	32.7	93.5	52.9	61.4	68.0	76.5	82.8
2003	170	67.1	10.8	27.3	99.0	54.1	60.3	67.1	75.0	80.9
2004	142	67.8	12.5	35.0	93.4	50.0	60.7	67.9	75.9	82.4
2005	148	69.2	12.1	25.2	102	53.4	63.6	68.8	77.4	83.4
2006	155	68.8	11.5	27.5	94.8	53.7	62.4	69.4	76.5	83.3
2007	202	69.3	12.4	16.4	93.2	53.7	63.1	70.5	78.9	83.3
2008	219	69.2	12.1	33.8	97.9	51.3	63.2	70.0	77.2	84.9
2009	170	69.6	11.2	34.7	94.1	53.9	63.6	70.7	77.3	83.8
2010	220	68.3	13.3	5.0	93.0	48.9	61.7	70.4	76.9	84.6
2011	210	69.1	13.4	9.2	97.4	48.8	63.1	71.8	77.5	83.7
2012	196	69.7	11.9	41.0	93.0	51.8	63.4	71.5	77.6	84.1
2013	205	71.3	11.5	38.5	93.1	54.1	64.0	73.7	79.2	84.8
2014	187	70.8	11.6	37.9	99.6	56.7	62.6	72.7	79.0	85.4
2015	197	71.5	11.8	29.8	95.1	55.1	63.8	72.9	79.8	85.8
2016	193	71.4	11.5	22.4	99.9	55.0	65.0	73.6	79.0	82.8
2017	146	70.3	12.8	34.9	94.1	53.7	62.5	71.5	80.2	85.1
2018	136	70.9	11.6	38.2	92.7	53.4	63.1	74.7	79.2	82.9
2019	94	68.0	12.9	29.8	90.2	51.6	59.4	70.8	77.9	82.5
2020	79	68.7	11.9	34.6	89.9	52.5	61.6	70.0	78.1	82.3
1998−2020	3545	69.3	12.1	5.0	102	52.5	62.2	70.8	77.9	83.8

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	61	69.7	12.3	37.6	94.0	57.5	61.5	69.2	78.4	85.8
1999	75	72.1	11.9	47.5	92.8	56.1	60.8	74.6	80.1	87.9
2000	65	72.1	12.2	40.6	94.4	55.7	65.3	75.6	79.8	85.8
2001	81	69.2	11.2	36.1	93.7	57.3	62.2	70.1	77.0	81.2
2002	136	72.0	12.8	30.3	93.2	55.6	61.5	73.2	82.1	87.8
2003	122	70.2	12.2	31.4	94.2	52.9	63.3	70.9	79.5	84.3
2004	145	70.8	11.9	29.1	92.1	55.7	64.6	70.7	80.4	84.2
2005	139	71.8	11.9	32.2	96.8	54.4	64.5	74.6	80.6	84.7
2006	155	71.9	12.8	22.7	95.3	54.8	64.0	73.4	81.2	86.4
2007	184	71.6	11.0	34.8	95.2	58.6	65.2	71.9	80.1	85.2
2008	173	72.3	11.3	37.5	94.3	56.9	65.2	73.8	79.9	85.9
2009	170	71.9	11.8	35.0	94.6	56.9	64.5	72.2	81.9	86.1
2010	150	71.3	12.9	20.5	97.2	54.0	63.6	72.5	81.4	86.4
2011	195	70.3	13.5	29.8	97.5	51.8	59.7	72.5	79.6	87.1
2012	158	71.6	13.1	8.5	97.5	53.5	63.7	74.5	81.1	85.0
2013	160	70.4	12.6	29.8	92.2	53.9	62.0	72.2	80.4	84.9
2014	164	70.0	12.3	34.2	98.4	53.5	62.4	71.7	79.4	84.5
2015	170	71.4	12.7	27.7	95.2	51.6	63.3	74.4	80.2	85.1
2016	127	72.3	13.2	26.1	95.8	53.4	65.7	76.0	81.6	86.7
2017	123	72.3	12.2	30.8	96.6	56.8	65.0	73.6	79.3	86.3
2018	83	72.1	11.5	48.4	92.1	53.0	64.0	74.2	80.4	85.0
2019	64	72.3	12.2	45.3	93.5	51.6	65.3	74.4	81.3	85.5
2020	65	67.9	12.0	43.4	91.4	52.1	60.1	66.4	76.2	86.4
1998–2020	2965	71.3	12.3	8.5	98.4	54.4	63.3	73.0	80.2	85.6

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	1	0.0	0.0	1	0.0	0.0			0.0
5-9	2	0.0	0.1	1	0.0	0.1	1	0.1	0.1
10-14	0	0.0	0.1			0.1			0.1
15-19	1	0.0	0.1	1	0.0	0.1			0.1
20-24	3	0.1	0.2	2	0.1	0.2	1	0.1	0.1
25-29	7	0.2	0.3	3	0.1	0.3	4	0.2	0.3
30-34	22	0.5	0.8	11	0.4	0.8	11	0.6	0.9
35-39	29	0.7	1.5	20	0.8	1.6	9	0.5	1.3
40-44	70	1.6	3.0	50	2.0	3.6	20	1.0	2.3
45-49	169	3.8	6.8	97	4.0	7.6	72	3.6	5.9
50-54	233	5.2	12.1	125	5.1	12.7	108	5.4	11.4
55-59	303	6.8	18.9	164	6.7	19.4	139	7.0	18.4
60-64	432	9.7	28.6	245	10.0	29.3	187	9.4	27.8
65-69	605	13.6	42.3	349	14.2	43.6	256	12.9	40.7
70-74	770	17.3	59.6	465	18.9	62.5	305	15.4	56.0
75-79	789	17.8	77.4	427	17.4	79.9	362	18.2	74.3
80-84	567	12.8	90.2	289	11.8	91.7	278	14.0	88.3
85+	437	9.8	100.0	204	8.3	100.0	233	11.7	100.0
All ages	4440	100.0		2454	100.0		1986	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=315 %	Females DCO rate n=303 %	Males Prop.all cancers n=153686 %	Females Prop.all cancers n=155051 %
0- 4	1		0.1				0.5	
5- 9	1	1	0.1	0.1			0.9	1.0
10-14								
15-19	1		0.1				0.3	
20-24	2	1	0.1	0.1			0.3	0.2
25-29	3	4	0.1	0.2			0.3	0.3
30-34	11	11	0.5	0.5			0.8	0.5
35-39	20	9	0.9	0.4			1.1	0.3
40-44	50	20	2.0	0.8			1.8	0.3
45-49	96	72	3.6	2.8			1.9	0.8
50-54	125	108	4.9	4.3	4.8	3.7	1.5	0.9
55-59	164	139	7.7	6.4	3.0	2.9	1.3	1.0
60-64	245	187	13.9	9.8	4.9	3.7	1.4	1.2
65-69	349	256	21.4	14.1	6.6	5.1	1.4	1.4
70-74	464	305	30.9	17.7	9.7	8.5	1.7	1.5
75-79	426	362	35.2	24.1	14.6	14.6	1.8	1.9
80-84	289	277	39.9	26.0	23.2	26.4	1.9	1.8
85+	204	232	43.7	22.3	46.6	53.0	1.9	1.4
All ages	2451	1984			12.9	15.3	1.6	1.3
Incidence								
Raw			7.5	5.9				
WS			3.6	2.4				
ES			5.3	3.6				
BRD-S			6.9	4.6				

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

ICD-10 C88,C90: Malignant immunoproliferative and plasmacellular disease
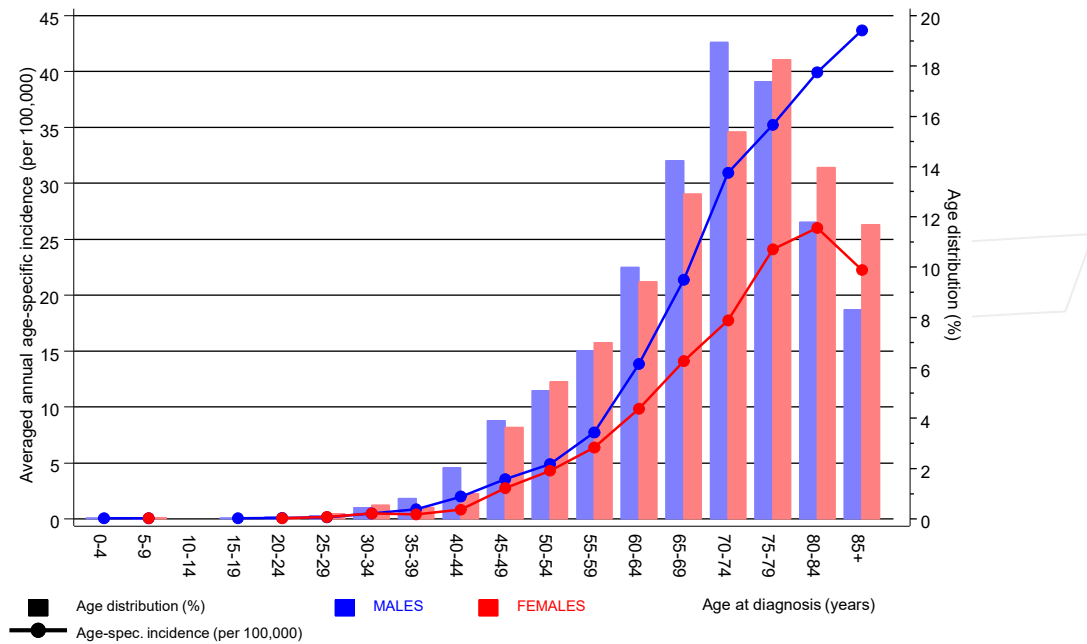Age distribution and age-specific incidence 2007 - 2020 (Males: 2451, Females: 1984)

Figure 6. Age distribution (males: mean=69.9 yrs, median=71.6 yrs; females: mean=71.3 yrs, median=73.1 yrs) and age-specific incidence.

ICD-10 C88,C90: Malignant immunoproliferative and plasmacellular disease

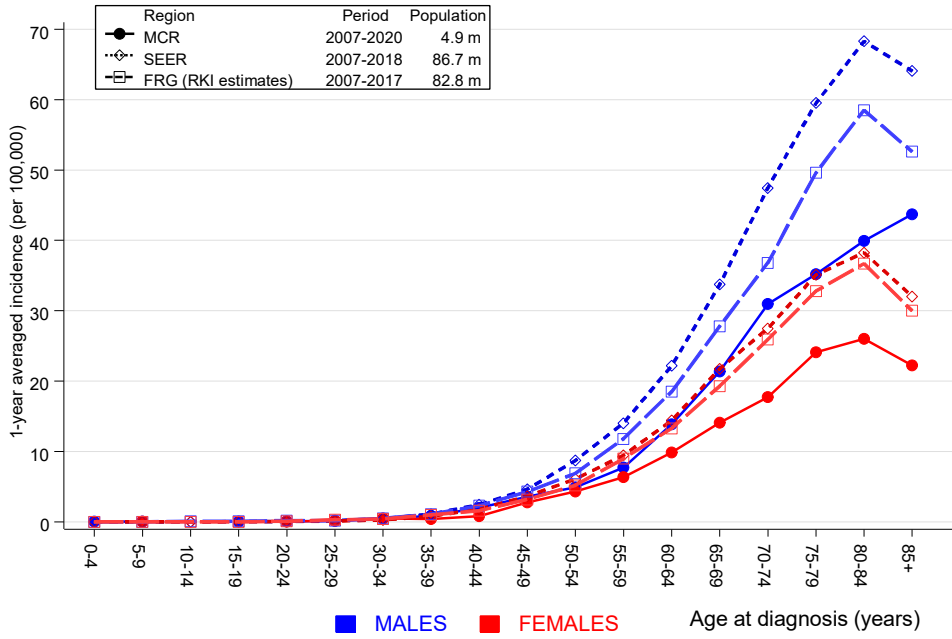Age-specific incidence rates: international comparison

Region	Period	Population
MCR	2007-2020	4.9 m
SEER	2007-2018	86.7 m
FRG (RKI estimates)	2007-2017	82.8 m

■ MALES   ■ FEMALES   Age at diagnosis (years)

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

Reference:

Estimated age-specific patient population of Germany, latest update: 16 March 2021. German Centre for Cancer Registry Data, Robert Koch Institute (RKI), based on data of the population based cancer registries. http://www.krebsdaten.de. Last access: 08/17/2021
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 %
C00	Lip	1	0.2	5.1	0.1	28.4		0.7	
C03-C06	Oral cavity	3	1.5	2.0	0.4	5.8		1.3	
C07-C08	Salivary gland	2	0.4	4.6	0.6	16.5		1.4	
C09-C10	Oropharynx	2	1.9	1.1	0.1	3.9		0.1	
C12-C13	Hypopharynx	2	1.0	2.0	0.2	7.1		0.9	
C15	Oesophagus	6	3.7	1.6	0.6	3.5		2.0	16.7
C16	Stomach	18	7.1	2.5	1.5	4.0	#	9.5	
C17	Small intestine	3	1.1	2.7	0.6	7.8		1.6	
C18	Colon	27	17.7	1.5	1.0	2.2	#	8.2	
C19-C20	Rectum	12	9.7	1.2	0.6	2.2		2.0	
C22	Liver	15	5.4	2.8	1.5	4.6	#	8.4	20.0
C23-C24	Bile	3	2.0	1.5	0.3	4.4		0.9	33.3
C25	Pancreas	15	7.3	2.1	1.2	3.4	#	6.8	13.3
C30-C31	Sinuses	1	0.3	2.9	0.1	16.3		0.6	
C32	Larynx	4	1.8	2.2	0.6	5.6		1.9	
C33-C34	Lung	41	21.7	1.9	1.4	2.6	#	16.9	2.4
C37	Thymus	2	0.1	18.4	2.2	66.4	#	1.7	
C38,C45	Mesothelioma	4	1.3	3.1	0.8	7.8		2.4	
C40-C41	Bone	3	0.2	19.8	4.1	57.9	#	2.5	
C43	Malign. melanoma	19	8.5	2.2	1.3	3.5	#	9.2	
C44	Skin others	1	0.0	21.2	0.5	117.9		0.8	
C46,C49	Soft tissue	4	1.1	3.8	1.0	9.7	#	2.6	
C50	Breast	1	0.5	2.0	0.1	11.0		0.4	
C60	Penis	1	0.5	2.1	0.1	11.9		0.5	
C61	Prostate	102	52.5	1.9	1.6	2.4	#	43.5	3.9
C64	Kidney	21	6.4	3.3	2.0	5.1	#	12.9	4.8
C65	Renal pelvis	2	0.8	2.4	0.3	8.7		1.0	
C67	Bladder	13	8.6	1.5	0.8	2.6		3.8	7.7
C69	Eye carcinoma	1	0.1	14.6	0.4	81.5		0.8	100.0
C70-C72	CNS cancer	6	2.3	2.6	0.9	5.6		3.2	16.7
C73	Thyroid	6	1.2	5.1	1.9	11.1	#	4.2	
C76-C79	CUP	11	3.1	3.6	1.8	6.4	#	7.0	
C81	Hodgkin lymphoma	2	0.4	4.7	0.6	17.1		1.4	
C82-C85	NHL	51	7.8	6.5	4.9	8.6	#	38.0	2.0
C90	Mult. myeloma	2	2.4	0.8	0.1	3.0		-0.4	50.0
C91-C96	Leukaemia	14	2.8	5.0	2.7	8.4	#	9.9	7.1
Not observed		0	3.0	0.0	0.0	1.2		-2.6	
All further malignancies		421	186.5	2.3	2.0	2.5	#	206.0	4.5

Patients	3083
Median age at next malignancy (years)	72.8
Person-years	11382
Mean observation time (years)	3.7
Median observation time (years)	2.4

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 %
C00	Lip	1	0.1	13.9	0.4	77.4		1.0	
C03-C06	Oral cavity	1	0.6	1.6	0.0	9.1		0.4	
C09-C10	Oropharynx	2	0.4	4.5	0.5	16.4		1.7	
C15	Oesophagus	1	0.7	1.4	0.0	7.7		0.3	
C16	Stomach	12	3.5	3.4	1.8	6.0	#	9.2	
C18	Colon	15	10.1	1.5	0.8	2.4		5.2	6.7
C19-C20	Rectum	5	4.1	1.2	0.4	2.8		0.9	
C21	Anus/canal	3	0.6	5.0	1.0	14.7	#	2.6	
C22	Liver	4	1.3	3.0	0.8	7.6		2.9	
C23-C24	Bile	2	1.5	1.3	0.2	4.9		0.6	
C25	Pancreas	12	5.0	2.4	1.2	4.2	#	7.5	33.3
C26	GI cancer	1	0.2	6.2	0.2	34.7		0.9	100.0
C33-C34	Lung	24	8.3	2.9	1.8	4.3	#	16.9	4.2
C38,C45	Mesothelioma	1	0.2	5.0	0.1	27.6		0.9	
C43	Malign. melanoma	16	4.1	3.9	2.3	6.4	#	12.9	12.5
C46,C49	Soft tissue	1	0.6	1.7	0.0	9.2		0.4	
C48	Peritoneal	4	0.5	8.6	2.3	22.0	#	3.8	
C50	Breast	53	32.5	1.6	1.2	2.1	#	22.0	5.7
C51	Vulva	2	1.1	1.8	0.2	6.4		0.9	
C53	Cervix uteri	2	1.3	1.6	0.2	5.7		0.8	
C54	Corpus uteri	6	6.0	1.0	0.4	2.2		-0.0	
C56	Ovary	8	4.3	1.9	0.8	3.7		4.0	12.5
C64	Kidney	3	2.5	1.2	0.2	3.5		0.5	
C65	Renal pelvis	1	0.3	2.9	0.1	16.2		0.7	
C67	Bladder	2	2.1	1.0	0.1	3.5		-0.1	
C69	Eye lymphoma	2	0.0	63.5	7.7	229.4	#	2.1	
C70-C72	CNS cancer	1	1.4	0.7	0.0	4.1		-0.4	100.0
C73	Thyroid	1	1.6	0.6	0.0	3.4		-0.7	
C74-C80	Cancer others	1	0.3	3.0	0.1	16.6		0.7	
C76-C79	CUP	2	1.9	1.1	0.1	3.9		0.1	
C81	Hodgkin lymphoma	2	0.2	11.0	1.3	39.6	#	2.0	
C82-C85	NHL	40	4.2	9.6	6.9	13.1	#	38.6	5.0
C90	Mult. myeloma	5	1.3	3.8	1.2	8.8	#	4.0	20.0
C91-C96	Leukaemia	13	1.6	8.4	4.5	14.3	#	12.3	15.4
C96	Systemic	1	0.0	41.7	1.1	232.5	#	1.1	100.0
	Not observed	0	2.3	0.0	0.0	1.6		-2.4	
	All further malignancies	250	106.8	2.3	2.1	2.6	#	154.3	8.0

Patients	2510
Median age at next malignancy (years)	73.6
Person-years	9278
Mean observation time (years)	3.7
Median observation time (years)	2.4

The occurrence of further specified malignancy is statistically significant.

Average incidence (Germany 1987 standard population) 2007 - 2020: Males
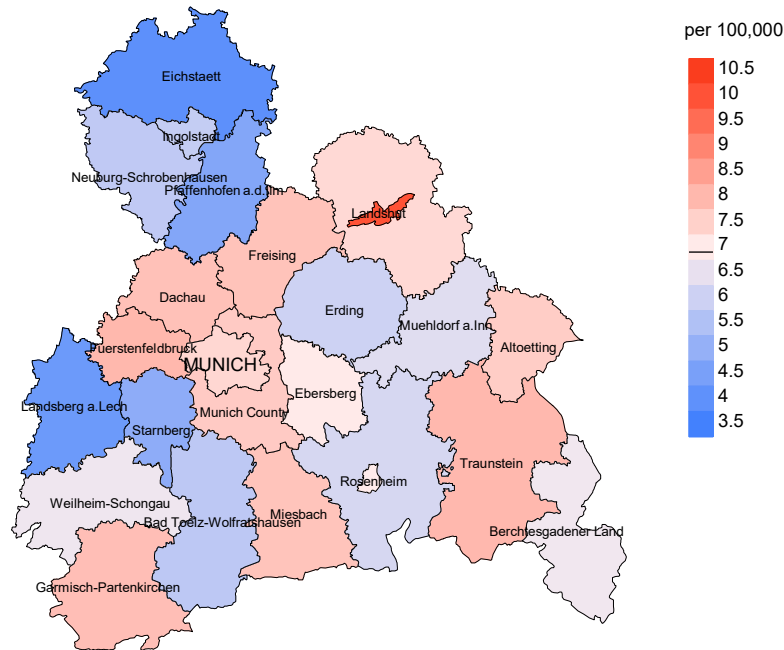
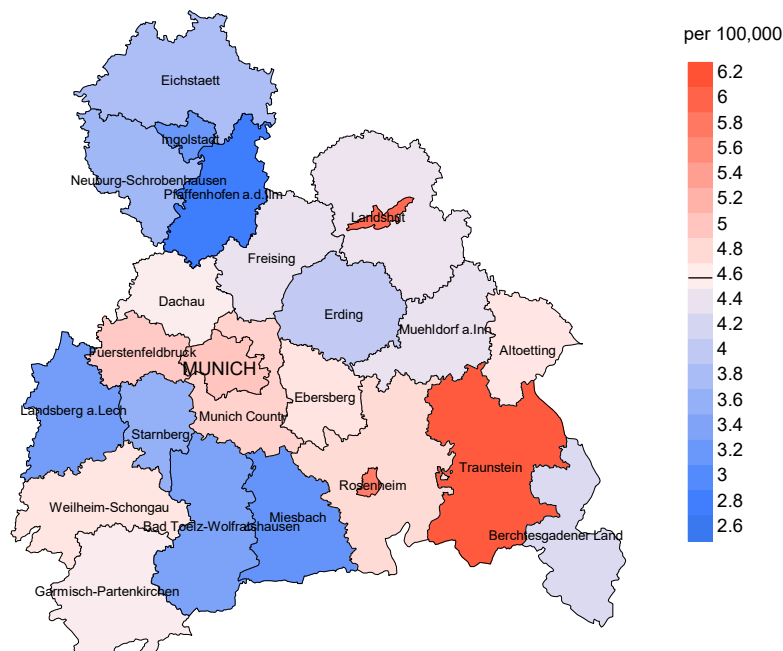Average incidence (Germany 1987 standard population) 2007 - 2020: Females

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 6.9/100,000 WS N=2,451, females 4.6/100,000 WS N=1,984).

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 56 women were identified with newly diagnosed immunoprolif. disease. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 4.7/100,000 (german standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 3.2 and 6.6/100,000.

Standardized incidence ratio (SIR) 2007 - 2020: Males
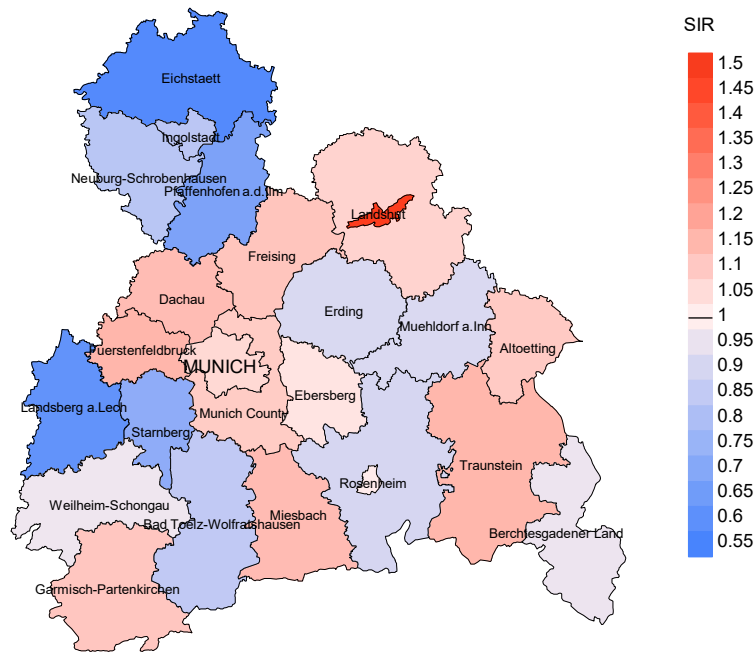
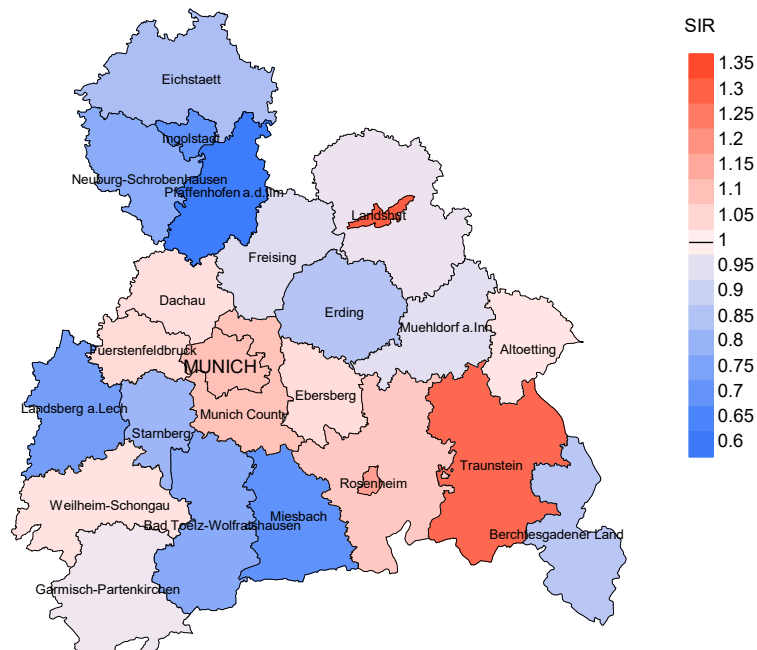### Standardized incidence ratio (SIR) 2007 - 2020: Females

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=2,451, females N=1,984).

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 56 women were identified with newly diagnosed immunoprolif. disease. Therefore, the mean standardized incidence ratio (SIR) for this cancer type in this area can be calculated at 1.04. Though, the value of this parameter may vary with an underlying probability of 99% between 0.71 and 1.45, 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	145	97.2	22.1	127	87.6	92.9
1999	154	98.1	19.5	142	92.2	95.1
2000	156	98.7	30.8	149	95.5	94.0
2001	154	98.1	22.1	135	87.7	96.3
2002	285	98.6	27.7	249	87.4	96.8
2003	292	97.9	20.2	250	85.6	98.0
2004	287	98.3	23.0	243	84.7	96.7
2005	287	97.6	16.0	245	85.4	96.3
2006	310	97.4	15.2	251	81.0	96.4
2007	386	97.2	17.6	318	82.4	96.2
2008	392	99.0	15.3	311	79.3	96.8
2009	340	98.8	13.2	257	75.6	93.8
2010	370	98.4	14.6	270	73.0	96.3
2011	405	96.8	16.0	279	68.9	93.2
2012	354	97.5	13.8	236	66.7	94.9
2013	365	98.1	14.2	243	66.6	90.5
2014	351	97.2	10.8	205	58.4	90.7
2015	367	97.3	14.7	241	65.7	87.1
2016	320	99.1	18.4	185	57.8	94.6
2017	269	100.0	16.4	126	46.8	87.3
2018	219	97.3	12.3	107	48.9	75.7
2019	158	100.0	3.2	50	31.6	80.0
2020	144	99.3		25	17.4	88.0
1998-2020	6510	98.1	16.3	4644	71.3	93.8

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	145	87	93.1	36	24.8
1999	154	103	96.1	45	29.2
2000	156	117	91.5	51	32.7
2001	154	108	94.4	38	24.7
2002	285	163	96.3	91	31.9
2003	292	179	98.3	82	28.1
2004	287	203	98.5	92	32.1
2005	287	158	98.1	68	23.7
2006	310	175	96.6	72	23.2
2007	386	215	99.1	95	24.6
2008	392	245	97.6	87	22.2
2009	340	234	97.4	72	21.2
2010	370	252	99.2	82	22.2
2011	405	274	98.2	88	21.7
2012	354	244	97.5	69	19.5
2013	365	256	98.8	79	21.6
2014	351	283	97.9	77	21.9
2015	367	287	99.0	92	25.1
2016	320	266	98.5	90	28.1
2017	269	279	97.8	61	22.7
2018	219	215	68.4	49	22.4
2019	158	203	39.9	16	10.1
2020	144	199	94.0	12	8.3
1998−2020	6510	4745	93.7	1544	23.7

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 4.94 m as of 2007, respectively)

Year of death	Deaths n	Prop. cancer-related %	Prop. non-cancer-related %	Prop. cancer recorded on death certificate %
1998	87	55.2	44.8	95.1
1999	103	72.8	27.2	97.0
2000	117	66.7	33.3	96.3
2001	108	60.2	39.8	99.0
2002	163	81.0	19.0	96.2
2003	179	79.9	20.1	96.6
2004	203	82.8	17.2	96.5
2005	158	82.3	17.7	94.8
2006	175	81.1	18.9	94.1
2007	215	83.7	16.3	93.4
2008	245	82.9	17.1	90.4
2009	234	81.2	18.8	95.6
2010	252	78.6	21.4	88.4
2011	274	77.7	22.3	89.6
2012	244	82.8	17.2	93.3
2013	256	80.9	19.1	90.5
2014	283	80.9	19.1	90.3
2015	287	77.0	23.0	86.6
2016	266	75.9	24.1	90.8
2017	279	73.5	26.5	86.1
2018	215	61.9	38.1	72.8
2019	203	44.8	55.2	75.3
2020	199	62.3	37.7	71.1
1998-2020	4745	75.4	24.6	90.2

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	38	68.5	64.6	78.5	70.0
1999	54	72.4	71.9	75.0	72.1
2000	66	75.4	72.1	77.0	77.8
2001	52	75.5	73.0	76.6	75.5
2002	81	71.4	71.9	70.1	71.7
2003	94	72.4	71.6	74.3	72.4
2004	106	73.5	73.3	77.2	73.6
2005	79	74.2	74.2	73.7	74.0
2006	91	74.1	73.5	79.7	73.3
2007	109	74.3	74.2	78.7	74.5
2008	139	72.7	70.6	81.0	71.7
2009	124	73.1	73.0	75.5	73.2
2010	130	74.7	74.1	76.7	74.0
2011	151	75.5	75.0	78.1	75.5
2012	134	75.4	75.2	77.4	76.1
2013	156	76.6	75.6	81.2	76.3
2014	154	77.4	76.4	77.9	77.2
2015	154	77.0	76.7	79.9	77.0
2016	144	77.3	77.5	75.9	77.5
2017	157	77.4	76.8	78.5	76.7
2018	127	77.5	77.0	78.3	76.9
2019	111	78.3	76.8	78.7	78.2
2020	118	77.8	76.1	80.5	76.1
1998–2020	2569	75.6	74.7	78.2	75.1

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	49	78.3	70.4	80.6	78.2
1999	49	78.8	76.9	82.5	78.8
2000	51	77.3	77.2	78.8	76.7
2001	56	76.9	74.5	77.5	76.6
2002	82	77.5	74.1	84.2	77.5
2003	85	75.1	73.3	80.3	75.1
2004	97	75.4	74.0	79.2	75.4
2005	79	76.9	75.3	85.0	76.3
2006	84	78.1	77.7	79.3	78.2
2007	106	78.3	77.7	80.2	78.8
2008	106	77.4	74.8	82.2	76.9
2009	110	73.8	72.6	81.5	73.4
2010	122	76.7	75.9	82.2	76.7
2011	123	76.6	74.9	83.5	75.8
2012	110	77.2	76.5	81.2	76.4
2013	100	78.9	79.0	78.9	79.5
2014	129	77.8	76.2	83.4	78.0
2015	133	78.0	77.6	83.4	77.9
2016	122	79.1	78.6	81.0	78.9
2017	122	78.4	77.8	81.5	77.8
2018	88	79.2	77.7	81.0	78.5
2019	92	79.0	78.4	80.1	78.4
2020	81	79.5	77.3	85.5	78.1
1998-2020	2176	77.6	76.5	81.4	77.1

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

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

Table 11a

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

Year of death	Deaths n	Mort. raw	MI-Index raw	Mort. WS	MI-Index WS	Mort. ES	MI-Index ES	Mort. BRD-S	MI-Index BRD-S
1998	25	2.3	0.30	1.4	0.29	2.0	0.29	2.3	0.27
1999	38	3.4	0.48	2.1	0.48	3.2	0.49	4.4	0.50
2000	43	3.8	0.47	2.1	0.46	3.3	0.47	5.0	0.50
2001	35	3.0	0.48	1.6	0.44	2.7	0.47	3.9	0.52
2002	63	3.4	0.42	1.8	0.41	2.9	0.42	3.9	0.45
2003	76	4.1	0.45	2.1	0.41	3.2	0.44	4.5	0.47
2004	87	4.6	0.61	2.4	0.56	3.7	0.59	5.0	0.63
2005	65	3.4	0.44	1.7	0.41	2.7	0.44	3.8	0.46
2006	72	3.8	0.46	1.8	0.42	2.8	0.44	3.9	0.48
2007	95	4.3	0.47	2.0	0.43	3.2	0.46	4.5	0.48
2008	119	5.3	0.54	2.6	0.52	4.0	0.54	5.3	0.56
2009	101	4.5	0.59	2.1	0.55	3.2	0.58	4.3	0.61
2010	98	4.3	0.45	1.8	0.37	2.9	0.40	4.2	0.45
2011	124	5.5	0.59	2.4	0.53	3.8	0.57	5.3	0.62
2012	108	4.8	0.55	2.0	0.48	3.1	0.52	4.4	0.57
2013	121	5.3	0.59	2.1	0.51	3.3	0.54	4.8	0.59
2014	122	5.2	0.65	2.0	0.54	3.3	0.59	4.7	0.65
2015	117	4.9	0.59	1.8	0.49	3.1	0.53	4.4	0.59
2016	107	4.5	0.56	1.8	0.51	2.9	0.53	4.0	0.55
2017	117	4.8	0.80	1.9	0.65	3.0	0.71	4.2	0.79
2018	75	3.1	0.55	1.1	0.46	1.9	0.50	2.6	0.53
2019	48	2.0	0.51	0.8	0.41	1.2	0.44	1.7	0.50
2020	63	2.6	0.81	1.1	0.68	1.7	0.74	2.2	0.79
1998-2020	1919	4.1	0.54	1.8	0.48	2.9	0.51	4.0	0.55

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	23	2.0	0.38	0.9	0.37	1.3	0.37	1.7	0.38
1999	37	3.1	0.49	1.1	0.43	1.8	0.45	2.6	0.48
2000	35	2.9	0.54	1.1	0.46	1.7	0.48	2.4	0.51
2001	30	2.5	0.37	1.0	0.31	1.6	0.34	2.2	0.37
2002	69	3.5	0.51	1.4	0.47	2.1	0.47	2.8	0.49
2003	67	3.4	0.55	1.4	0.48	2.1	0.50	2.7	0.53
2004	81	4.1	0.56	1.6	0.49	2.4	0.52	3.3	0.55
2005	65	3.3	0.47	1.2	0.42	1.9	0.43	2.6	0.45
2006	70	3.5	0.45	1.2	0.36	1.9	0.39	2.7	0.44
2007	85	3.7	0.46	1.2	0.37	2.0	0.41	2.8	0.45
2008	84	3.6	0.49	1.3	0.44	2.1	0.45	2.8	0.46
2009	89	3.8	0.53	1.5	0.48	2.2	0.49	2.9	0.51
2010	100	4.3	0.67	1.4	0.54	2.3	0.58	3.1	0.62
2011	89	3.8	0.46	1.4	0.39	2.2	0.41	2.9	0.44
2012	94	4.0	0.59	1.4	0.52	2.2	0.55	2.9	0.54
2013	86	3.6	0.54	1.1	0.40	1.8	0.43	2.6	0.48
2014	107	4.4	0.65	1.5	0.51	2.4	0.55	3.3	0.61
2015	104	4.3	0.61	1.3	0.49	2.1	0.52	3.0	0.56
2016	95	3.9	0.75	1.1	0.58	1.8	0.64	2.6	0.68
2017	88	3.6	0.72	1.0	0.52	1.7	0.57	2.4	0.64
2018	58	2.3	0.70	0.7	0.56	1.2	0.60	1.7	0.65
2019	44	1.8	0.69	0.5	0.53	0.8	0.57	1.2	0.63
2020	61	2.5	0.94	0.8	0.63	1.3	0.70	1.8	0.84
1998-2020	1661	3.4	0.56	1.2	0.46	1.9	0.49	2.6	0.53

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	0.0	0.0	1	0.1	0.1			0.0
30-34	1	0.0	0.1	1	0.1	0.1			0.0
35-39	4	0.2	0.2	3	0.2	0.4	1	0.1	0.1
40-44	11	0.4	0.7	7	0.5	0.8	4	0.3	0.4
45-49	28	1.1	1.7	19	1.3	2.2	9	0.8	1.2
50-54	75	2.9	4.6	46	3.3	5.4	29	2.4	3.6
55-59	107	4.1	8.7	55	3.9	9.3	52	4.4	8.0
60-64	157	6.0	14.8	96	6.8	16.1	61	5.2	13.2
65-69	323	12.4	27.2	179	12.7	28.8	144	12.2	25.3
70-74	482	18.5	45.7	269	19.0	47.8	213	18.0	43.3
75-79	540	20.8	66.5	306	21.6	69.4	234	19.8	63.1
80-84	461	17.7	84.3	230	16.3	85.7	231	19.5	82.6
85+	409	15.7	100.0	203	14.3	100.0	206	17.4	100.0
All ages	2599	100.0		1415	100.0		1184	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.	MI-index	Females Age-spec. mortal.	MI-index	Males Prop.all cancers %	Females Prop.all cancers %
0- 4								
5- 9								
10-14								
15-19								
20-24								
25-29	1		0.0	0.33			1.1	
30-34	1		0.0	0.09			0.7	
35-39	3	1	0.1	0.15	0.0	0.11	1.1	0.2
40-44	7	4	0.3	0.14	0.2	0.20	1.2	0.5
45-49	19	9	0.7	0.20	0.3	0.13	1.3	0.5
50-54	46	29	1.8	0.37	1.2	0.27	1.7	1.1
55-59	55	52	2.6	0.34	2.4	0.37	1.2	1.4
60-64	96	61	5.4	0.39	3.2	0.33	1.5	1.2
65-69	179	144	11.0	0.51	7.9	0.56	1.9	2.1
70-74	269	213	17.9	0.58	12.4	0.70	2.3	2.4
75-79	306	234	25.3	0.72	15.6	0.65	2.4	2.4
80-84	230	231	31.8	0.80	21.7	0.83	2.2	2.5
85+	203	206	43.5	1.00	19.8	0.89	2.2	1.7
All ages	1415	1184					2.0	1.9
Mortality								
Raw			4.3	0.58	3.5	0.60		
WS			1.8	0.50	1.2	0.48		
ES			2.9	0.54	1.8	0.51		
BRD-S			4.0	0.58	2.6	0.56		
PYLL-70								
per 100,000			12.1		8.2			
ES			10.2		6.6			
AYLL-70			8.5		7.7			

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	2	0.3			1	50.0	1	50.0
C07-C08 Salivary gland	1	0.1					1	100.0
C09-C10 Oropharynx	2	0.3	2	100.0				
C12-C13 Hypopharynx	2	0.3			1	50.0	1	50.0
C15 Oesophagus	11	1.5	4	36.4	2	18.2	5	45.5
C16 Stomach	18	2.5	8	44.4	3	16.7	7	38.9
C17 Small intestine	3	0.4	3	100.0				
C18 Colon	38	5.3	22	57.9	5	13.2	11	28.9
C19-C20 Rectum	28	3.9	16	57.1	2	7.1	10	35.7
C22 Liver	15	2.1	3	20.0	1	6.7	11	73.3
C23-C24 Bile	4	0.6	1	25.0			3	75.0
C25 Pancreas	20	2.8	1	5.0	2	10.0	17	85.0
C30-C31 Sinuses	4	0.6	2	50.0			2	50.0
C32 Larynx	6	0.8	3	50.0			3	50.0
C33-C34 Lung	46	6.4	11	23.9	9	19.6	26	56.5
C38,C45 Mesothelioma	5	0.7			1	20.0	4	80.0
C40-C41 Bone	5	0.7			1	20.0	4	80.0
C43 Malign. melanoma	32	4.5	22	68.8	1	3.1	9	28.1
C44 Skin others	72	10.0	23	31.9	2	2.8	47	65.3
C46,C49 Soft tissue	4	0.6	1	25.0			3	75.0
C50 Breast	1	0.1					1	100.0
C60 Penis	2	0.3			1	50.0	1	50.0
C61 Prostate	187	26.1	128	68.4	12	6.4	47	25.1
C62 Testis	6	0.8	5	83.3	1	16.7		
C64 Kidney	33	4.6	15	45.5	5	15.2	13	39.4
C65 Renal pelvis	2	0.3					2	100.0
C66 Ureter	1	0.1	1	100.0				
C67 Bladder	19	2.6	10	52.6			9	47.4
C69 Eye carcinoma	1	0.1					1	100.0
C69 Eye melanoma	1	0.1					1	100.0
C70-C72 CNS cancer	9	1.3	1	11.1	2	22.2	6	66.7
C73 Thyroid	6	0.8	4	66.7			2	33.3
C76-C79 CUP	9	1.3	1	11.1	1	11.1	7	77.8
C81 Hodgkin lymphoma	3	0.4	1	33.3			2	66.7
C82-C85 NHL	57	7.9	10	17.5	12	21.1	35	61.4
C90 Mult. myeloma	51	7.1			1	2.0	50	98.0
C91-C96 Leukaemia	11	1.5	1	9.1	1	9.1	9	81.8
All further malignancies	717	100.0	299	41.7	67	9.3	351	49.0

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

Table 14b

Further malignancies in deaths in period 1998–2020
FEMALES

Diagnosis	Total n	Total %↓	Pre n	Pre ←%	Syn-chron ±30d n	Syn-chron ±30d ←%	Post n	Post ←%
C03–C06 Oral cavity	4	0.8	2	50.0			2	50.0
C07–C08 Salivary gland	1	0.2	1	100.0				
C09–C10 Oropharynx	1	0.2					1	100.0
C15 Oesophagus	1	0.2					1	100.0
C16 Stomach	15	3.0	4	26.7	3	20.0	8	53.3
C18 Colon	30	6.0	17	56.7	3	10.0	10	33.3
C19–C20 Rectum	21	4.2	15	71.4	1	4.8	5	23.8
C21 Anus/canal	5	1.0	3	60.0			2	40.0
C22 Liver	2	0.4					2	100.0
C23–C24 Bile	1	0.2					1	100.0
C25 Pancreas	15	3.0	1	6.7	4	26.7	10	66.7
C30–C31 Sinuses	1	0.2	1	100.0				
C33–C34 Lung	25	5.0	4	16.0	4	16.0	17	68.0
C38,C45 Mesothelioma	1	0.2					1	100.0
C43 Malign. melanoma	32	6.4	17	53.1			15	46.9
C44 Skin others	29	5.8	15	51.7	2	6.9	12	41.4
C46,C49 Soft tissue	2	0.4					2	100.0
C48 Peritoneal	5	1.0	1	20.0	1	20.0	3	60.0
C50 Breast	127	25.5	98	77.2	7	5.5	22	17.3
C51 Vulva	4	0.8	2	50.0			2	50.0
C53 Cervix uteri	9	1.8	9	100.0				
C54 Corpus uteri	15	3.0	13	86.7			2	13.3
C55,C57 Fem. genitals un	1	0.2	1	100.0				
C56 Ovary	10	2.0	5	50.0	3	30.0	2	20.0
C64 Kidney	12	2.4	9	75.0	2	16.7	1	8.3
C65 Renal pelvis	2	0.4	1	50.0			1	50.0
C66 Ureter	1	0.2	1	100.0				
C67 Bladder	5	1.0	1	20.0	1	20.0	3	60.0
C69 Eye melanoma	1	0.2					1	100.0
C70–C72 CNS cancer	3	0.6	1	33.3			2	66.7
C73 Thyroid	5	1.0	4	80.0			1	20.0
C76–C79 CUP	9	1.8	3	33.3	2	22.2	4	44.4
C81 Hodgkin lymphoma	4	0.8	4	100.0				
C82–C85 NHL	40	8.0	10	25.0	7	17.5	23	57.5
C90 Mult. myeloma	47	9.4			2	4.3	45	95.7
C91–C96 Leukaemia	13	2.6	2	15.4	1	7.7	10	76.9
All further malignancies	499	100.0	245	49.1	43	8.6	211	42.3

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.	MI-index	Females Age-spec. mortal.	MI-index	Males Prop.all cancers %	Females Prop.all cancers %
0- 4								
5- 9								
10-14								
15-19								
20-24								
25-29	1		0.0	0.33			1.2	
30-34	1		0.0	0.09			0.7	
35-39	3	1	0.1	0.18	0.0	0.11	1.2	0.3
40-44	4	4	0.2	0.09	0.2	0.21	0.7	0.5
45-49	16	6	0.6	0.19	0.2	0.09	1.2	0.4
50-54	43	25	1.7	0.39	1.0	0.28	1.8	1.1
55-59	55	45	2.6	0.38	2.1	0.38	1.4	1.4
60-64	85	49	4.8	0.40	2.6	0.33	1.6	1.2
65-69	151	107	9.3	0.54	5.9	0.54	2.1	1.9
70-74	213	168	14.2	0.59	9.8	0.73	2.4	2.5
75-79	228	184	18.8	0.80	12.3	0.68	2.5	2.4
80-84	160	178	22.1	0.98	16.7	0.82	2.1	2.5
85+	130	152	27.8	0.93	14.6	0.85	2.0	1.6
All ages	1090	919					2.0	1.9
Mortality								
Raw			3.3	0.59	2.7	0.59		
WS			1.4	0.50	0.9	0.47		
ES			2.3	0.54	1.4	0.51		
BRD-S			3.1	0.59	2.0	0.55		
PYLL-70								
per 100,000			10.8		6.8			
ES			9.2		5.5			
AYLL-70			8.6		8.1			

* 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.	MI-index	Females Age- spec. mortal.	MI-index	Males Prop.all cancers %	Females Prop.all cancers %
0- 4								
5- 9								
10-14								
15-19								
20-24								
25-29	1		0.0	0.33			1.2	
30-34	1		0.0	0.10			0.7	
35-39	3	1	0.1	0.20	0.0	0.11	1.2	0.3
40-44	4	3	0.2	0.09	0.1	0.16	0.7	0.4
45-49	16	5	0.6	0.21	0.2	0.08	1.3	0.4
50-54	38	22	1.5	0.40	0.9	0.27	1.6	1.0
55-59	44	44	2.1	0.33	2.0	0.40	1.2	1.4
60-64	73	44	4.1	0.41	2.3	0.33	1.4	1.1
65-69	127	94	7.8	0.52	5.2	0.54	1.8	1.7
70-74	181	151	12.1	0.57	8.8	0.74	2.1	2.3
75-79	180	157	14.9	0.72	10.5	0.63	2.1	2.2
80-84	134	161	18.5	0.89	15.1	0.78	1.9	2.3
85+	108	141	23.1	0.81	13.5	0.81	1.8	1.6
All ages	910	823					1.8	1.7
Mortality								
Raw			2.8	0.55	2.5	0.57		
WS			1.2	0.48	0.8	0.46		
ES			1.9	0.51	1.3	0.50		
BRD-S			2.6	0.55	1.8	0.54		
PYLL-70								
per 100,000			9.5		6.1			
ES			8.1		5.0			
AYLL-70			8.9		8.1			

* See corresponding tables with multiple malignancies.

ICD-10 C88,C90: Malignant immunoproliferative and plasmacellular disease
Age distribution and age-specific mortality 2007 - 2020 (Males: 1415, Females: 1184)
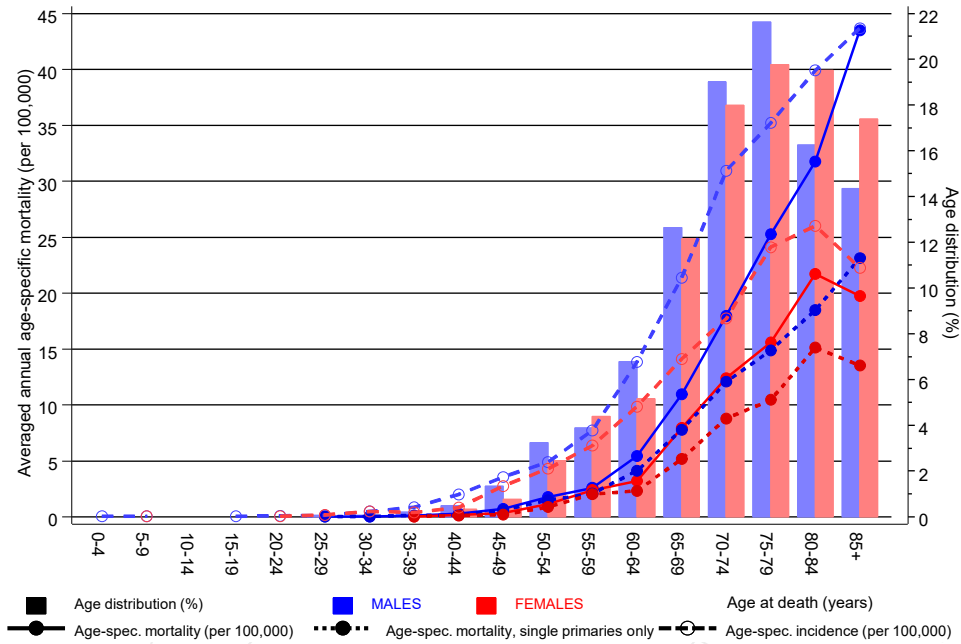
Figure 17. Distribution of age at death (bars; males: mean=70.2 yrs, median=71.3 yrs; females: mean=71.3 yrs, median=72.8 yrs) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

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

Average mortality (Germany 1987 standard population) 2007 - 2020: Males
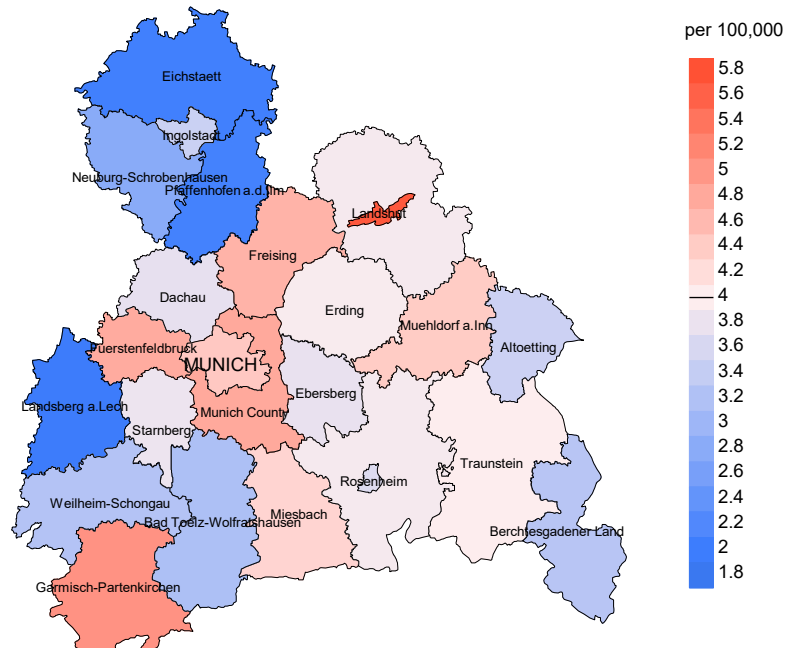
Average mortality (Germany 1987 standard population) 2007 - 2020: Females
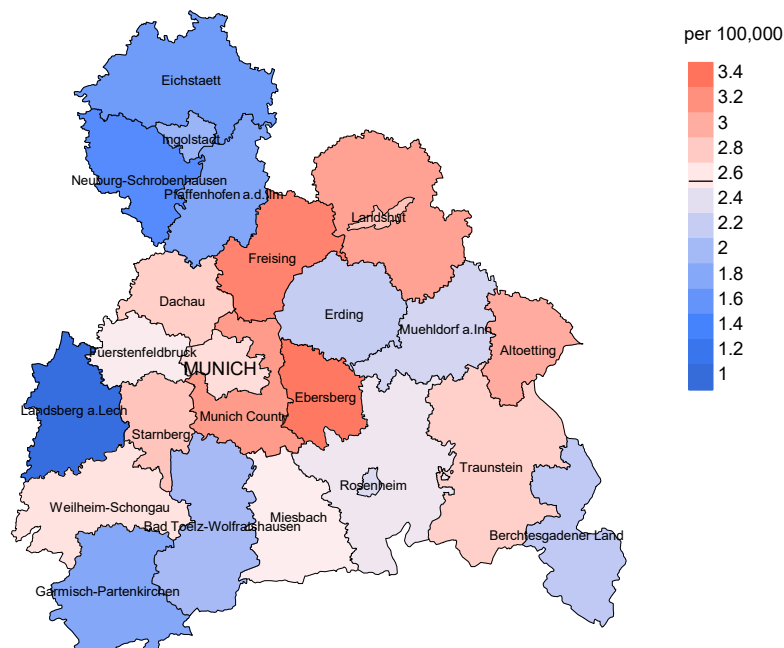
Figure 18a. Map of cancer mortality (german standard population) by county averaged for period 2007 to 2020. According to their individual mortality rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (males 4.0/100,000 WS N=1,415, females 2.6/100,000 WS N=1,184).

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 42 women died from immunoprolif. disease. Therefore, the mean mortality rate for this cancer type in this area can be calculated at 3.4/100,000 (german standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 2.2 and 5.0/100,000.

Standardized mortality ratio (SMR) 2007 - 2020: Males
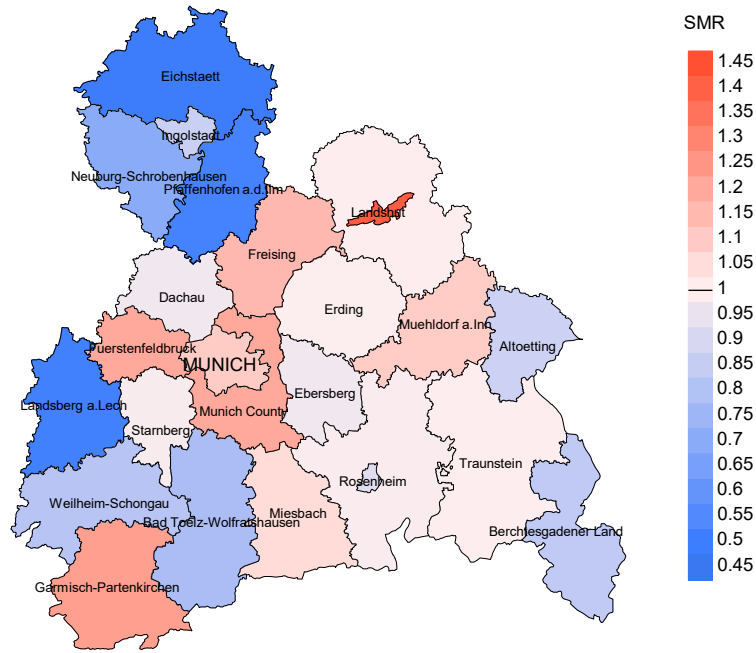
Standardized mortality ratio (SMR) 2007 - 2020: Females
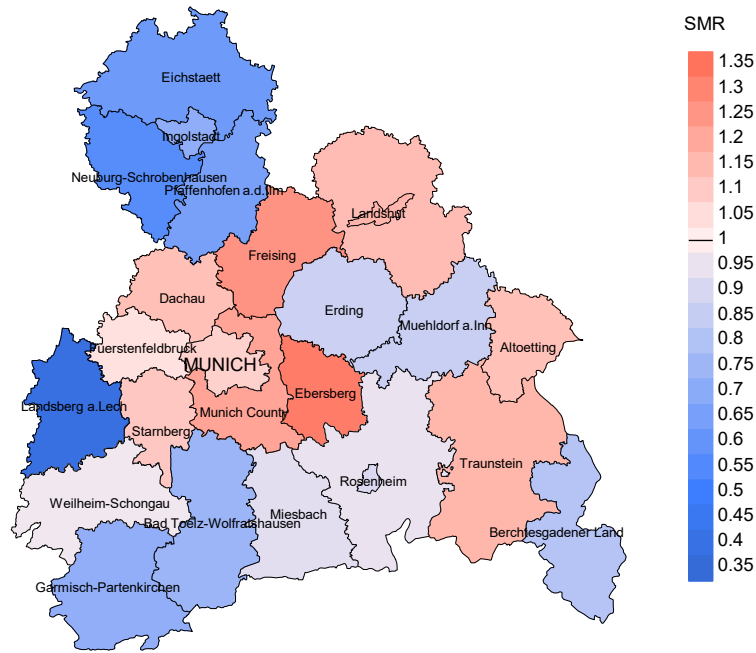
Figure 18b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2007 to 2020. According to their individual SMR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (males N=1,415, females N=1,184).

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 42 women died from immunoprolif. disease. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 1.32. Though, the value of this parameter may vary with an underlying probability of 99% between 0.86 and 1.94, 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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