Munich Cancer Registry

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ICD-10 C90.0: Multiple myeloma

Incidence and Mortality

Year of diagnosis	1998-2020
Patients	2,761
Diseases	2,761
Creation date	12/21/2021
Database export	12/20/2021
Population	4.95 m

Munich Cancer Registry
Cancer Registry Bavaria - Upper Bavaria Regional Center
at Klinikum Grosshadern/IBE
Marchioninistr. 15
Munich, 81377
Germany

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

https://www.tumorregister-muenchen.de/en/facts/base/bC900_E-ICD-10-C90.0-Multiple-myeloma-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.

Some remarks regarding this cancer type

The results for plasmacytomas 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
C90.0	Multiple myeloma

INCIDENCE

Table 1

Cases by year of diagnosis, proportions of further malignancies, deaths, and active follow-up (ALL PATIENTS)

Year of diagnosis	All cases n	Prop. at least 1 further malign. prior + synchron. %	Prop. at least 1 further malign. after %	Prop. deaths %	Prop. actively followed %
1998	13	7.7	9.1	100.0	100.0
1999	39	11.5	9.1	94.9	100.0
2000	21	12.3	9.2	85.7	95.2
2001	23	13.5	9.1	95.7	100.0
2002	45	14.9	9.0	82.2	97.8 #
2003	67	13.9	9.0	86.6	98.5
2004	71	15.1	8.7	87.3	97.2
2005	113	16.6	8.5	88.5	99.1
2006	99	17.3	8.3	87.9	100.0
2007	154	17.1	8.2	85.1	96.8 #
2008	194	16.9	8.1	81.4	99.5
2009	180	17.2	7.7	76.1	99.4
2010	171	17.9	7.5	77.8	98.2
2011	193	18.6	7.1	72.0	98.4
2012	176	19.8	6.7	70.5	97.7
2013	188	20.0	5.9	66.5	98.4
2014	196	20.7	5.3	58.2	97.4
2015	175	20.6	4.6	67.4	97.7
2016	170	20.6	4.0	52.9	99.4
2017	141	20.8	2.8	45.4	100.0
2018	130	21.2	2.5	46.2	98.5
2019	102	21.3	1.5	34.3	100.0
2020	100	21.5	2.0	19.0	99.0 ##
1998-2020	2761	21.5	9.1	68.1	98.6

2,761 cases diagnosed 1998-2020 are related to a total of 2,761 patients. Currently, in 814 (29.5 %) of these 2,761 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 619 / 151 / 44 (22.4 % / 5.5 % / 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 retreived from the respective headings.

How to interpret:
In 2018, a subgroup of 130 cases has been diagnosed, of which 21.2 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 2.5 % of cases, at least one new malignancy has occurred during the follow-up period (all numbers refer to the date of the database export, see cover sheet).

Table 1a

Cases by year of diagnosis, proportions of further malignancies, deaths, and active follow-up (MALES)

Year of diagnosis	Males n	Males %	Prop. at least 1 further malign. prior + synchron. %	Prop. at least 1 further malign. after %	Prop. deaths %	Prop. actively followed %
1998	6	46.2	0.0	10.7	100.0	100.0
1999	22	56.4	10.7	10.7	95.5	100.0
2000	12	57.1	12.5	10.8	83.3	91.7
2001	11	47.8	15.7	10.6	90.9	100.0
2002	23	51.1	17.6	10.5	69.6	95.7 #
2003	43	64.2	17.1	10.5	83.7	97.7
2004	38	53.5	18.7	10.2	84.2	97.4
2005	57	50.4	18.9	10.0	89.5	100.0
2006	46	46.5	19.0	9.7	87.0	100.0
2007	72	46.8	18.8	9.5	81.9	94.4 #
2008	106	54.6	18.1	9.4	80.2	100.0
2009	89	49.4	18.5	8.8	76.4	98.9
2010	110	64.3	19.4	8.6	80.9	99.1
2011	110	57.0	20.3	8.0	71.8	98.2
2012	103	58.5	21.5	7.7	72.8	98.1
2013	107	56.9	21.6	6.8	66.4	99.1
2014	103	52.6	22.1	5.7	57.3	98.1
2015	96	54.9	21.6	5.3	63.5	97.9
2016	113	66.5	21.8	4.2	54.9	99.1
2017	80	56.7	22.3	2.6	43.8	100.0
2018	79	60.8	22.6	2.6	48.1	98.7
2019	60	58.8	22.5	2.6	31.7	100.0
2020	57	57.0	22.7	3.6	17.5	98.2 ##
1998-2020	1543	55.9	22.7	10.7	66.9	98.6

1,543 cases diagnosed 1998-2020 are related to a total of 1,543 patients. Currently, in 496 (32.1 %) of these 1,543 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 367 / 94 / 35 (23.8 % / 6.1 % / 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 79 cases has been diagnosed, of which 22.6 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 2.6 % of cases, at least one new malignancy has occurred during the follow-up period (all numbers refer to the date of the database export, see cover sheet).

Table 1b

Cases by year of diagnosis, proportions of further malignancies, deaths, and active follow-up (FEMALES)

Year of diagnosis	Females n	Females %	Prop. at least 1 further malign. prior + synchron. %	Prop. at least 1 further malign. after %	Prop. deaths %	Prop. actively followed %
1998	7	53.8	14.3	7.2	100.0	100.0
1999	17	43.6	12.5	7.0	94.1	100.0
2000	9	42.9	12.1	7.1	88.9	100.0
2001	12	52.2	11.1	7.2	100.0	100.0
2002	22	48.9	11.9	7.1	95.5	100.0 #
2003	24	35.8	9.9	7.1	91.7	100.0
2004	33	46.5	10.5	6.7	90.9	97.0
2005	56	49.6	13.9	6.5	87.5	98.2
2006	53	53.5	15.5	6.5	88.7	100.0
2007	82	53.2	15.2	6.5	87.8	98.8 #
2008	88	45.4	15.6	6.5	83.0	98.9
2009	91	50.6	15.8	6.1	75.8	100.0
2010	61	35.7	16.2	6.0	72.1	96.7
2011	83	43.0	16.6	6.0	72.3	98.8
2012	73	41.5	17.9	5.4	67.1	97.3
2013	81	43.1	18.1	4.8	66.7	97.5
2014	93	47.4	19.0	4.8	59.1	96.8
2015	79	45.1	19.5	3.6	72.2	97.5
2016	57	33.5	19.1	3.6	49.1	100.0
2017	61	43.3	18.9	3.1	47.5	100.0
2018	51	39.2	19.4	2.2	43.1	98.0
2019	42	41.2	19.8	0.0	38.1	100.0
2020	43	43.0	19.9	0.0	20.9	100.0 ##
1998-2020	1218	44.1	19.9	7.2	69.7	98.6

1,218 cases diagnosed 1998-2020 are related to a total of 1,218 patients. Currently, in 318 (26.1 %) of these 1,218 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 252 / 57 / 9 (20.7 % / 4.7 % / 0.7 %) patients exist having 2 / 3 / 4+ malignancies.

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

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

How to interpret:
In 2018, a subgroup of 51 cases has been diagnosed, of which 19.4 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 2.2 % 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
(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	6	7	0.5	0.6	0.4	0.3	0.5	0.4	0.6	0.5
1999	22	17	2.0	1.4	1.2	0.5	1.8	0.8	2.6	1.1
2000	12	9	1.1	0.7	0.6	0.4	0.9	0.6	1.2	0.7
2001	11	12	0.9	1.0	0.6	0.6	0.8	0.8	1.1	0.9
2002	23	22	1.2	1.1	0.8	0.6	1.1	0.9	1.3	1.0
2003	43	24	2.3	1.2	1.3	0.6	1.9	0.8	2.4	1.0
2004	38	33	2.0	1.7	1.1	0.8	1.6	1.2	2.0	1.4
2005	57	56	3.0	2.8	1.6	1.3	2.4	2.0	2.9	2.5
2006	46	53	2.4	2.6	1.3	1.2	1.9	1.7	2.3	2.2
2007	72	82	3.3	3.6	1.8	1.6	2.6	2.3	3.2	2.9
2008	106	88	4.8	3.8	2.6	1.7	3.7	2.5	4.5	3.2
2009	89	91	4.0	3.9	2.0	1.7	2.9	2.5	3.6	3.2
2010	110	61	4.9	2.6	2.5	1.2	3.6	1.7	4.7	2.1
2011	110	83	4.9	3.6	2.3	1.6	3.4	2.4	4.5	3.0
2012	103	73	4.5	3.1	2.0	1.3	3.1	1.9	4.0	2.5
2013	107	81	4.6	3.4	2.3	1.5	3.3	2.2	4.2	2.8
2014	103	93	4.4	3.9	2.1	1.7	3.2	2.5	4.0	3.1
2015	96	79	4.0	3.2	1.9	1.3	2.8	1.9	3.7	2.6
2016	113	57	4.7	2.3	2.1	1.0	3.2	1.4	4.2	1.9
2017	80	61	3.3	2.5	1.7	1.1	2.4	1.6	3.0	1.9
2018	79	51	3.2	2.1	1.5	0.9	2.3	1.3	2.9	1.6
2019	60	42	2.5	1.7	1.2	0.7	1.7	1.0	2.2	1.3
2020	57	43	2.3	1.7	1.2	0.9	1.7	1.3	2.1	1.4
1998-2020	1543	1218	3.3	2.5	1.7	1.1	2.5	1.6	3.2	2.1

The computation of the incidence measures includes all cancers, irrespective of first or subsequent malignancy.

Table 3

Age distribution parameters by year of diagnosis (ALL PATIENTS)

Year of diagnosis	Cases n	Mean	Std. dev.	Min.	Max.	10%	25%	Median 50%	75%	90%
1998	13	63.8	10.5	49.5	88.6	52.7	57.5	61.5	69.2	73.0
1999	39	72.0	12.1	45.2	92.4	55.3	62.9	73.5	80.1	88.4
2000	21	66.6	13.1	40.6	88.2	48.5	59.3	67.2	75.6	83.1
2001	23	64.4	12.2	36.1	88.2	48.6	57.4	63.3	75.0	77.5
2002	45	63.4	10.1	38.9	79.8	50.2	56.1	63.0	71.0	77.1
2003	67	65.4	11.6	37.0	94.2	51.3	57.4	64.3	75.0	81.4
2004	71	66.8	10.8	37.1	85.3	52.5	60.7	67.9	74.7	79.3
2005	113	68.0	10.4	42.1	85.6	53.0	61.8	67.1	75.9	82.6
2006	99	67.5	11.8	22.7	86.8	48.1	62.4	68.1	76.5	82.4
2007	154	68.6	10.1	40.1	90.4	55.9	62.4	69.1	75.5	81.8
2008	194	68.7	11.0	35.9	94.0	56.1	61.9	68.8	77.5	81.4
2009	180	69.7	11.2	34.7	94.6	55.1	63.5	70.4	77.3	84.0
2010	171	68.5	10.6	40.5	86.4	52.5	62.4	69.5	76.3	80.9
2011	193	68.8	11.6	31.0	90.7	52.3	62.0	70.5	76.8	81.7
2012	176	69.9	11.6	31.5	90.8	51.6	62.9	72.1	77.5	83.4
2013	188	69.1	11.3	38.5	91.3	52.0	62.2	71.1	77.8	81.8
2014	196	69.4	11.3	38.1	92.2	54.2	61.0	70.3	77.6	84.4
2015	175	70.8	10.7	43.9	92.9	55.1	63.2	72.8	79.3	82.6
2016	170	69.4	11.3	35.7	88.7	54.2	61.2	71.4	78.1	81.8
2017	141	69.4	11.7	34.9	96.6	53.7	62.7	70.1	77.8	82.6
2018	130	70.0	11.0	39.1	92.7	53.3	62.5	72.6	77.9	81.8
2019	102	69.6	12.6	30.4	91.8	51.6	61.1	71.5	79.4	83.8
2020	100	67.0	11.4	34.6	89.9	53.6	59.9	66.7	75.1	81.6
1998–2020	2761	68.8	11.3	22.7	96.6	53.1	61.8	70.1	77.2	82.4

Table 3a

Age distribution parameters by year of diagnosis (MALES)

Year of diagnosis	Cases n	Mean	Std. dev.	Min.	Max.	10%	25%	Median 50%	75%	90%
1998	6	62.7	9.1	49.5	69.5	49.5	52.7	67.6	69.2	69.5
1999	22	69.2	11.8	45.2	88.4	48.5	62.9	71.1	77.8	82.9
2000	12	67.1	14.0	46.4	88.2	48.5	59.6	62.8	79.5	87.7
2001	11	64.0	9.7	48.6	77.5	55.1	57.4	61.7	75.4	75.7
2002	23	63.6	9.3	45.8	79.8	52.1	54.8	63.3	71.0	76.6
2003	43	64.3	10.1	41.6	82.0	51.7	56.8	62.5	72.6	78.7
2004	38	66.0	10.9	37.1	83.1	48.4	60.7	66.8	74.7	78.6
2005	57	67.4	9.8	44.0	85.6	53.0	62.4	66.6	74.0	80.9
2006	46	66.1	10.1	41.7	85.1	47.4	62.0	67.9	71.5	77.5
2007	72	67.3	10.7	40.1	87.3	54.9	60.2	67.9	74.7	81.5
2008	106	67.0	11.1	35.9	88.8	52.3	61.4	68.0	74.3	79.4
2009	89	68.6	10.1	34.7	88.4	54.9	64.9	69.8	73.5	82.8
2010	110	68.2	10.6	41.8	85.8	50.9	62.1	69.4	75.9	80.7
2011	110	69.1	12.1	31.0	88.7	51.4	64.4	71.5	76.6	82.3
2012	103	70.0	10.9	42.4	90.8	52.0	64.7	71.8	76.9	82.7
2013	107	69.0	11.1	38.5	87.4	51.1	63.0	70.8	77.0	81.4
2014	103	69.3	11.8	38.1	92.2	54.5	59.4	70.2	78.9	84.4
2015	96	70.5	10.6	43.9	92.1	55.1	63.2	71.5	78.8	84.4
2016	113	69.9	10.8	41.5	88.7	54.5	63.2	71.5	78.1	82.0
2017	80	68.3	11.8	34.9	86.5	52.1	61.8	69.7	77.7	81.7
2018	79	69.2	11.1	39.1	92.7	53.2	61.3	71.9	77.9	80.0
2019	60	67.5	12.9	30.4	88.1	50.3	59.5	70.6	77.7	82.1
2020	57	68.0	11.4	34.6	89.9	54.5	61.6	68.7	76.6	81.3
1998–2020	1543	68.3	11.1	30.4	92.7	52.3	61.6	69.7	76.6	81.6

Table 3b

Age distribution parameters by year of diagnosis (FEMALES)

Year of diagnosis	Cases n	Mean	Std. dev.	Min.	Max.	10%	25%	Median 50%	75%	90%
1998	7	64.8	12.1	52.8	88.6	52.8	57.5	60.8	73.0	88.6
1999	17	75.7	11.9	55.3	92.4	57.8	64.4	78.4	81.4	92.3
2000	9	65.9	12.7	40.6	83.1	40.6	59.3	69.8	72.7	83.1
2001	12	64.8	14.5	36.1	88.2	48.6	55.0	67.0	73.4	79.6
2002	22	63.1	11.1	38.9	78.8	50.2	56.1	61.0	73.9	77.1
2003	24	67.5	13.8	37.0	94.2	48.6	61.8	65.6	78.4	84.6
2004	33	67.7	10.7	38.8	85.3	55.7	61.3	69.2	74.0	81.7
2005	56	68.6	11.1	42.1	85.3	52.8	61.0	70.1	76.6	82.7
2006	53	68.7	13.1	22.7	86.8	51.7	63.7	68.2	78.2	83.3
2007	82	69.8	9.5	44.4	90.4	58.6	64.5	69.9	76.0	82.0
2008	88	70.7	10.6	37.5	94.0	56.9	63.4	70.4	79.2	83.5
2009	91	70.8	12.1	35.0	94.6	55.4	63.1	72.4	80.0	84.8
2010	61	69.2	10.7	40.5	86.4	54.2	62.7	69.9	77.0	82.0
2011	83	68.5	11.0	42.9	90.7	54.0	58.5	69.1	77.0	80.8
2012	73	69.7	12.5	31.5	89.4	51.6	59.8	72.7	78.2	84.3
2013	81	69.3	11.7	41.6	91.3	52.7	62.1	71.3	79.0	82.0
2014	93	69.5	10.7	42.1	89.4	54.2	62.4	70.8	77.2	83.9
2015	79	71.0	10.9	45.3	92.9	55.1	63.1	73.2	79.4	82.6
2016	57	68.6	12.5	35.7	87.8	48.5	60.5	71.3	77.6	81.3
2017	61	70.8	11.4	37.7	96.6	57.6	63.8	70.8	77.8	84.8
2018	51	71.1	10.8	48.8	90.5	54.9	62.9	73.6	78.5	84.1
2019	42	72.5	11.7	45.7	91.8	56.7	65.5	73.9	81.3	85.5
2020	43	65.7	11.3	43.4	88.4	52.3	57.1	63.6	73.3	83.0
1998–2020	1218	69.5	11.4	22.7	96.6	53.8	61.9	70.6	78.1	83.4

Table 4

Age distribution by 5-year age group and sex for period 2007-2020

Age at diagnosis Years	Cases n	%	Cum.%	Males n	%	Cum.%	Females n	%	Cum.%
0-4									
5-9									
10-14									
15-19									
20-24									
25-29									
30-34	8	0.4	0.4	6	0.5	0.5	2	0.2	0.2
35-39	14	0.6	1.0	9	0.7	1.2	5	0.5	0.7
40-44	39	1.7	2.7	29	2.3	3.4	10	1.0	1.7
45-49	87	3.8	6.5	47	3.7	7.1	40	4.1	5.8
50-54	126	5.6	12.1	73	5.7	12.8	53	5.4	11.2
55-59	187	8.2	20.3	98	7.6	20.4	89	9.0	20.2
60-64	262	11.5	31.9	154	12.0	32.4	108	11.0	31.2
65-69	349	15.4	47.2	202	15.7	48.1	147	14.9	46.1
70-74	416	18.3	65.6	252	19.6	67.7	164	16.6	62.7
75-79	407	17.9	83.5	226	17.6	85.3	181	18.4	81.1
80-84	256	11.3	94.8	134	10.4	95.7	122	12.4	93.5
85+	119	5.2	100.0	55	4.3	100.0	64	6.5	100.0
All ages	2270	100.0		1285	100.0		985	100.0	

Table 5

Age-specific incidence 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 Prop.all cancers n=153686 %	Females Prop.all cancers n=155051 %
0- 4						
5- 9						
10-14						
15-19						
20-24						
25-29						
30-34	6	2	0.3	0.1	0.5	0.1
35-39	9	5	0.4	0.2	0.5	0.1
40-44	29	10	1.2	0.4	1.0	0.2
45-49	47	40	1.8	1.5	0.9	0.4
50-54	73	53	2.9	2.1	0.9	0.4
55-59	98	89	4.6	4.1	0.8	0.7
60-64	154	108	8.7	5.7	0.9	0.7
65-69	202	147	12.4	8.1	0.8	0.8
70-74	252	164	16.8	9.5	0.9	0.8
75-79	226	181	18.7	12.1	0.9	0.9
80-84	134	122	18.5	11.5	0.9	0.8
85+	55	64	11.8	6.1	0.5	0.4
All ages	1285	985			0.8	0.6
Incidence						
Raw			3.9	2.9		
WS			1.9	1.3		
ES			2.8	1.9		
BRD-S			3.6	2.4		

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

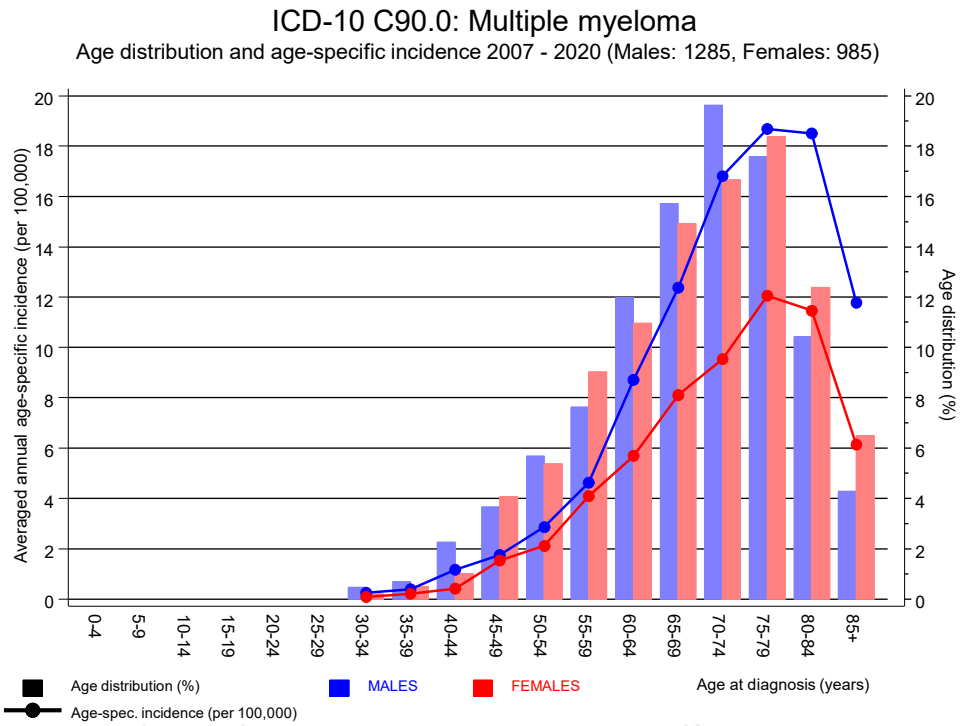


Figure 6. Age distribution (males: mean=68.8 yrs, median=70.4 yrs; females: mean=69.8 yrs, median=71.1 yrs) and age-specific incidence.

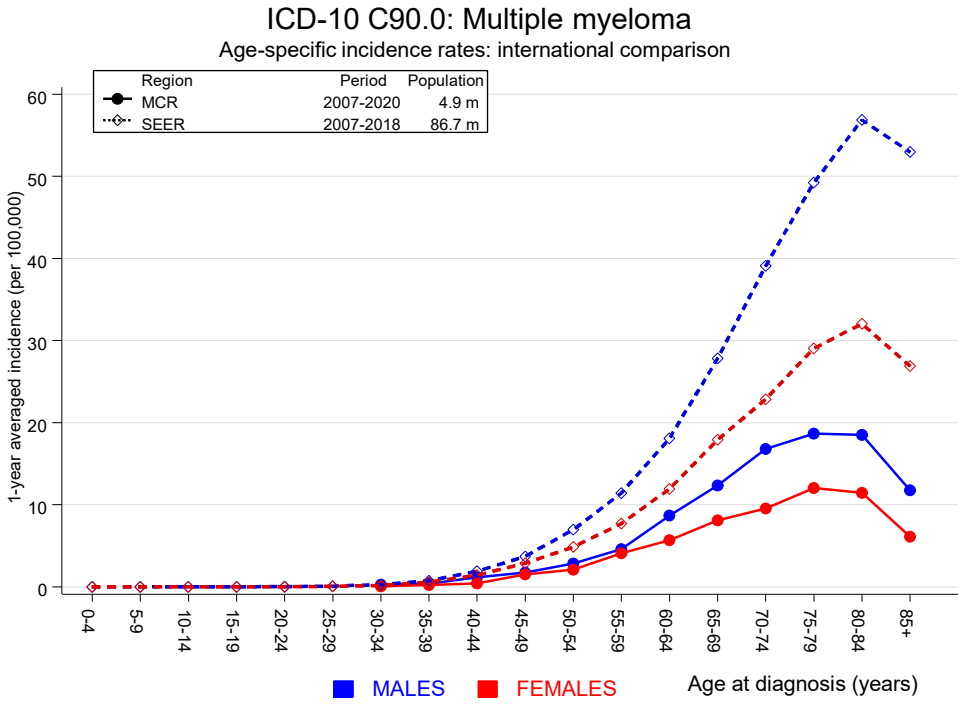


Figure 6a. Age-specific incidence in MCR registry areas compared to SEER (Surveillance, Epidemiology, and End Results, USA).

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 %
C00	Lip	1	0.1	12.9	0.3	72.1		1.9	
C07–C08	Salivary gland	2	0.2	11.1	1.3	40.0	#	3.7	
C15	Oesophagus	1	1.7	0.6	0.0	3.4		−1.3	
C16	Stomach	6	2.8	2.1	0.8	4.6		6.3	
C17	Small intestine	1	0.5	2.0	0.1	11.2		1.0	
C18	Colon	11	7.2	1.5	0.8	2.7		7.7	
C19–C20	Rectum	6	4.1	1.5	0.5	3.2		3.9	
C22	Liver	3	2.4	1.3	0.3	3.7		1.3	
C23–C24	Bile	3	0.8	3.6	0.7	10.4		4.3	33.3
C25	Pancreas	5	3.1	1.6	0.5	3.7		3.8	
C32	Larynx	1	0.8	1.3	0.0	7.3		0.5	
C33–C34	Lung	19	9.2	2.1	1.2	3.2	#	19.7	
C37	Thymus	2	0.0	41.1	5.0	148.4	#	3.9	
C38,C45	Mesothelioma	1	0.6	1.8	0.0	10.0		0.9	
C40–C41	Bone	1	0.1	15.2	0.4	84.6		1.9	
C43	Malign. melanoma	10	3.7	2.7	1.3	4.9	#	12.6	
C46,C49	Soft tissue	2	0.4	4.6	0.6	16.6		3.1	
C61	Prostate	36	21.7	1.7	1.2	2.3	#	28.9	2.8
C64	Kidney	7	2.7	2.6	1.0	5.4	#	8.7	
C65	Renal pelvis	1	0.4	2.8	0.1	15.6		1.3	
C67	Bladder	5	3.5	1.4	0.5	3.3		3.0	20.0
C70–C72	CNS cancer	3	1.0	3.1	0.6	9.0		4.1	33.3
C73	Thyroid	2	0.5	3.9	0.5	14.1		3.0	
C76–C79	CUP	2	1.3	1.6	0.2	5.7		1.5	
C81	Hodgkin lymphoma	2	0.2	10.8	1.3	39.0	#	3.6	
C82–C85	NHL	18	3.2	5.6	3.3	8.8	#	29.7	
C91–C96	Leukaemia	6	1.2	5.2	1.9	11.4	#	9.8	
Not observed		0	4.8	0.0	0.0	0.8	#	−9.6	
All further malignancies		157	77.9	2.0	1.7	2.4	#	159.0	2.5

Patients	1504
Median age at next malignancy (years)	72.8
Person-years	4973
Mean observation time (years)	3.3
Median observation time (years)	2.2

The occurrence of further specified malignancy is statistically significant.

Table 7b

Standardized incidence ratio (SIR, with 95% confidence limits), excess absolute risk (EAR) and DCO rate of further malignancies for period 1998–2020
FEMALES

Diagnosis		Observed n	Expected n	SIR	CI 95%	CI 95%		EAR	DCO %
C15	Oesophagus	1	0.3	3.1	0.1	17.2		1.7	
C16	Stomach	3	1.4	2.2	0.5	6.4		4.0	
C18	Colon	9	4.1	2.2	1.0	4.2	#	12.1	
C19–C20	Rectum	2	1.7	1.2	0.1	4.3		0.8	
C21	Anus/canal	1	0.3	3.8	0.1	21.4		1.8	
C22	Liver	1	0.6	1.7	0.0	9.7		1.0	
C25	Pancreas	2	2.1	1.0	0.1	3.5		−0.2	50.0
C33–C34	Lung	6	3.7	1.6	0.6	3.5		5.6	
C38,C45	Mesothelioma	1	0.1	11.6	0.3	64.7		2.2	
C43	Malign. melanoma	7	1.8	3.9	1.6	8.1	#	12.8	14.3
C46,C49	Soft tissue	1	0.3	3.9	0.1	22.0		1.8	
C48	Peritoneal	3	0.2	14.1	2.9	41.1	#	6.8	
C50	Breast	21	14.2	1.5	0.9	2.3		16.6	14.3
C51	Vulva	2	0.5	4.2	0.5	15.0		3.7	
C54	Corpus uteri	2	2.6	0.8	0.1	2.8		−1.5	
C56	Ovary	2	1.8	1.1	0.1	4.0		0.5	
C64	Kidney	1	1.0	1.0	0.0	5.3		−0.1	
C65	Renal pelvis	1	0.1	6.8	0.2	37.9		2.1	
C70–C72	CNS cancer	1	0.6	1.8	0.0	9.8		1.1	100.0
C81	Hodgkin lymphoma	1	0.1	12.9	0.3	71.8		2.3	
C82–C85	NHL	8	1.7	4.6	2.0	9.1	#	15.4	
C91–C96	Leukaemia	6	0.6	9.3	3.4	20.2	#	13.1	16.7
Not observed		0	5.6	0.0	0.0	0.7	#	−13.8	
All further malignancies		82	45.4	1.8	1.4	2.2	#	89.8	8.5

Patients	1188
Median age at next malignancy (years)	73.9
Person-years	4081
Mean observation time (years)	3.4
Median observation time (years)	2.3

The occurrence of further specified malignancy is statistically significant.

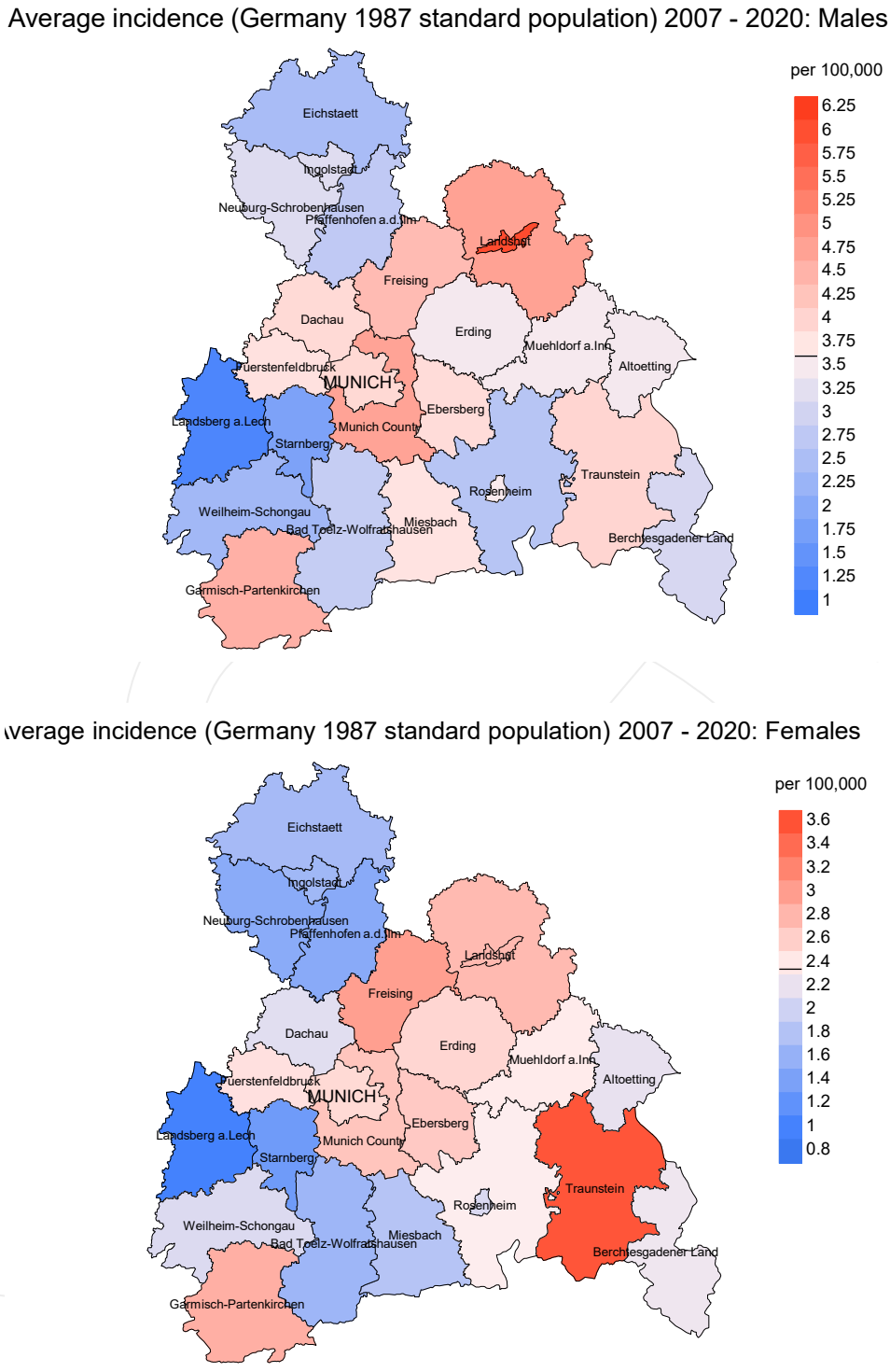
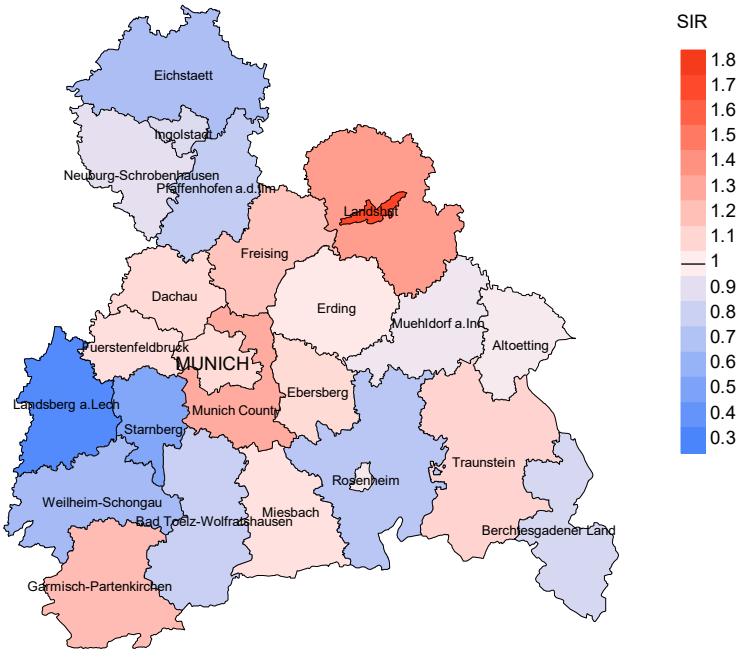


Figure 8a. Map of cancer incidence (german standard population) by county averaged for period 2007 to 2020. According to their individual incidence rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (males 3.6/100,000 WS N=1,285, females 2.4/100,000 WS N=985).

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 30 women were identified with newly diagnosed multiple myeloma. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 2.6/100,000 (german standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 1.6 and 4.2/100,000.

Standardized incidence ratio (SIR) 2007 - 2020: Males



Standardized incidence ratio (SIR) 2007 - 2020: Females

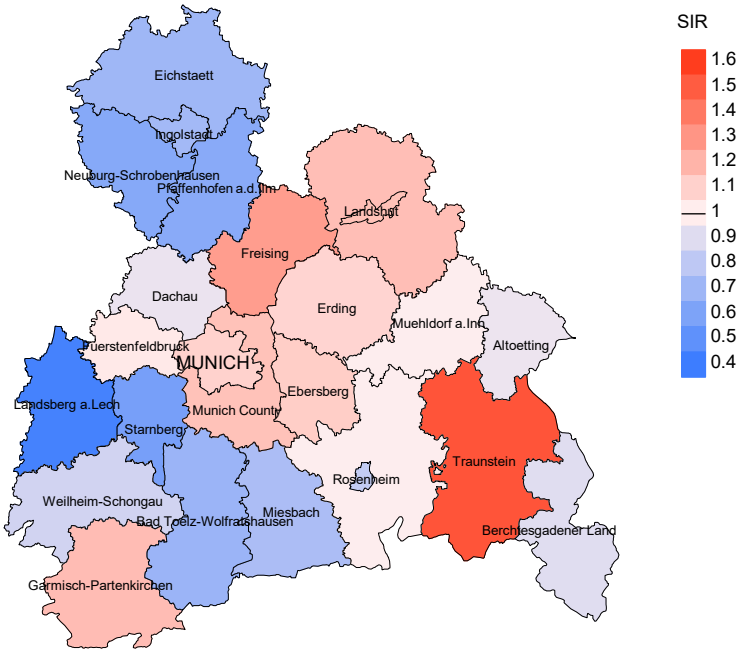


Figure 8b. Map of standardized incidence ratio (SIR) by county averaged for period 2007 to 2020. According to their individual SIR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (males N=1,285, females N=985).

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 30 women were identified with newly diagnosed multiple myeloma. Therefore, the mean standardized incidence ratio (SIR) for this cancer type in this area can be calculated at 1.11. Though, the value of this parameter may vary with an underlying probability of 99% between 0.66 and 1.75, and is therefore not statistically striking.

MORTALITY

Table 9a

Annual cohorts: Incident cancers, follow-up status,
and deaths among the annual cohorts

(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 %	Deaths n	Prop. deaths %	Prop. deaths with death certific. %
1998	13	100.0	13	100.0	92.3
1999	39	100.0	37	94.9	100.0
2000	21	95.2	18	85.7	94.4
2001	23	100.0	22	95.7	100.0
2002	45	97.8	37	82.2	94.6
2003	67	98.5	58	86.6	96.6
2004	71	97.2	62	87.3	98.4
2005	113	99.1	100	88.5	95.0
2006	99	100.0	87	87.9	95.4
2007	154	96.8	131	85.1	95.4
2008	194	99.5	158	81.4	94.9
2009	180	99.4	137	76.1	92.0
2010	171	98.2	133	77.8	96.2
2011	193	98.4	139	72.0	91.4
2012	176	97.7	124	70.5	93.5
2013	188	98.4	125	66.5	86.4
2014	196	97.4	114	58.2	90.4
2015	175	97.7	118	67.4	82.2
2016	170	99.4	90	52.9	93.3
2017	141	100.0	64	45.4	81.3
2018	130	98.5	60	46.2	68.3
2019	102	100.0	35	34.3	82.9
2020	100	99.0	19	19.0	84.2
1998–2020	2761	98.6	1881	68.1	91.4

Table 9b

Annual cohorts of incident cancers and deaths,
and cases deceased within the same year of being diagnosed with cancer

(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	Deaths in same year n	Prop. deaths in same year %
1998	13			
1999	39	32	25	64.1
2000	21	9	6	28.6
2001	23	7	3	13.0
2002	45	13	5	11.1
2003	67	16	4	6.0
2004	71	23	8	11.3
2005	113	33	8	7.1
2006	99	46	12	12.1
2007	154	66	10	6.5
2008	194	78	15	7.7
2009	180	109	23	12.8
2010	171	118	17	9.9
2011	193	125	20	10.4
2012	176	124	18	10.2
2013	188	143	16	8.5
2014	196	171	32	16.3
2015	175	144	20	11.4
2016	170	147	24	14.1
2017	141	153	17	12.1
2018	130	127	17	13.1
2019	102	128	9	8.8
2020	100	107	10	10.0
1998–2020	2761	1919	319	11.6

Table 9c

Annual cohorts of deaths, and proportion of cancer-related and non-cancer-related deaths

(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 %
1999	32	62.5	37.5	100.0
2000	9	11.1	88.9	88.9
2001	7	85.7	14.3	100.0
2002	13	76.9	23.1	100.0
2003	16	93.8	6.3	93.8
2004	23	73.9	26.1	91.3
2005	33	87.9	12.1	93.5
2006	46	84.8	15.2	97.8
2007	66	89.4	10.6	95.4
2008	78	85.9	14.1	89.3
2009	109	87.2	12.8	97.1
2010	118	83.1	16.9	91.5
2011	125	84.8	15.2	95.0
2012	124	83.9	16.1	92.4
2013	143	82.5	17.5	93.0
2014	171	84.8	15.2	90.4
2015	144	82.6	17.4	90.1
2016	147	81.0	19.0	93.1
2017	153	79.7	20.3	88.6
2018	127	63.8	36.2	75.3
2019	128	50.0	50.0	81.5
2020	107	72.0	28.0	79.2
1999-2020	1919	78.7	21.3	90.7

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
1999	17	74.0	71.9	76.8	74.0
2000	5	79.3	61.4	83.5	79.3
2001	4	75.2	71.9	78.4	75.2
2002	9	71.0	73.2	65.1	70.7
2003	8	74.9	72.9	82.1	76.8
2004	15	74.3	73.5	76.7	73.9
2005	12	69.6	68.8	72.9	68.8
2006	20	70.2	69.5	82.7	70.0
2007	34	74.0	73.4	78.7	74.4
2008	43	69.5	69.4	81.9	69.5
2009	57	71.9	72.0	65.8	72.0
2010	61	74.1	74.2	72.0	73.9
2011	75	74.9	75.5	67.9	75.2
2012	58	72.9	73.4	72.5	74.4
2013	94	75.2	74.9	77.9	74.9
2014	93	76.1	76.1	77.6	76.0
2015	82	76.2	75.8	77.3	75.9
2016	80	77.7	77.8	75.9	77.7
2017	95	76.5	76.2	77.7	75.6
2018	70	73.8	74.5	73.5	73.1
2019	67	78.0	74.9	78.8	76.6
2020	66	76.7	74.0	79.1	75.9
1999–2020	1065	74.9	74.5	76.8	74.6

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
1999	15	78.4	75.7	79.6	78.4
2000	4	86.5		86.5	83.1
2001	3	70.9	70.9		70.9
2002	4	70.8	71.2	69.0	70.8
2003	8	72.0	72.0		72.0
2004	8	74.6	73.1	85.8	73.5
2005	21	75.3	75.2	82.7	73.5
2006	26	78.1	78.1	66.7	78.2
2007	32	76.3	76.4	69.4	76.4
2008	35	77.4	76.9	81.0	77.1
2009	52	73.6	71.8	81.1	72.1
2010	57	76.9	76.3	81.8	76.9
2011	50	73.6	72.7	80.5	73.8
2012	66	77.5	74.6	81.2	74.8
2013	49	78.5	78.8	74.9	78.4
2014	78	77.3	75.4	83.2	77.0
2015	62	75.2	75.0	79.3	75.2
2016	67	77.1	76.9	77.8	76.9
2017	58	77.3	77.1	78.3	76.2
2018	57	77.1	76.9	80.5	78.5
2019	61	76.3	78.2	74.8	78.9
2020	41	78.0	77.0	80.8	76.3
1999–2020	854	76.8	75.9	80.0	76.3

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
1999	10	0.9	0.45	0.5	0.46	0.8	0.47	1.3	0.49
2000	1	0.1	0.08	0.1	0.08	0.1	0.07	0.1	0.06
2001	3	0.3	0.27	0.1	0.26	0.2	0.28	0.3	0.32
2002	7	0.4	0.30	0.2	0.28	0.3	0.30	0.4	0.35
2003	7	0.4	0.16	0.2	0.14	0.3	0.15	0.4	0.17
2004	11	0.6	0.29	0.3	0.26	0.5	0.28	0.7	0.33
2005	11	0.6	0.19	0.3	0.19	0.5	0.20	0.6	0.21
2006	15	0.8	0.33	0.4	0.30	0.6	0.31	0.8	0.33
2007	32	1.4	0.44	0.7	0.40	1.1	0.44	1.5	0.47
2008	40	1.8	0.38	0.9	0.34	1.3	0.36	1.7	0.38
2009	49	2.2	0.55	1.0	0.52	1.6	0.55	2.1	0.59
2010	50	2.2	0.45	0.9	0.38	1.5	0.41	2.1	0.46
2011	64	2.9	0.58	1.2	0.50	1.9	0.55	2.8	0.61
2012	48	2.1	0.47	0.9	0.46	1.4	0.46	1.9	0.48
2013	74	3.2	0.69	1.3	0.56	2.1	0.62	2.9	0.68
2014	76	3.3	0.74	1.3	0.59	2.1	0.64	2.9	0.73
2015	67	2.8	0.70	1.1	0.57	1.8	0.63	2.5	0.68
2016	63	2.6	0.56	1.1	0.49	1.7	0.52	2.3	0.56
2017	78	3.2	0.98	1.3	0.78	2.0	0.85	2.9	0.95
2018	40	1.6	0.51	0.7	0.48	1.1	0.49	1.4	0.49
2019	30	1.2	0.50	0.5	0.43	0.8	0.45	1.1	0.50
2020	42	1.7	0.74	0.7	0.61	1.1	0.66	1.5	0.72
1999-2020	818	1.8	0.54	0.8	0.47	1.3	0.51	1.8	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
1999	10	0.8	0.59	0.3	0.58	0.5	0.59	0.6	0.57
2000									
2001	3	0.2	0.25	0.1	0.18	0.2	0.20	0.2	0.20
2002	3	0.2	0.14	0.1	0.12	0.1	0.12	0.1	0.14
2003	8	0.4	0.33	0.2	0.31	0.3	0.33	0.4	0.36
2004	6	0.3	0.18	0.1	0.16	0.2	0.17	0.3	0.19
2005	18	0.9	0.32	0.3	0.24	0.5	0.26	0.7	0.29
2006	24	1.2	0.45	0.4	0.33	0.7	0.38	0.9	0.43
2007	27	1.2	0.33	0.4	0.27	0.7	0.30	1.0	0.34
2008	27	1.2	0.31	0.4	0.24	0.6	0.26	1.0	0.30
2009	46	2.0	0.51	0.8	0.45	1.2	0.47	1.5	0.49
2010	48	2.1	0.79	0.7	0.57	1.1	0.62	1.5	0.71
2011	42	1.8	0.51	0.7	0.43	1.0	0.43	1.4	0.47
2012	56	2.4	0.77	0.9	0.66	1.3	0.69	1.7	0.68
2013	44	1.8	0.54	0.5	0.36	0.9	0.40	1.3	0.48
2014	69	2.9	0.74	1.0	0.58	1.5	0.62	2.1	0.69
2015	52	2.1	0.66	0.7	0.55	1.1	0.58	1.5	0.60
2016	56	2.3	0.98	0.7	0.73	1.2	0.80	1.7	0.89
2017	44	1.8	0.72	0.6	0.56	0.9	0.60	1.3	0.66
2018	41	1.7	0.80	0.5	0.61	0.8	0.66	1.2	0.75
2019	34	1.4	0.81	0.4	0.66	0.7	0.70	1.0	0.76
2020	35	1.4	0.81	0.5	0.52	0.7	0.58	1.0	0.71
1999-2020	693	1.5	0.58	0.5	0.45	0.8	0.49	1.1	0.54

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									
30-34	1	0.1	0.1	1	0.1	0.1			0.0
35-39	3	0.2	0.3	3	0.4	0.5			0.0
40-44	6	0.4	0.7	4	0.5	1.1	2	0.3	0.3
45-49	19	1.4	2.1	12	1.6	2.7	7	1.1	1.4
50-54	38	2.8	4.9	26	3.5	6.1	12	1.9	3.4
55-59	62	4.5	9.4	29	3.9	10.0	33	5.3	8.7
60-64	85	6.2	15.6	52	6.9	16.9	33	5.3	14.0
65-69	177	12.9	28.5	104	13.8	30.7	73	11.8	25.8
70-74	277	20.2	48.6	151	20.1	50.7	126	20.3	46.1
75-79	291	21.2	69.8	163	21.6	72.4	128	20.6	66.7
80-84	245	17.8	87.6	123	16.3	88.7	122	19.6	86.3
85+	170	12.4	100.0	85	11.3	100.0	85	13.7	100.0
All ages	1374	100.0		753	100.0		621	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								
30-34	1		0.0	0.17			0.7	
35-39	3		0.1	0.33			1.1	
40-44	4	2	0.2	0.14	0.1	0.20	0.7	0.2
45-49	12	7	0.4	0.26	0.3	0.18	0.8	0.4
50-54	26	12	1.0	0.36	0.5	0.23	1.0	0.5
55-59	29	33	1.4	0.30	1.5	0.37	0.7	0.9
60-64	52	33	2.9	0.34	1.7	0.31	0.8	0.7
65-69	104	73	6.4	0.51	4.0	0.50	1.1	1.0
70-74	151	126	10.1	0.60	7.3	0.77	1.3	1.4
75-79	163	128	13.5	0.72	8.5	0.71	1.3	1.3
80-84	123	122	17.0	0.92	11.5	1.00	1.2	1.3
85+	85	85	18.2	1.55	8.2	1.33	0.9	0.7
All ages	753	621					1.1	1.0
Mortality								
Raw			2.3	0.59	1.8	0.63		
WS			1.0	0.50	0.6	0.49		
ES			1.5	0.54	1.0	0.53		
BRD-S			2.1	0.59	1.4	0.58		
PYLL-70								
per 100,000			6.9		4.5			
ES			5.8		3.6			
AYLL-70			8.6		7.9			

Table 14a

Further malignancies in deaths in period 1999–2020
MALES

Diagnosis		Total n	Total %↓	Pre n	Pre ←%	Syn-chron ±30d n	Syn-chron ±30d ←%	Post n	Post ←%
C07–C08	Salivary gland	1	0.3					1	100.0
C09–C10	Oropharynx	2	0.6	2	100.0				
C15	Oesophagus	1	0.3			1	100.0		
C16	Stomach	9	2.9	5	55.6			4	44.4
C17	Small intestine	1	0.3	1	100.0				
C18	Colon	16	5.1	11	68.8			5	31.3
C19–C20	Rectum	11	3.5	5	45.5	1	9.1	5	45.5
C22	Liver	3	1.0	1	33.3			2	66.7
C23–C24	Bile	4	1.3	1	25.0			3	75.0
C25	Pancreas	5	1.6	1	20.0			4	80.0
C30–C31	Sinuses	2	0.6	2	100.0				
C32	Larynx	2	0.6	1	50.0			1	50.0
C33–C34	Lung	20	6.4	7	35.0	3	15.0	10	50.0
C38,C45	Mesothelioma	1	0.3					1	100.0
C40–C41	Bone	1	0.3					1	100.0
C43	Malign. melanoma	13	4.2	9	69.2	1	7.7	3	23.1
C44	Skin others	34	10.9	12	35.3	2	5.9	20	58.8
C46,C49	Soft tissue	1	0.3					1	100.0
C60	Penis	1	0.3			1	100.0		
C61	Prostate	87	27.9	64	73.6	4	4.6	19	21.8
C62	Testis	2	0.6	2	100.0				
C64	Kidney	12	3.8	7	58.3			5	41.7
C65	Renal pelvis	1	0.3					1	100.0
C66	Ureter	1	0.3	1	100.0				
C67	Bladder	9	2.9	6	66.7			3	33.3
C69	Eye melanoma	1	0.3					1	100.0
C70–C72	CNS cancer	2	0.6					2	100.0
C73	Thyroid	1	0.3					1	100.0
C76–C79	CUP	3	1.0	1	33.3			2	66.7
C81	Hodgkin lymphoma	2	0.6	1	50.0			1	50.0
C82–C85	NHL	17	5.4	5	29.4	1	5.9	11	64.7
C90	Mult. myeloma	43	13.8					43	100.0
C91–C96	Leukaemia	3	1.0					3	100.0
All further malignancies		312	100.0	145	46.5	14	4.5	153	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 1999–2020
FEMALES

Diagnosis		Total n	Total %↓	Pre n	Pre ←%	Syn-chron ±30d n	Syn-chron ±30d ←%	Post n	Post ←%
C15	Oesophagus	1	0.5					1	100.0
C16	Stomach	7	3.4	3	42.9	2	28.6	2	28.6
C18	Colon	7	3.4	4	57.1	1	14.3	2	28.6
C19–C20	Rectum	5	2.4	3	60.0	1	20.0	1	20.0
C21	Anus/canal	2	1.0	1	50.0			1	50.0
C25	Pancreas	5	2.4	1	20.0	2	40.0	2	40.0
C30–C31	Sinuses	1	0.5	1	100.0				
C33–C34	Lung	5	2.4	1	20.0	2	40.0	2	40.0
C38,C45	Mesothelioma	1	0.5					1	100.0
C43	Malign. melanoma	17	8.3	10	58.8			7	41.2
C44	Skin others	11	5.4	4	36.4			7	63.6
C46,C49	Soft tissue	1	0.5					1	100.0
C48	Peritoneal	2	1.0			1	50.0	1	50.0
C50	Breast	51	24.9	38	74.5	3	5.9	10	19.6
C51	Vulva	1	0.5					1	100.0
C53	Cervix uteri	5	2.4	5	100.0				
C54	Corpus uteri	6	2.9	5	83.3			1	16.7
C56	Ovary	5	2.4	3	60.0	2	40.0		
C64	Kidney	4	2.0	3	75.0			1	25.0
C65	Renal pelvis	2	1.0	1	50.0			1	50.0
C67	Bladder	1	0.5	1	100.0				
C70–C72	CNS cancer	1	0.5					1	100.0
C73	Thyroid	2	1.0	2	100.0				
C76–C79	CUP	4	2.0	3	75.0	1	25.0		
C82–C85	NHL	11	5.4	4	36.4	4	36.4	3	27.3
C90	Mult. myeloma	43	21.0			2	4.7	41	95.3
C91–C96	Leukaemia	4	2.0					4	100.0
All further malignancies		205	100.0	93	45.4	21	10.2	91	44.4

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								
30-34	1		0.0	0.17			0.7	
35-39	3		0.1	0.43			1.2	
40-44	2	2	0.1	0.07	0.1	0.20	0.4	0.3
45-49	9	5	0.3	0.20	0.2	0.14	0.7	0.3
50-54	24	9	0.9	0.36	0.4	0.20	1.0	0.4
55-59	29	30	1.4	0.34	1.4	0.38	0.8	0.9
60-64	48	30	2.7	0.36	1.6	0.36	0.9	0.7
65-69	88	51	5.4	0.54	2.8	0.46	1.2	0.9
70-74	118	97	7.9	0.60	5.6	0.82	1.3	1.4
75-79	122	101	10.1	0.85	6.7	0.73	1.3	1.3
80-84	81	97	11.2	1.17	9.1	1.03	1.1	1.3
85+	49	63	10.5	1.63	6.0	1.40	0.8	0.7
All ages	574	485					1.1	1.0
Mortality								
Raw			1.8	0.59	1.4	0.63		
WS			0.8	0.50	0.5	0.48		
ES			1.2	0.54	0.8	0.52		
BRD-S			1.6	0.60	1.1	0.58		
PYLL-70								
per 100,000			6.1		3.7			
ES			5.2		3.0			
AYLL-70			8.6		8.3			

* 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								
30-34	1		0.0	0.17			0.7	
35-39	3		0.1	0.60			1.2	
40-44	2	2	0.1	0.07	0.1	0.20	0.4	0.3
45-49	9	5	0.3	0.23	0.2	0.14	0.7	0.4
50-54	23	8	0.9	0.38	0.3	0.18	1.0	0.4
55-59	29	30	1.4	0.36	1.4	0.41	0.8	1.0
60-64	43	27	2.4	0.36	1.4	0.33	0.8	0.7
65-69	77	48	4.7	0.53	2.6	0.46	1.1	0.9
70-74	100	90	6.7	0.56	5.2	0.86	1.1	1.4
75-79	104	95	8.6	0.85	6.3	0.73	1.2	1.3
80-84	70	90	9.7	1.09	8.5	1.01	1.0	1.3
85+	44	58	9.4	1.52	5.6	1.32	0.7	0.6
All ages	505	453					1.0	1.0
Mortality								
Raw			1.6	0.58	1.3	0.63		
WS			0.7	0.49	0.5	0.48		
ES			1.1	0.53	0.7	0.52		
BRD-S			1.4	0.58	1.0	0.58		
PYLL-70								
per 100,000			5.8		3.6			
ES			5.0		2.9			
AYLL-70			8.9		8.4			

* See corresponding tables with multiple malignancies.

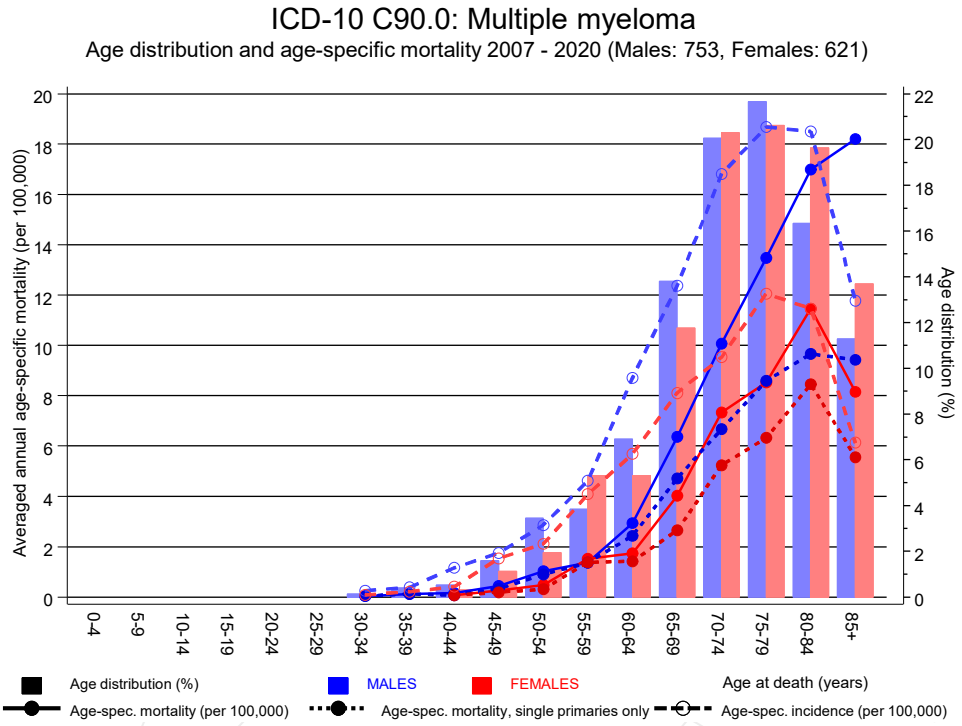
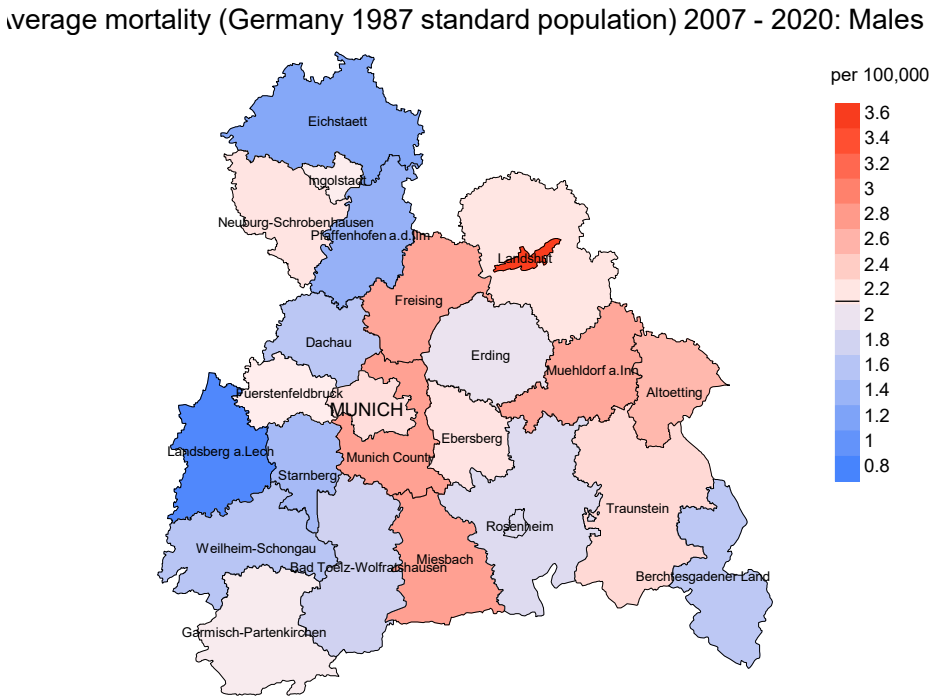


Figure 17. Distribution of age at death (bars; males: mean=70.0 yrs, median=71.2 yrs; females: mean=71.0 yrs, median=72.6 yrs) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

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



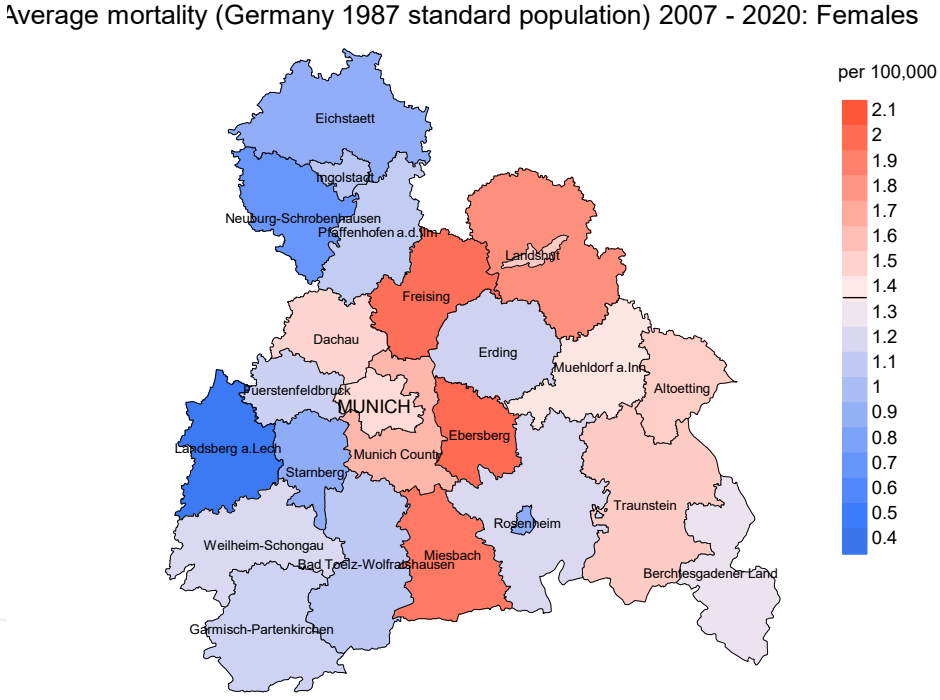
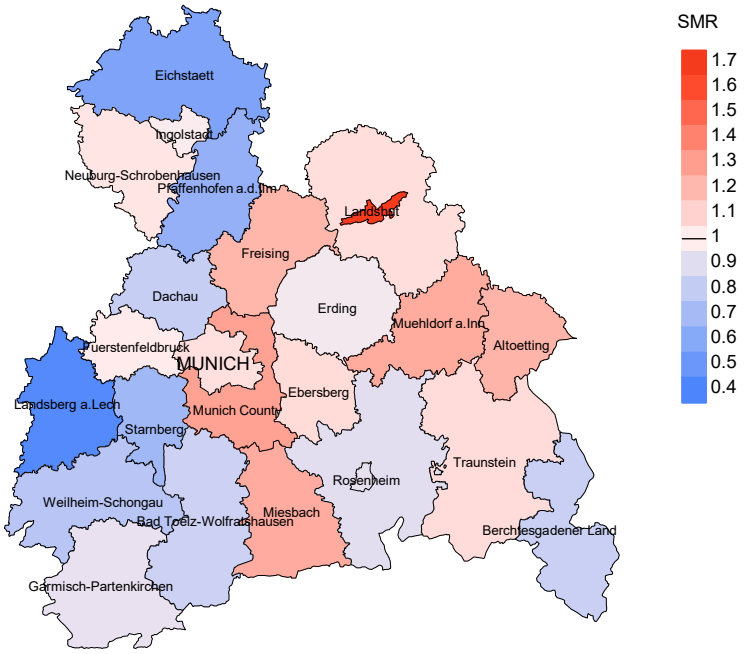


Figure 18a. Map of cancer mortality (german standard population) by county averaged for period 2007 to 2020. According to their individual mortality rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (males 2.1/100,000 WS N=753, females 1.4/100,000 WS N=621).

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 24 women died from multiple myeloma. Therefore, the mean mortality rate for this cancer type in this area can be calculated at 2.0/100,000 (german standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 1.1 and 3.4/100,000.

Standardized mortality ratio (SMR) 2007 - 2020: Males



Standardized mortality ratio (SMR) 2007 - 2020: Females

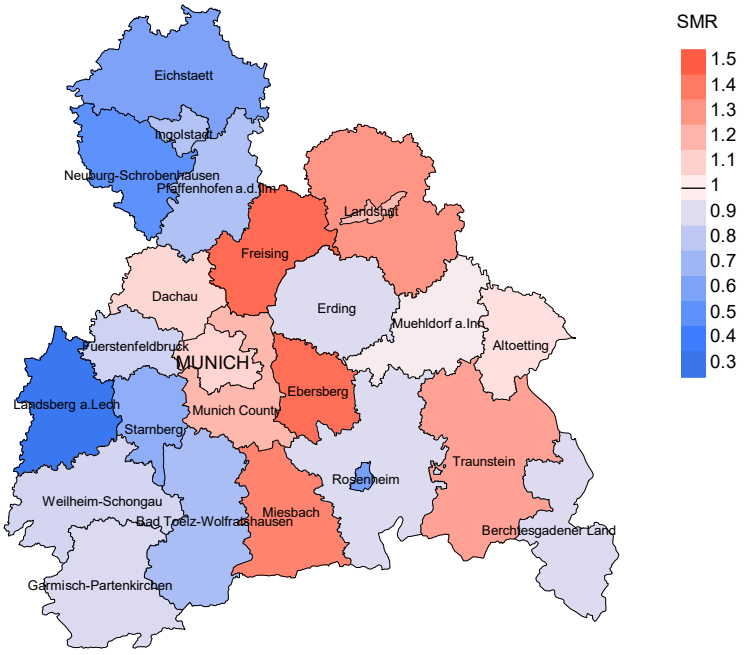


Figure 18b. Map of standardized mortality ratio (SMR) by county averaged for period 2007 to 2020. According to their individual SMR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (males N=753, females N=621).

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 24 women died from multiple myeloma. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 1.43. Though, the value of this parameter may vary with an underlying probability of 99% between 0.79 and 2.37, 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

Recommended Citation

Munich Cancer Registry. ICD-10 C90.0: Multiple myeloma - Incidence and Mortality [Internet]. 2021 [updated 2021 Dec 21; cited 2022 Feb 1]. Available from: https://www.tumorregister-muenchen.de/en/facts/base/bC900_E-ICD-10-C90.0-Multiple-myeloma-incidence-and-mortality.pdf

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