Munich Cancer Registry

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- *Deutsch*

ICD-10 D09.0, D41.4: Bladder tumor

Incidence and Mortality

Year of diagnosis	1998-2020
Patients	11,967
Diseases	11,980
Creation date	12/21/2021
Database export	12/20/2021
Population	4.95 m

Munich Cancer Registry
Cancer Registry Bavaria - Upper Bavaria Regional Center
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Marchioninistr. 15
Munich, 81377
Germany

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

https://www.tumorregister-muenchen.de/en/facts/base/bD0941E-ICD-10-D09.0-D41.4-Bladder-tumor-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 currentness of the data. The baseline statistics and survival data are updated annually. This yearly analysis comprises the Annual Report of the MCR.

Clinics and physicians have access to essentially more detailed data, with which they can check, compare and in the best case optimize their own data and results.

We would be pleased to receive corrections, critique and useful suggestions. Just send an e-mail to tumor@ibe.med.uni-muenchen.de.

Munich Cancer Registry, December 2021

[#] Base data has been collected since 1998. An increase in new diseases is apparent, which is an effect of two extensions in the MCR catchment area (from a base population of 2.65 million to 4.10 in 2002, and to 4.69 million in 2007).

[##] Due to the high frequency and good prognosis of non-malignant skin cancer (C44), no systematic ascertainment is performed for this diagnosis. C44 is not designated as a primary, but rather as a secondary tumor.

[###] DCO (death certificate only) identifies a cancer case that first becomes available to the MCR through the death certificate.

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

Code	Description
D09.0	Carcinoma in situ: Bladder
D41.4	Neoplasm of uncertain or unknown behaviour of urinary organs: Bladder

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	285	9.8	24.7	70.5	96.1
1999	286	12.1	24.6	68.2	97.9
2000	284	13.0	24.4	71.1	96.8
2001	268	14.0	24.1	65.3	96.6
2002	447	15.0	23.9	64.2	98.0 #
2003	447	15.0	23.6	63.5	95.3
2004	558	15.5	23.3	62.7	95.5
2005	552	16.6	22.8	59.8	94.9
2006	514	16.9	22.4	56.0	94.6
2007	685	17.4	21.8	56.2	94.5 #
2008	637	18.1	21.0	52.4	98.1
2009	662	18.6	20.4	50.0	97.9
2010	704	19.2	19.6	46.2	96.2
2011	709	19.7	18.6	43.2	97.2
2012	712	20.5	17.9	41.6	97.3
2013	714	20.9	17.2	38.9	95.7
2014	683	21.3	16.5	37.3	96.0
2015	553	21.6	15.2	25.3	91.5
2016	519	21.8	14.3	22.7	98.1
2017	508	22.1	12.7	19.9	99.8
2018	540	22.5	11.1	14.3	98.7
2019	437	22.7	8.1	14.0	99.1
2020	276	22.8	4.9	7.2	99.6 ##
1998-2020	11980	22.8	24.7	44.6	96.6

11,980 cases diagnosed 1998-2020 are related to a total of 11,967 patients. Currently, in 5,182 (43.3 %) of these 11,967 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 3,576 / 1,121 / 485 (29.9 % / 9.4 % / 4.1 %) 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 540 cases has been diagnosed, of which 22.5 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 11.1 % 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	212	74.4	9.4	25.8	69.3	95.3
1999	203	71.0	11.3	25.7	67.0	98.0
2000	212	74.6	12.4	25.5	69.8	96.7
2001	200	74.6	13.8	25.1	69.5	98.0
2002	329	73.6	15.0	24.8	64.4	98.5 #
2003	335	74.9	15.2	24.4	64.5	94.9
2004	400	71.7	15.9	24.2	63.5	95.5
2005	419	75.9	17.1	23.7	61.6	94.7
2006	401	78.0	17.2	23.1	59.1	94.5
2007	540	78.8	17.3	22.4	57.8	95.4 #
2008	478	75.0	18.3	21.6	53.1	98.3
2009	496	74.9	18.9	20.9	51.0	98.4
2010	538	76.4	19.4	20.1	48.9	96.7
2011	540	76.2	19.9	19.0	44.1	97.8
2012	547	76.8	20.8	18.2	43.0	97.8
2013	566	79.3	21.1	17.4	40.5	95.6
2014	548	80.2	21.5	16.9	37.4	96.2
2015	436	78.8	21.8	15.7	27.1	92.2
2016	409	78.8	21.9	14.5	23.2	98.0
2017	405	79.7	22.3	13.2	21.5	99.8
2018	431	79.8	22.7	11.2	14.8	98.6
2019	349	79.9	22.8	8.3	14.9	99.1
2020	213	77.2	22.9	4.4	8.0	100.0 ##
1998-2020	9207	76.9	22.9	25.8	45.3	96.9

9,207 cases diagnosed 1998-2020 are related to a total of 9,198 patients. Currently, in 4,108 (44.7 %) of these 9,198 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 2,819 / 886 / 403 (30.6 % / 9.6 % / 4.4 %) patients exist having 2 / 3 / 4+ malignancies.

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

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

How to interpret:
In 2018, a subgroup of 431 cases has been diagnosed, of which 22.7 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 11.2 % 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 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	73	25.6	11.0	21.0	74.0	98.6
1999	83	29.0	14.1	21.0	71.1	97.6
2000	72	25.4	14.5	20.8	75.0	97.2
2001	68	25.4	14.5	20.9	52.9	92.6
2002	118	26.4	15.0	20.8	63.6	96.6 #
2003	112	25.1	14.4	20.9	60.7	96.4
2004	158	28.3	14.3	20.5	60.8	95.6
2005	133	24.1	15.4	19.9	54.1	95.5
2006	113	22.0	16.3	20.0	45.1	94.7
2007	145	21.2	17.8	19.6	50.3	91.0 #
2008	159	25.0	17.6	19.0	50.3	97.5
2009	166	25.1	17.8	18.9	47.0	96.4
2010	166	23.6	18.5	17.8	37.3	94.6
2011	169	23.8	19.3	17.3	40.2	95.3
2012	165	23.2	19.7	16.7	37.0	95.8
2013	148	20.7	20.2	16.8	33.1	95.9
2014	135	19.8	20.7	15.2	37.0	95.6
2015	117	21.2	21.1	13.5	18.8	88.9
2016	110	21.2	21.5	13.3	20.9	98.2
2017	103	20.3	21.5	11.0	13.6	100.0
2018	109	20.2	21.9	10.7	11.9	99.1
2019	88	20.1	22.2	7.4	10.2	98.9
2020	63	22.8	22.4	6.5	4.8	98.4 ##
1998-2020	2773	23.1	22.4	21.0	42.2	95.9

2,773 cases diagnosed 1998-2020 are related to a total of 2,769 patients. Currently, in 1,074 (38.8 %) of these 2,769 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 757 / 235 / 82 (27.3 % / 8.5 % / 3.0 %) 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 109 cases has been diagnosed, of which 21.9 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 10.7 % 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 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	212	73	19.1	6.2	11.7	2.8	17.5	4.1	23.2	5.4
1999	203	83	18.1	7.0	10.8	3.0	16.2	4.6	21.9	5.9
2000	212	72	18.6	6.0	10.8	2.5	16.5	3.9	22.0	5.2
2001	200	68	17.3	5.6	9.8	2.8	15.1	4.1	20.8	5.2
2002	329	118	17.7	6.0	9.9	2.7	14.9	4.1	19.6	5.2
2003	335	112	17.9	5.7	10.0	2.7	14.8	3.9	18.9	4.8
2004	400	158	21.3	8.0	11.4	3.5	17.2	5.1	22.7	6.5
2005	419	133	22.1	6.7	11.5	3.0	17.6	4.4	23.6	5.5
2006	401	113	20.9	5.6	11.0	2.2	16.4	3.4	21.3	4.5
2007	540	145	24.4	6.3	12.4	2.8	18.7	4.1	24.7	5.1
2008	478	159	21.5	6.9	10.6	3.1	16.0	4.5	21.1	5.6
2009	496	166	22.2	7.1	11.2	3.0	16.7	4.5	21.6	5.8
2010	538	166	23.9	7.1	11.4	3.0	17.3	4.4	23.1	5.6
2011	540	169	24.1	7.2	11.0	3.2	16.8	4.6	22.5	5.7
2012	547	165	24.1	7.0	11.2	2.9	17.0	4.3	22.4	5.4
2013	566	148	24.6	6.2	11.2	2.5	17.1	3.7	22.8	4.7
2014	548	135	23.5	5.6	10.6	2.2	16.1	3.3	21.2	4.3
2015	436	117	18.3	4.8	8.1	2.1	12.3	3.0	16.6	3.8
2016	409	110	17.0	4.5	7.8	1.8	11.7	2.7	15.4	3.4
2017	405	103	16.8	4.2	7.3	1.7	11.2	2.5	14.9	3.2
2018	431	109	17.7	4.4	7.4	1.9	11.4	2.8	15.4	3.4
2019	349	88	14.3	3.5	6.3	1.3	9.5	2.0	12.6	2.6
2020	213	63	8.7	2.5	3.8	1.0	5.8	1.5	7.7	1.9
1998-2020	9207	2773	19.8	5.7	9.6	2.5	14.5	3.6	19.1	4.6

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	285	68.0	13.0	22.9	98.1	50.7	58.9	69.6	77.7	84.0
1999	286	68.8	12.5	18.9	96.7	54.6	60.2	69.9	78.0	84.1
2000	284	69.6	11.2	34.0	94.0	54.0	62.0	71.7	77.5	84.1
2001	268	69.6	10.7	28.4	90.7	55.0	62.3	71.1	77.6	82.5
2002	447	68.9	11.6	28.3	93.8	54.1	61.3	70.6	77.3	82.6
2003	447	67.9	11.8	28.8	92.0	52.0	60.9	68.6	75.8	82.2
2004	558	69.3	11.8	23.3	93.9	53.7	62.3	69.7	77.7	83.6
2005	552	69.8	11.9	18.4	95.3	56.3	62.7	71.0	78.0	84.0
2006	514	70.0	10.9	24.7	97.4	57.1	63.4	69.7	78.0	83.6
2007	685	69.5	11.9	21.7	96.5	54.2	63.0	70.3	78.4	83.4
2008	637	69.9	11.2	23.8	94.9	54.3	64.0	70.4	78.3	83.4
2009	662	69.7	11.9	28.5	95.9	54.3	62.8	71.1	78.2	83.3
2010	704	70.5	11.2	22.4	96.9	55.1	64.0	71.8	78.7	83.7
2011	709	71.4	10.7	28.4	97.8	57.0	65.6	71.9	78.6	84.8
2012	712	71.0	11.5	32.6	97.7	54.9	64.5	72.2	79.4	85.3
2013	714	71.3	11.8	18.3	99.0	55.3	64.5	72.7	80.1	85.2
2014	683	71.8	11.1	20.9	101	57.1	66.0	73.0	79.6	84.9
2015	553	71.5	10.9	33.3	96.6	55.8	65.4	73.3	78.6	84.0
2016	519	71.4	11.7	20.5	95.5	55.2	64.9	73.3	79.3	85.1
2017	508	72.0	11.3	16.4	96.5	56.3	65.8	73.9	80.1	84.4
2018	540	72.3	11.4	16.5	103	56.8	65.0	74.6	80.1	85.2
2019	437	71.8	12.0	24.8	95.6	56.2	63.3	74.5	79.9	85.6
2020	276	72.3	11.7	27.6	99.8	55.7	64.5	74.0	80.9	85.1
1998-2020	11980	70.5	11.6	16.4	103	55.1	63.5	71.8	78.7	84.1

Table 3a

Age distribution parameters by year of diagnosis (MALES)

Year of diagnosis	Cases n	Mean	Std. dev.	Min.	Max.	Median 10%	25%	50%	75%	90%
1998	212	66.9	12.1	28.9	91.4	51.3	58.2	68.5	76.3	82.1
1999	203	68.0	12.4	18.9	92.9	54.5	60.5	68.9	77.0	83.4
2000	212	68.8	10.9	40.8	94.0	53.3	61.5	70.7	76.4	83.8
2001	200	69.9	10.6	28.4	90.7	55.9	62.3	71.1	77.7	83.1
2002	329	68.5	11.3	28.3	93.0	55.2	61.3	69.7	76.7	81.9
2003	335	67.8	11.3	30.2	92.0	52.8	60.9	68.4	75.5	81.8
2004	400	68.7	11.8	23.3	93.9	52.9	61.5	69.4	77.0	83.4
2005	419	69.8	11.6	18.4	95.3	56.4	62.8	71.5	77.5	83.2
2006	401	69.2	11.1	24.7	94.9	55.6	62.8	69.0	77.5	83.5
2007	540	69.4	11.6	21.7	93.9	53.5	63.0	70.3	77.9	82.9
2008	478	69.8	10.9	29.6	94.2	54.3	64.4	70.2	77.9	83.0
2009	496	69.2	11.9	28.5	95.2	53.8	62.3	70.5	77.9	83.1
2010	538	70.4	10.9	25.6	90.8	55.1	63.9	72.0	78.2	83.3
2011	540	71.7	10.5	28.4	93.7	56.7	66.7	72.5	78.9	84.7
2012	547	70.9	11.4	32.6	97.0	55.4	64.6	72.1	79.1	84.7
2013	566	71.2	11.7	18.3	99.0	55.3	64.6	72.8	79.9	84.8
2014	548	71.6	11.1	20.9	98.5	56.7	66.1	72.7	79.2	84.9
2015	436	71.7	10.9	33.3	96.6	56.2	65.8	73.7	78.8	84.3
2016	409	71.5	11.6	20.5	95.5	55.1	64.9	73.3	79.3	84.8
2017	405	72.1	11.3	16.4	96.5	55.9	66.3	73.7	80.0	84.4
2018	431	72.8	11.4	16.5	103	57.1	65.4	75.1	80.4	85.3
2019	349	71.4	12.2	24.8	93.2	54.7	62.6	74.5	79.9	85.3
2020	213	72.4	11.2	37.4	99.8	55.9	64.3	73.8	80.8	85.1
1998–2020	9207	70.4	11.4	16.4	103	55.1	63.5	71.7	78.4	83.9

Table 3b

Age distribution parameters by year of diagnosis (FEMALES)

Year of diagnosis	Cases n	Mean	Std. dev.	Min.	Max.	Median 10%	25%	50%	75%	90%
1998	73	71.1	14.8	22.9	98.1	46.9	65.0	74.4	81.5	86.0
1999	83	70.8	12.4	43.4	96.7	55.9	59.8	71.8	79.7	85.1
2000	72	71.9	11.8	34.0	91.8	55.4	65.3	74.3	79.7	85.6
2001	68	68.7	10.8	45.2	87.5	52.8	61.8	71.5	76.2	81.8
2002	118	70.2	12.4	38.7	93.8	52.5	61.4	72.1	79.4	85.2
2003	112	68.1	13.3	28.8	90.4	49.1	61.8	69.7	78.1	82.9
2004	158	70.6	11.7	36.9	92.6	55.5	63.6	70.3	79.9	85.0
2005	133	69.6	12.8	32.0	94.6	54.4	61.0	69.4	79.6	85.1
2006	113	72.9	9.9	47.0	97.4	59.7	65.4	72.8	80.9	83.9
2007	145	69.8	13.0	22.2	96.5	54.5	63.5	70.5	79.3	84.3
2008	159	70.2	12.0	23.8	94.9	54.0	62.0	71.0	80.2	84.9
2009	166	71.3	11.7	36.0	95.9	54.8	64.7	72.4	78.8	84.9
2010	166	71.0	12.1	22.4	96.9	55.0	64.3	71.7	79.7	85.8
2011	169	70.3	11.1	30.4	97.8	58.0	63.0	70.6	77.6	85.0
2012	165	71.3	12.1	40.2	97.7	53.1	64.1	72.4	79.8	86.9
2013	148	71.6	12.1	40.6	95.2	55.0	63.2	72.3	81.4	86.2
2014	135	72.7	10.9	45.2	101	58.2	65.3	73.6	80.5	84.9
2015	117	70.7	11.1	44.8	95.4	54.9	63.4	71.8	78.3	84.0
2016	110	71.2	12.0	29.7	93.5	55.5	64.2	73.2	79.8	85.2
2017	103	71.4	11.4	27.3	94.3	57.8	63.8	74.0	80.2	84.1
2018	109	70.6	11.1	37.4	95.4	55.1	62.6	72.3	78.2	84.0
2019	88	73.3	11.3	46.6	95.6	58.5	64.4	74.8	81.0	88.3
2020	63	71.7	13.4	27.6	91.9	53.6	64.7	74.9	81.7	84.3
1998-2020	2773	70.9	11.9	22.2	101	55.1	63.4	72.0	79.7	85.1

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	3	0.0	0.0	3	0.0	0.0			0.0
20-24	9	0.1	0.1	5	0.1	0.1	4	0.2	0.2
25-29	13	0.2	0.3	9	0.1	0.3	4	0.2	0.4
30-34	28	0.3	0.6	23	0.4	0.6	5	0.3	0.7
35-39	44	0.5	1.2	38	0.6	1.2	6	0.3	1.0
40-44	110	1.3	2.5	87	1.3	2.5	23	1.2	2.3
45-49	201	2.4	4.9	156	2.4	4.9	45	2.4	4.7
50-54	379	4.5	9.4	294	4.5	9.5	85	4.6	9.3
55-59	590	7.1	16.5	443	6.8	16.3	147	8.0	17.3
60-64	817	9.8	26.3	623	9.6	25.9	194	10.5	27.8
65-69	1214	14.6	40.9	959	14.8	40.6	255	13.8	41.7
70-74	1580	18.9	59.8	1232	19.0	59.6	348	18.9	60.6
75-79	1489	17.9	77.7	1202	18.5	78.1	287	15.6	76.1
80-84	1107	13.3	90.9	861	13.3	91.4	246	13.3	89.5
85+	755	9.1	100.0	561	8.6	100.0	194	10.5	100.0
All ages	8339	100.0		6496	100.0		1843	100.0	

Table 5

Age-specific incidence
for period 2007-2020

Age at diagnosis Years	Males n	Females n	Males Age-spec. incid.	Females Age-spec. incid.
0- 4				
5- 9				
10-14				
15-19	3		0.2	
20-24	5	4	0.2	0.2
25-29	9	4	0.4	0.2
30-34	23	5	1.0	0.2
35-39	38	6	1.6	0.3
40-44	87	23	3.5	1.0
45-49	156	45	5.8	1.7
50-54	294	85	11.5	3.4
55-59	443	147	20.9	6.7
60-64	623	194	35.2	10.2
65-69	959	255	58.8	14.1
70-74	1232	348	82.2	20.2
75-79	1200	287	99.2	19.1
80-84	861	245	118.9	23.0
85+	561	194	120.1	18.6
All ages	6494	1842		
Incidence				
Raw			19.9	5.5
WS			9.2	2.3
ES			13.9	3.4
BRD-S			18.3	4.3

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).

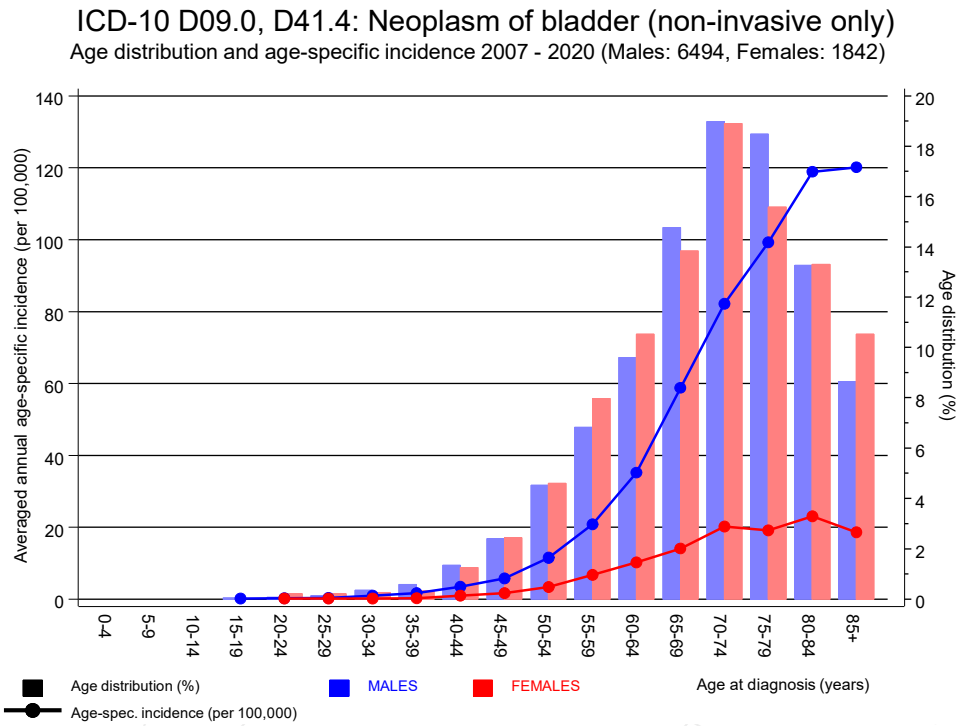


Figure 6. Age distribution (males: mean=71.0 yrs, median=72.5 yrs; females: mean=71.1 yrs, median=72.1 yrs) and age-specific incidence.

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 %
C03–C06	Oral cavity	14	5.8	2.4	1.3	4.1	#	1.9	7.1
C07–C08	Salivary gland	4	2.2	1.8	0.5	4.6		0.4	
C09–C10	Oropharynx	12	6.8	1.8	0.9	3.1		1.2	8.3
C12–C13	Hypopharynx	7	3.7	1.9	0.8	3.9		0.8	
C15	Oesophagus	30	15.4	2.0	1.3	2.8	#	3.3	3.3
C16	Stomach	55	35.9	1.5	1.2	2.0	#	4.3	1.8
C17	Small intestine	13	5.0	2.6	1.4	4.4	#	1.8	7.7
C18	Colon	142	87.0	1.6	1.4	1.9	#	12.5	7.0
C19–C20	Rectum	57	42.9	1.3	1.0	1.7	#	3.2	
C21	Anus/canal	4	1.9	2.1	0.6	5.3		0.5	
C22	Liver	55	24.0	2.3	1.7	3.0	#	7.1	14.5
C23–C24	Bile	18	9.4	1.9	1.1	3.0	#	1.9	33.3
C25	Pancreas	66	34.8	1.9	1.5	2.4	#	7.1	18.2
C30–C31	Sinuses	4	1.5	2.7	0.7	6.9		0.6	
C32	Larynx	19	7.4	2.6	1.5	4.0	#	2.6	10.5
C33–C34	Lung	316	96.8	3.3	2.9	3.6	#	49.8	10.8
C38,C45	Mesothelioma	13	6.1	2.1	1.1	3.7	#	1.6	
C43	Malign. melanoma	70	37.4	1.9	1.5	2.4	#	7.4	1.4
C46,C49	Soft tissue	8	5.1	1.6	0.7	3.1		0.7	
C50	Breast	6	2.3	2.6	0.9	5.6		0.8	
C60	Penis	7	2.2	3.1	1.3	6.5	#	1.1	28.6
C61	Prostate	824	234.0	3.5	3.3	3.8	#	134.1	5.0
C62	Testis	6	1.4	4.3	1.6	9.3	#	1.0	
C64	Kidney	86	27.6	3.1	2.5	3.9	#	13.3	15.1
C65	Renal pelvis	125	4.0	31.1	25.9	37.1	#	27.5	
C66	Ureter	94	2.4	38.7	31.3	47.4	#	20.8	
C67	Bladder	474	44.7	10.6	9.7	11.6	#	97.5	
C68	Urethra	36	0.9	41.6	29.1	57.6	#	8.0	
C68	Urinary org.	5	0.7	6.9	2.2	16.2	#	1.0	80.0
C70–C72	CNS cancer	20	10.0	2.0	1.2	3.1	#	2.3	10.0
C73	Thyroid	10	4.4	2.3	1.1	4.2	#	1.3	
C76–C79	CUP	25	15.1	1.7	1.1	2.4	#	2.2	
C81	Hodgkin lymphoma	4	1.8	2.3	0.6	5.8		0.5	25.0
C82–C85	NHL	71	37.3	1.9	1.5	2.4	#	7.7	8.5
C90	Mult. myeloma	15	11.6	1.3	0.7	2.1		0.8	26.7
C91–C96	Leukaemia	28	14.0	2.0	1.3	2.9	#	3.2	28.6
Others, specified		12	4.2	2.9	1.5	5.0	#	1.8	16.7
Not observed		0	5.0	0.0	0.0	0.7	#	-1.1	
All further malignancies		2755	852.5	3.2	3.1	3.4	#	432.3	5.8

Patients	9118
Median age at next malignancy (years)	75.5
Person-years	44013
Mean observation time (years)	4.8
Median observation time (years)	3.5

The occurrence of further specified malignancy is statistically significant.

Further observed malignancies with count 1 to 2 are pooled in category “Others, specified”.

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 %
C03–C06	Oral cavity	1	1.0	1.0	0.0	5.6		-0.0	
C09–C10	Oropharynx	2	0.6	3.2	0.4	11.6		1.0	
C11	Nasopharynx	1	0.1	16.4	0.4	91.6		0.7	
C15	Oesophagus	3	1.2	2.5	0.5	7.3		1.3	
C16	Stomach	12	7.0	1.7	0.9	3.0		3.6	16.7
C17	Small intestine	4	0.9	4.3	1.2	11.0	#	2.2	
C18	Colon	24	19.8	1.2	0.8	1.8		3.0	
C19–C20	Rectum	11	7.6	1.4	0.7	2.6		2.4	
C21	Anus/canal	2	1.0	2.0	0.2	7.4		0.7	
C22	Liver	6	2.4	2.5	0.9	5.4		2.5	16.7
C23–C24	Bile	5	2.9	1.7	0.6	4.0		1.5	40.0
C25	Pancreas	21	9.5	2.2	1.4	3.4	#	8.2	33.3
C26	GI cancer	1	0.4	2.5	0.1	13.8		0.4	100.0
C30–C31	Sinuses	1	0.3	3.9	0.1	21.7		0.5	
C33–C34	Lung	73	13.3	5.5	4.3	6.9	#	42.6	4.1
C43	Malign. melanoma	13	6.6	2.0	1.1	3.4	#	4.6	
C48	Peritoneal	1	0.7	1.4	0.0	7.9		0.2	
C50	Breast	93	51.3	1.8	1.5	2.2	#	29.8	5.4
C51	Vulva	5	2.1	2.3	0.8	5.5		2.0	
C53	Cervix uteri	6	2.0	3.0	1.1	6.6	#	2.9	50.0
C54	Corpus uteri	18	9.6	1.9	1.1	3.0	#	6.0	5.6
C56	Ovary	8	7.1	1.1	0.5	2.2		0.6	
C64	Kidney	14	4.4	3.2	1.8	5.4	#	6.9	7.1
C65	Renal pelvis	36	0.6	58.0	40.6	80.3	#	25.3	
C66	Ureter	32	0.3	94.8	64.8	133.8	#	22.6	
C67	Bladder	117	4.2	28.0	23.2	33.6	#	80.6	
C68	Urethra	2	0.1	39.2	4.7	141.6	#	1.4	
C68	Urinary org.	1	0.1	10.5	0.3	58.6		0.6	100.0
C70–C72	CNS cancer	5	2.3	2.2	0.7	5.1		1.9	40.0
C73	Thyroid	2	2.2	0.9	0.1	3.2		-0.2	
C74–C80	Cancer others	1	0.8	1.2	0.0	6.8		0.1	
C76–C79	CUP	6	3.8	1.6	0.6	3.4		1.5	
C82–C85	NHL	14	7.5	1.9	1.0	3.1	#	4.6	21.4
C90	Mult. myeloma	5	2.4	2.1	0.7	4.9		1.9	20.0
C91–C96	Leukaemia	4	2.9	1.4	0.4	3.5		0.8	25.0
Not observed		0	4.3	0.0	0.0	0.9	#	-3.0	
All further malignancies		550	183.4	3.0	2.8	3.3	#	262.0	6.2

Patients	2725
Median age at next malignancy (years)	76.6
Person-years	13995
Mean observation time (years)	5.1
Median observation time (years)	3.8

The occurrence of further specified malignancy is statistically significant.

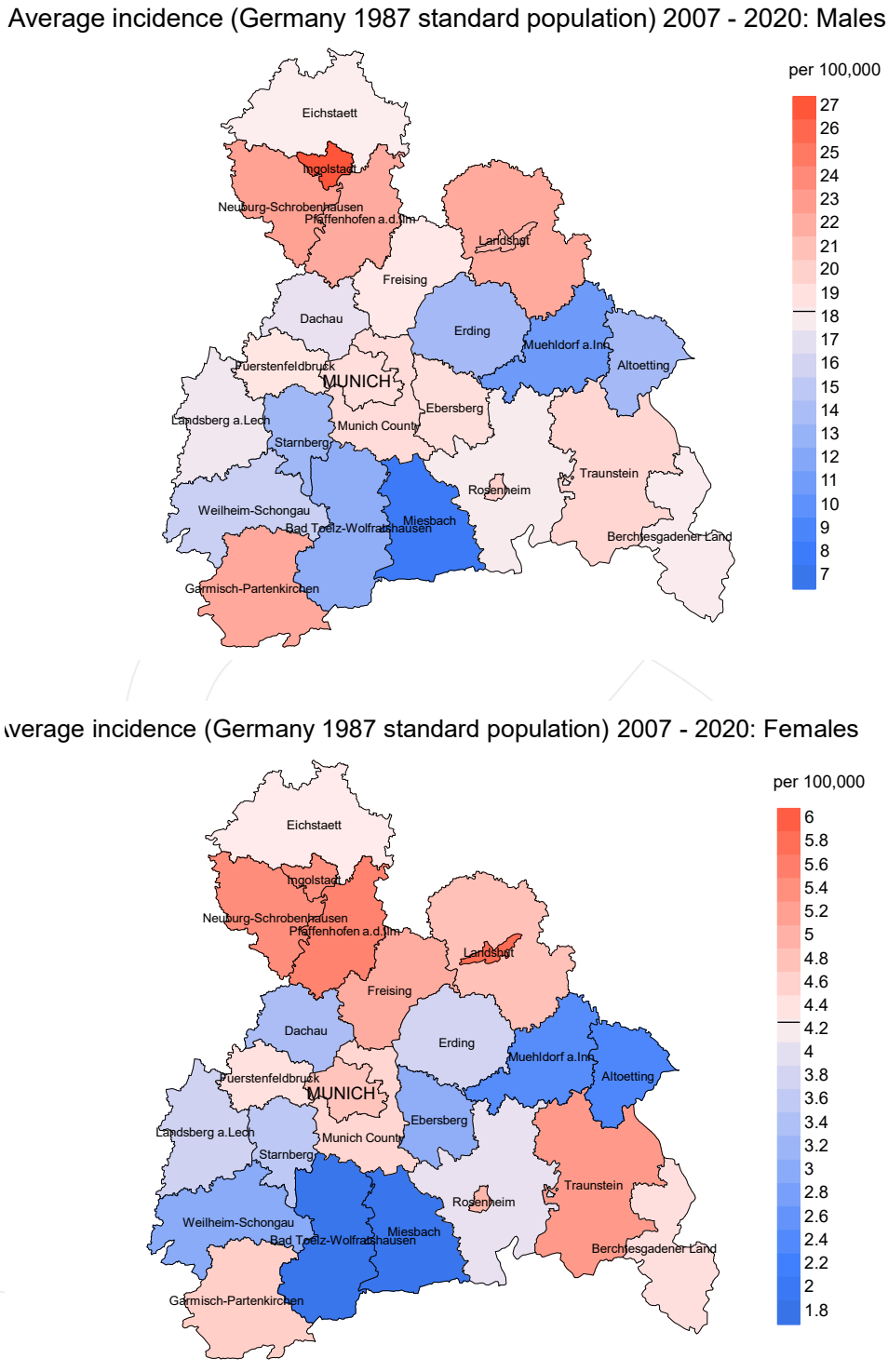
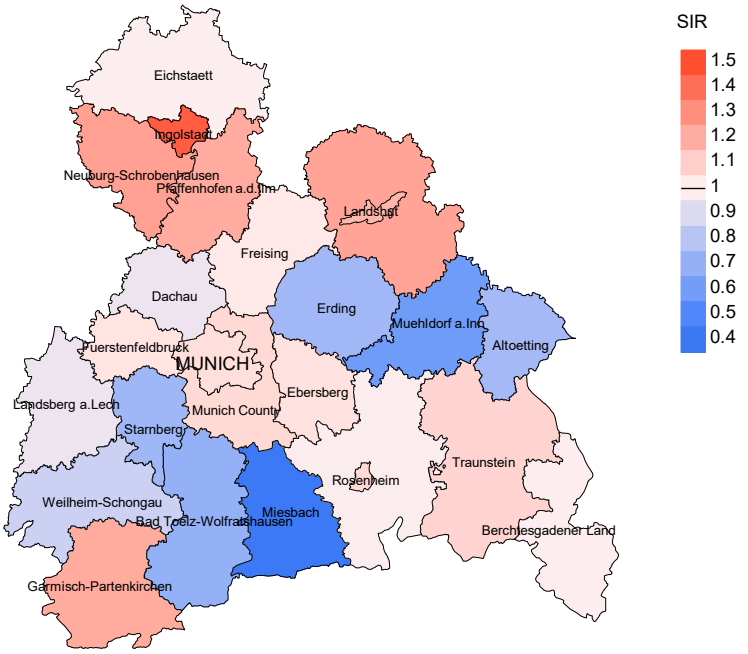


Figure 8a. Map of cancer incidence (german standard population) by county averaged for period 2007 to 2020. According to their individual incidence rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (males 18.3/100,000 WS N=6,494, females 4.3/100,000 WS N=1,842).

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 36 women were identified with newly diagnosed bladder tumor. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 3.1/100,000 (german standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 1.9 and 4.7/100,000.

Standardized incidence ratio (SIR) 2007 - 2020: Males



Standardized incidence ratio (SIR) 2007 - 2020: Females

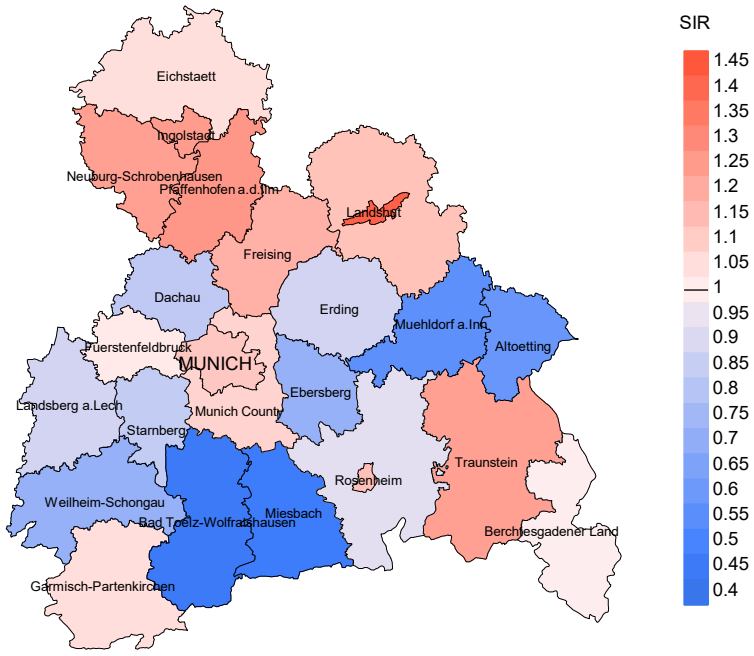


Figure 8b. Map of standardized incidence ratio (SIR) by county averaged for period 2007 to 2020. According to their individual SIR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (males N=6,494, females N=1,842).

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 36 women were identified with newly diagnosed bladder tumor. Therefore, the mean standardized incidence ratio (SIR) for this cancer type in this area can be calculated at 0.72. Though, the value of this parameter may vary with an underlying probability of 99% between 0.45 and 1.09, 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	285	96.1	201	70.5	91.5
1999	286	97.9	195	68.2	95.4
2000	284	96.8	202	71.1	91.6
2001	268	96.6	175	65.3	93.7
2002	447	98.0	287	64.2	92.7
2003	447	95.3	284	63.5	91.9
2004	558	95.5	350	62.7	93.1
2005	552	94.9	330	59.8	93.3
2006	514	94.6	288	56.0	90.6
2007	685	94.5	385	56.2	92.5
2008	637	98.1	334	52.4	90.1
2009	662	97.9	331	50.0	92.7
2010	704	96.2	325	46.2	89.2
2011	709	97.2	306	43.2	88.6
2012	712	97.3	296	41.6	88.5
2013	714	95.7	278	38.9	88.5
2014	683	96.0	255	37.3	86.7
2015	553	91.5	140	25.3	87.9
2016	519	98.1	118	22.7	87.3
2017	508	99.8	101	19.9	86.1
2018	540	98.7	77	14.3	62.3
2019	437	99.1	61	14.0	77.0
2020	276	99.6	20	7.2	85.0
1998–2020	11980	96.6	5339	44.6	90.3

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	285	96	6	2.1
1999	286	102	8	2.8
2000	284	103	4	1.4
2001	268	124	7	2.6
2002	447	167	7	1.6
2003	447	184	7	1.6
2004	558	211	14	2.5
2005	552	211	17	3.1
2006	514	221	11	2.1
2007	685	264	12	1.8
2008	637	261	14	2.2
2009	662	280	18	2.7
2010	704	320	10	1.4
2011	709	375	27	3.8
2012	712	394	29	4.1
2013	714	388	22	3.1
2014	683	435	24	3.5
2015	553	433	15	2.7
2016	519	432	24	4.6
2017	508	498	21	4.1
2018	540	403	13	2.4
2019	437	417	13	3.0
2020	276	489	12	4.3
1998–2020	11980	6808	335	2.8

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 %
1998	96	41.7	58.3	59.3
1999	102	30.4	69.6	51.6
2000	103	43.7	56.3	50.5
2001	124	37.9	62.1	53.1
2002	167	46.1	53.9	60.2
2003	184	38.0	62.0	59.3
2004	211	44.5	55.5	60.2
2005	211	50.2	49.8	58.7
2006	221	52.5	47.5	64.3
2007	264	45.8	54.2	61.2
2008	261	46.0	54.0	55.8
2009	280	43.2	56.8	55.3
2010	320	41.6	58.4	54.1
2011	375	44.5	55.5	62.1
2012	394	46.7	53.3	60.4
2013	388	43.6	56.4	57.6
2014	435	42.8	57.2	59.1
2015	433	41.8	58.2	56.2
2016	432	47.2	52.8	59.5
2017	498	42.8	57.2	53.1
2018	403	29.8	70.2	49.4
2019	417	14.6	85.4	50.6
2020	489	20.0	80.0	63.0
1998-2020	6808	39.7	60.3	57.7

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
1998	74	82.5	82.8	82.5	82.6
1999	64	78.1	79.2	76.5	78.1
2000	78	79.6	75.7	81.0	76.5
2001	89	80.4	79.5	81.3	79.6
2002	138	81.3	77.2	82.8	79.1
2003	138	79.4	76.7	81.2	77.8
2004	147	80.4	78.9	83.8	79.8
2005	147	81.4	79.1	83.4	80.6
2006	163	79.1	78.0	80.2	77.3
2007	191	80.7	78.6	81.6	80.0
2008	198	80.8	79.4	82.1	80.0
2009	213	81.1	80.8	81.2	81.4
2010	252	83.8	81.2	84.8	82.4
2011	285	82.0	80.7	82.9	81.3
2012	313	81.9	80.4	83.4	80.5
2013	309	83.5	79.9	85.0	81.1
2014	343	82.6	82.1	82.8	81.4
2015	322	83.1	80.1	84.3	80.7
2016	330	83.4	80.5	84.5	80.9
2017	386	82.9	80.6	84.7	81.0
2018	317	83.3	81.3	83.7	81.2
2019	335	83.9	82.0	84.2	82.9
2020	384	83.7	81.6	83.9	83.3
1998–2020	5216	82.1	80.0	83.5	80.7

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	22	86.6	83.6	87.0	82.7
1999	38	82.4	77.9	83.2	79.2
2000	25	87.6	86.2	89.3	86.2
2001	35	83.4	82.0	84.5	82.0
2002	29	87.4	82.5	88.8	86.6
2003	46	86.2	80.3	89.1	82.6
2004	64	85.2	81.8	85.9	84.4
2005	64	82.3	79.0	84.1	79.8
2006	58	83.3	80.4	83.9	80.8
2007	73	83.1	81.4	86.6	81.6
2008	63	85.1	82.1	86.7	82.6
2009	67	85.3	79.4	87.0	82.7
2010	68	84.9	80.0	87.4	80.0
2011	90	84.0	80.8	85.7	81.2
2012	81	84.7	78.6	88.9	79.5
2013	79	84.8	80.2	88.0	81.3
2014	92	87.8	83.3	88.3	84.0
2015	111	85.5	79.8	86.7	81.9
2016	102	86.3	82.3	88.0	82.4
2017	112	87.0	82.0	90.4	82.3
2018	86	86.9	80.1	88.1	81.7
2019	82	85.9	82.9	87.4	82.9
2020	105	85.2	78.8	85.3	83.2
1998–2020	1592	85.3	81.2	87.0	82.3

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
1998	33	3.0	0.16	1.6	0.14	2.8	0.16	4.3	0.19
1999	21	1.9	0.10	1.0	0.09	1.8	0.11	2.6	0.12
2000	37	3.2	0.17	1.8	0.16	2.9	0.18	4.4	0.20
2001	33	2.8	0.17	1.5	0.16	2.6	0.17	3.7	0.18
2002	68	3.6	0.21	1.8	0.19	3.1	0.21	4.5	0.23
2003	56	3.0	0.17	1.5	0.15	2.5	0.17	3.6	0.19
2004	71	3.8	0.18	1.7	0.15	3.0	0.17	4.7	0.21
2005	75	4.0	0.18	1.8	0.15	3.0	0.17	4.6	0.20
2006	90	4.7	0.22	2.0	0.18	3.5	0.21	5.5	0.26
2007	88	4.0	0.16	1.7	0.14	3.0	0.16	4.4	0.18
2008	96	4.3	0.20	1.7	0.16	3.0	0.19	4.8	0.23
2009	92	4.1	0.19	1.6	0.15	2.9	0.17	4.3	0.20
2010	103	4.6	0.19	1.8	0.15	3.1	0.18	4.6	0.20
2011	128	5.7	0.24	2.1	0.19	3.8	0.23	5.6	0.25
2012	156	6.9	0.29	2.5	0.22	4.4	0.26	6.6	0.30
2013	131	5.7	0.23	2.0	0.18	3.5	0.21	5.3	0.23
2014	156	6.7	0.28	2.3	0.21	4.1	0.25	6.0	0.28
2015	144	6.1	0.33	2.1	0.26	3.7	0.30	5.4	0.32
2016	160	6.7	0.39	2.2	0.28	3.9	0.33	5.8	0.38
2017	162	6.7	0.40	2.3	0.31	3.9	0.35	5.8	0.39
2018	95	3.9	0.22	1.3	0.17	2.2	0.19	3.3	0.21
2019	51	2.1	0.15	0.7	0.11	1.2	0.12	1.7	0.14
2020	84	3.5	0.39	1.1	0.30	2.0	0.35	2.9	0.37
1998-2020	2130	4.6	0.23	1.8	0.18	3.1	0.21	4.6	0.24

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	7	0.6	0.10	0.2	0.06	0.3	0.07	0.4	0.08
1999	10	0.8	0.12	0.3	0.10	0.5	0.11	0.6	0.11
2000	8	0.7	0.11	0.1	0.05	0.3	0.07	0.4	0.08
2001	14	1.2	0.21	0.3	0.12	0.6	0.14	0.8	0.16
2002	9	0.5	0.08	0.1	0.04	0.2	0.05	0.3	0.06
2003	14	0.7	0.13	0.2	0.08	0.4	0.09	0.5	0.10
2004	23	1.2	0.15	0.3	0.10	0.6	0.11	0.8	0.12
2005	31	1.6	0.23	0.5	0.17	0.8	0.19	1.2	0.21
2006	26	1.3	0.23	0.4	0.17	0.6	0.19	0.9	0.20
2007	33	1.4	0.23	0.4	0.14	0.7	0.16	1.0	0.19
2008	24	1.0	0.15	0.2	0.08	0.4	0.10	0.7	0.13
2009	29	1.2	0.17	0.3	0.11	0.6	0.13	0.9	0.15
2010	30	1.3	0.18	0.3	0.12	0.6	0.13	0.9	0.16
2011	39	1.7	0.23	0.5	0.14	0.8	0.17	1.1	0.19
2012	28	1.2	0.17	0.4	0.13	0.6	0.14	0.8	0.16
2013	38	1.6	0.26	0.4	0.18	0.7	0.19	1.0	0.22
2014	30	1.2	0.22	0.3	0.14	0.5	0.16	0.8	0.17
2015	37	1.5	0.32	0.4	0.18	0.6	0.22	1.0	0.26
2016	44	1.8	0.40	0.5	0.25	0.8	0.29	1.1	0.33
2017	51	2.1	0.50	0.5	0.32	0.9	0.36	1.3	0.40
2018	25	1.0	0.23	0.3	0.14	0.4	0.16	0.6	0.19
2019	11	0.4	0.13	0.1	0.06	0.2	0.07	0.3	0.10
2020	14	0.6	0.22	0.1	0.14	0.2	0.17	0.3	0.18
1998-2020	575	1.2	0.21	0.3	0.13	0.5	0.15	0.8	0.17

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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