Munich Cancer Registry

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- *Deutsch*

ICD-10 D45: Polycythaemia vera

Incidence and Mortality

Year of diagnosis	1998-2020
Patients	777
Diseases	777
Creation date	12/21/2021
Database export	12/20/2021
Population	4.95 m

Munich Cancer Registry
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Munich, 81377
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https://www.tumorregister-muenchen.de/en

https://www.tumorregister-muenchen.de/en/facts/base/bD45__E-ICD-10-D45-Polycythaemia-vera-incidence-and-mortality.pdf

Index of figures and tables

Global Statements about the statistics on the Internet −
Baseline Statistics (grey button), **Survival** (red button)

In these analyses, the clinics and physicians of Upper Bavaria and the city and county of Landshut[#], with a total of 4.69 million inhabitants, account for the frequency of cancer diseases[##] and the achieved long term results. Additionally, the long term survival evaluated by the Munich Cancer Registry (MCR) is compared with the results of the population-based registry in the USA (SEER), which is useful for checking the consistency of the data on an international level.

In comparing several tables, inconsistent figures may be detected. This is based on the fact that different patient cohorts are included in the base calculation, for example when proportions of multiple tumors or DCO-cases[###] are concerned. In other cases the individual tumor diagnosis is the basis for calculation, for example with incidence.

The foot notes describe the currentness of the data. The baseline statistics and survival data are updated annually. This yearly analysis comprises the Annual Report of the MCR.

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

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

Munich Cancer Registry, December 2021

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

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

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

ICD-10 codes (ICD-10 2016) used for specifying cancer site

Code	Description
D45	Polycythaemia vera

INCIDENCE

Table 1

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

Year of diagnosis	All cases n	DCO cases n	Prop. DCO %	Prop. at least 1 further malign. prior + synchron. %	Prop. at least 1 further malign. after %	Prop. deaths %	Prop. actively followed %
1998	22	4	18.2	0.0	17.9	86.4	100.0
1999	24	5	20.8	8.7	17.6	83.3	100.0
2000	24	9	37.5	14.3	17.6	83.3	95.8
2001	24	9	37.5	17.0	17.3	66.7	95.8
2002	30	9	30.0	16.9	17.3	80.0	100.0 #
2003	40	15	37.5	13.4	17.4	72.5	95.0
2004	32	15	46.9	13.8	17.5	75.0	100.0
2005	40	9	22.5	13.6	17.3	75.0	97.5
2006	49	18	36.7	14.0	17.0	83.7	95.9
2007	61	20	32.8	13.0	17.4	72.1	96.7 #
2008	47	14	29.8	13.5	18.0	72.3	100.0
2009	49	12	24.5	14.0	17.6	65.3	98.0
2010	44	16	36.4	15.4	18.5	70.5	100.0
2011	46	11	23.9	14.7	18.9	54.3	97.8
2012	43	11	25.6	14.8	20.0	67.4	95.3
2013	44	10	22.7	15.8	21.6	61.4	93.2
2014	43	16	37.2	16.3	18.4	62.8	90.7
2015	32	15	46.9	17.0	17.3	68.8	96.9
2016	37	15	40.5	18.2	14.8	64.9	89.2
2017	23	13	56.5	18.2	13.3	60.9	95.7
2018	12	2	16.7	18.3	13.0	33.3	100.0
2019	9	1	11.1	18.3	18.2	11.1	88.9
2020	2			18.4	0.0		100.0 ##
1998-2020	777	249	32.0	18.4	17.9	69.1	96.5

777 cases diagnosed 1998-2020 are related to a total of 777 patients. Currently, in 274 (35.3 %) of these 777 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 199 / 54 / 21 (25.6 % / 6.9 % / 2.7 %) 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 12 cases has been diagnosed, of which 18.3 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 13.0 % of cases, at least one new malignancy has occurred during the follow-up period (all numbers refer to the date of the database export, see cover sheet).

Table 1a

Cases 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	8	36.4	1	12.5	0.0	21.9	87.5	100.0
1999	11	45.8	2	18.2	5.3	21.6	81.8	100.0
2000	14	58.3	5	35.7	18.2	21.4	92.9	100.0
2001	14	58.3	3	21.4	21.3	21.2	57.1	100.0
2002	12	40.0	2	16.7	22.0	21.2	75.0	100.0 #
2003	22	55.0	4	18.2	16.0	20.7	68.2	90.9
2004	17	53.1	7	41.2	15.3	20.9	70.6	100.0
2005	26	65.0	7	26.9	14.5	20.4	80.8	100.0
2006	25	51.0	9	36.0	15.4	20.4	84.0	92.0
2007	30	49.2	7	23.3	13.4	20.3	60.0	96.7 #
2008	23	48.9	8	34.8	13.4	21.7	78.3	100.0
2009	21	42.9	3	14.3	13.5	21.1	57.1	95.2
2010	24	54.5	7	29.2	15.0	20.5	66.7	100.0
2011	23	50.0	3	13.0	13.7	21.1	52.2	100.0
2012	23	53.5	2	8.7	13.7	22.5	65.2	95.7
2013	25	56.8	3	12.0	15.1	25.0	68.0	92.0
2014	21	48.8	4	19.0	15.9	21.4	52.4	95.2
2015	20	62.5	7	35.0	16.7	20.3	70.0	95.0
2016	21	56.8	9	42.9	18.4	15.6	71.4	90.5
2017	11	47.8	5	45.5	18.7	12.5	54.5	100.0
2018	10	83.3	2	20.0	18.7	7.1	30.0	100.0
2019	3	33.3	1	33.3	18.8	0.0	33.3	100.0
2020	1	50.0			18.8	0.0		100.0 ##
1998-2020	405	52.1	101	24.9	18.8	21.9	67.4	96.8

405 cases diagnosed 1998-2020 are related to a total of 405 patients. Currently, in 160 (39.5 %) of these 405 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 114 / 29 / 17 (28.1 % / 7.2 % / 4.2 %) patients exist having 2 / 3 / 4+ malignancies.

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

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

How to interpret:
In 2018, a subgroup of 10 cases has been diagnosed, of which 18.7 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 7.1 % 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 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	14	63.6	3	21.4	0.0	13.5	85.7	100.0	
1999	13	54.2	3	23.1	11.1	13.1	84.6	100.0	
2000	10	41.7	4	40.0	10.8	13.4	70.0	90.0	
2001	10	41.7	6	60.0	12.8	13.1	80.0	90.0	
2002	18	60.0	7	38.9	12.3	13.2	83.3	100.0	#
2003	18	45.0	11	61.1	10.8	13.7	77.8	100.0	
2004	15	46.9	8	53.3	12.2	13.8	80.0	100.0	
2005	14	35.0	2	14.3	12.5	13.9	64.3	92.9	
2006	24	49.0	9	37.5	12.5	13.4	83.3	100.0	
2007	31	50.8	13	41.9	12.6	14.3	83.9	96.8	#
2008	24	51.1	6	25.0	13.6	14.0	66.7	100.0	
2009	28	57.1	9	32.1	14.6	13.6	71.4	100.0	
2010	20	45.5	9	45.0	15.9	16.1	75.0	100.0	
2011	23	50.0	8	34.8	15.6	16.3	56.5	95.7	
2012	20	46.5	9	45.0	16.0	17.0	70.0	95.0	
2013	19	43.2	7	36.8	16.6	17.4	52.6	94.7	
2014	22	51.2	12	54.5	16.7	14.7	72.7	86.4	
2015	12	37.5	8	66.7	17.3	13.0	66.7	100.0	
2016	16	43.2	6	37.5	17.9	13.9	56.3	87.5	
2017	12	52.2	8	66.7	17.6	14.3	66.7	91.7	
2018	2	16.7			17.8	22.2	50.0	100.0	
2019	6	66.7			17.8	28.6		83.3	
2020	1	50.0			18.0	0.0		100.0	##
1998-2020	372	47.9	148	39.8	18.0	13.5	71.0	96.2	

372 cases diagnosed 1998-2020 are related to a total of 372 patients. Currently, in 114 (30.6 %) of these 372 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 85 / 25 / 4 (22.8 % / 6.7 % / 1.1 %) 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 2 cases has been diagnosed, of which 17.8 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 22.2 % 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	8	14	0.7	1.2	0.5	0.5	0.7	0.8	0.8	1.0
1999	11	13	1.0	1.1	0.5	0.6	0.9	0.8	1.5	0.9
2000	14	10	1.2	0.8	0.7	0.4	1.1	0.6	1.5	0.7
2001	14	10	1.2	0.8	0.8	0.3	1.1	0.5	1.3	0.6
2002	12	18	0.6	0.9	0.4	0.4	0.5	0.6	0.7	0.8
2003	22	18	1.2	0.9	0.7	0.3	1.0	0.5	1.2	0.7
2004	17	15	0.9	0.8	0.5	0.2	0.8	0.4	0.9	0.6
2005	26	14	1.4	0.7	0.7	0.3	1.1	0.4	1.5	0.5
2006	25	24	1.3	1.2	0.7	0.4	1.0	0.7	1.4	0.9
2007	30	31	1.4	1.3	0.7	0.5	1.1	0.8	1.4	1.1
2008	23	24	1.0	1.0	0.5	0.5	0.8	0.7	1.0	0.8
2009	21	28	0.9	1.2	0.4	0.4	0.7	0.6	1.0	0.8
2010	24	20	1.1	0.9	0.5	0.3	0.7	0.5	1.0	0.6
2011	23	23	1.0	1.0	0.5	0.4	0.8	0.6	0.9	0.7
2012	23	20	1.0	0.8	0.5	0.3	0.7	0.4	0.9	0.6
2013	25	19	1.1	0.8	0.5	0.3	0.7	0.4	1.0	0.6
2014	21	22	0.9	0.9	0.4	0.2	0.6	0.4	0.8	0.6
2015	20	12	0.8	0.5	0.3	0.2	0.5	0.2	0.8	0.3
2016	21	16	0.9	0.7	0.3	0.2	0.5	0.3	0.8	0.5
2017	11	12	0.5	0.5	0.2	0.2	0.3	0.3	0.4	0.3
2018	10	2	0.4	0.1	0.2	0.0	0.3	0.0	0.4	0.1
2019	3	6	0.1	0.2	0.1	0.2	0.1	0.2	0.1	0.2
2020	1	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1998-2020	405	372	0.9	0.8	0.4	0.3	0.6	0.4	0.8	0.6

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)
(incl. DCO)

Year of diagnosis	Cases n	Mean	Std. dev.	Min.	Max.	10%	25%	Median 50%	75%	90%
1998	22	68.5	10.3	52.8	88.7	55.1	61.8	68.4	75.4	83.5
1999	24	69.0	14.1	40.4	89.4	44.6	60.2	72.3	78.8	84.3
2000	24	68.3	15.0	29.7	86.1	42.2	64.2	71.2	77.1	83.7
2001	24	67.9	12.6	45.7	92.3	51.0	59.8	66.2	77.2	84.9
2002	30	69.6	13.5	29.4	88.9	52.8	62.0	72.5	81.1	85.6
2003	40	66.5	16.0	27.9	90.7	38.7	59.8	67.5	78.0	83.5
2004	32	71.0	12.5	44.7	90.2	55.1	60.9	71.7	81.4	85.4
2005	40	70.4	13.0	30.2	96.5	52.9	64.7	71.3	78.9	82.4
2006	49	72.6	13.1	29.8	96.3	55.1	62.9	74.4	82.3	88.1
2007	61	70.5	13.7	22.9	93.0	51.5	61.6	73.8	80.7	86.0
2008	47	71.1	10.8	42.8	92.7	58.2	64.0	68.1	80.1	85.5
2009	49	74.5	12.1	39.8	93.5	55.7	69.2	76.6	83.8	87.3
2010	44	71.9	15.2	28.5	99.4	46.4	67.4	72.4	83.7	87.9
2011	46	69.3	13.4	41.1	92.1	47.8	61.1	68.2	79.5	87.1
2012	43	70.8	12.4	46.0	92.5	53.1	63.1	71.9	81.8	85.2
2013	44	72.6	12.7	35.1	97.3	55.7	65.8	74.2	79.2	86.8
2014	43	74.5	13.6	25.1	92.1	59.1	70.1	76.4	83.0	90.5
2015	32	74.6	12.8	37.0	90.5	56.6	70.8	78.2	82.8	86.2
2016	37	78.2	9.9	47.9	104	69.7	73.5	78.7	84.2	89.4
2017	23	76.7	11.4	52.6	93.0	60.7	70.5	76.7	85.0	91.6
2018	12	70.1	12.8	47.5	91.8	53.9	60.0	73.1	75.7	83.3
2019	9	57.2	17.3	26.4	79.8	26.4	58.5	61.6	66.6	79.8
2020	2	82.9	3.2	80.6	85.1	80.6	80.6	82.9	85.1	85.1
1998-2020	777	71.4	13.3	22.9	104	53.5	63.6	73.3	81.3	86.4

Table 3a

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

Year of diagnosis	Cases n	Mean	Std. dev.	Min.	Max.	10%	25%	Median 50%	75%	90%
1998	8	63.7	8.1	52.8	75.4	52.8	56.5	65.2	69.2	75.4
1999	11	72.6	11.7	47.3	84.9	58.2	64.8	75.1	82.7	84.3
2000	14	69.1	13.1	32.2	86.1	58.8	67.3	70.1	77.1	82.7
2001	14	62.5	10.9	45.7	82.7	48.7	56.1	60.3	69.0	79.9
2002	12	67.3	10.7	49.4	87.7	57.9	60.1	64.7	73.6	81.1
2003	22	61.8	14.2	27.9	77.8	40.9	54.9	65.7	70.0	77.3
2004	17	64.9	11.4	44.7	88.2	50.6	57.4	66.3	70.9	81.8
2005	26	69.7	14.3	30.2	96.5	48.0	60.3	71.5	78.2	82.4
2006	25	69.5	13.1	29.8	91.3	55.1	62.6	72.2	77.3	84.1
2007	30	67.2	13.0	45.5	93.0	49.5	56.9	67.9	78.1	82.7
2008	23	72.6	8.7	58.6	90.4	63.3	66.8	68.3	79.2	84.2
2009	21	71.1	14.2	39.8	88.6	52.4	69.3	76.2	80.9	83.0
2010	24	69.8	11.5	42.9	84.9	47.8	68.5	71.2	77.2	83.7
2011	23	64.8	13.9	41.1	87.1	45.8	51.7	67.4	75.2	82.6
2012	23	67.1	13.2	46.0	92.1	47.8	53.5	69.7	76.4	83.1
2013	25	70.1	12.5	35.1	86.5	53.5	65.0	74.2	78.5	81.9
2014	21	69.1	15.6	25.1	90.0	49.4	63.0	72.0	77.7	88.7
2015	20	74.4	12.0	37.0	90.5	60.6	70.5	78.3	80.7	85.5
2016	21	77.3	11.9	47.9	104	60.0	73.5	78.7	84.6	86.4
2017	11	77.8	9.3	59.8	92.0	70.5	70.6	76.7	85.0	88.3
2018	10	68.5	11.9	47.5	83.3	50.7	54.8	73.1	75.5	79.6
2019	3	62.0	6.0	58.5	68.9	58.5	58.5	58.7	68.9	68.9
2020	1	80.6		80.6	80.6	80.6	80.6	80.6	80.6	80.6
1998–2020	405	69.1	12.9	25.1	104	50.6	61.1	70.9	78.0	83.9

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	14	71.3	10.6	55.1	88.7	57.4	62.7	70.3	81.7	83.8
1999	13	65.9	15.7	40.4	89.4	44.3	56.4	66.7	77.2	82.9
2000	10	67.1	18.1	29.7	85.3	36.0	60.3	72.6	79.0	84.5
2001	10	75.5	11.1	61.0	92.3	62.9	65.8	74.3	84.9	91.1
2002	18	71.1	15.2	29.4	88.9	47.9	64.0	74.5	81.3	87.3
2003	18	72.3	16.5	34.3	90.7	36.6	63.4	79.1	82.8	89.6
2004	15	78.0	10.1	55.7	90.2	61.4	72.6	80.6	85.2	86.9
2005	14	71.8	10.7	43.5	85.1	62.7	67.8	71.3	81.3	82.4
2006	24	75.8	12.6	48.8	96.3	58.3	67.1	77.9	85.6	90.5
2007	31	73.7	13.8	22.9	92.7	57.8	67.4	76.9	82.1	86.9
2008	24	69.6	12.5	42.8	92.7	57.4	60.7	65.4	82.0	85.5
2009	28	77.1	9.7	58.6	93.5	62.8	68.9	77.4	85.1	88.5
2010	20	74.3	18.8	28.5	99.4	45.0	62.8	82.6	87.3	91.5
2011	23	73.7	11.6	53.1	92.1	61.1	64.1	73.0	85.4	87.4
2012	20	75.0	10.3	48.6	92.5	64.9	69.6	73.3	83.8	87.0
2013	19	75.8	12.4	50.8	97.3	61.1	66.6	74.1	86.8	93.6
2014	22	79.7	9.1	59.1	92.1	70.6	74.5	78.3	89.9	91.2
2015	12	74.7	14.5	38.4	90.3	56.6	72.3	77.1	84.5	86.2
2016	16	79.5	6.5	71.5	92.0	71.6	73.7	78.6	83.3	91.5
2017	12	75.8	13.4	52.6	93.0	60.7	63.4	78.3	86.6	91.6
2018	2	78.5	18.8	65.2	91.8	65.2	65.2	78.5	91.8	91.8
2019	6	54.7	21.0	26.4	79.8	26.4	31.6	62.0	66.6	79.8
2020	1	85.1		85.1	85.1	85.1	85.1	85.1	85.1	85.1
1998-2020	372	73.9	13.3	22.9	99.4	57.8	65.7	76.1	83.9	88.5

Table 4

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

Age at diagnosis Years	Cases n	%	Cum.%	Males n	%	Cum.%	Females n	%	Cum.%
0-4									
5-9									
10-14									
15-19									
20-24	1	0.2	0.2			0.0	1	0.4	0.4
25-29	3	0.6	0.8	1	0.4	0.4	2	0.8	1.3
30-34	1	0.2	1.0			0.4	1	0.4	1.7
35-39	4	0.8	1.8	3	1.2	1.6	1	0.4	2.1
40-44	5	1.0	2.8	3	1.2	2.7	2	0.8	3.0
45-49	20	4.1	6.9	18	7.0	9.8	2	0.8	3.8
50-54	16	3.3	10.2	12	4.7	14.5	4	1.7	5.5
55-59	32	6.5	16.7	19	7.4	21.9	13	5.5	11.0
60-64	41	8.3	25.0	15	5.9	27.7	26	11.0	22.0
65-69	55	11.2	36.2	32	12.5	40.2	23	9.7	31.8
70-74	79	16.1	52.2	44	17.2	57.4	35	14.8	46.6
75-79	84	17.1	69.3	51	19.9	77.3	33	14.0	60.6
80-84	74	15.0	84.3	36	14.1	91.4	38	16.1	76.7
85+	77	15.7	100.0	22	8.6	100.0	55	23.3	100.0
All ages	492	100.0		256	100.0		236	100.0	

Table 5

Age-specific incidence and DCO rate
for period 2007-2020

Age at diagnosis Years	Males n	Females n	Males Age-spec. incid.	Females Age-spec. incid.	Males DCO rate n=61 %	Females DCO rate n=95 %
0- 4						
5- 9						
10-14						
15-19						
20-24		1		0.1		
25-29	1	2	0.0	0.1		
30-34		1		0.0		
35-39	3	1	0.1	0.0		
40-44	3	2	0.1	0.1		
45-49	18	2	0.7	0.1		
50-54	12	4	0.5	0.2	8.3	
55-59	19	13	0.9	0.6		7.7
60-64	15	26	0.8	1.4		
65-69	32	23	2.0	1.3	18.8	13.0
70-74	44	35	2.9	2.0	13.6	25.7
75-79	51	33	4.2	2.2	39.2	42.4
80-84	36	38	5.0	3.6	41.7	52.6
85+	22	55	4.7	5.3	59.1	87.3
All ages	256	236			23.8	40.3
Incidence						
Raw			0.8	0.7		
WS			0.4	0.3		
ES			0.5	0.4		
BRD-S			0.7	0.5		

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

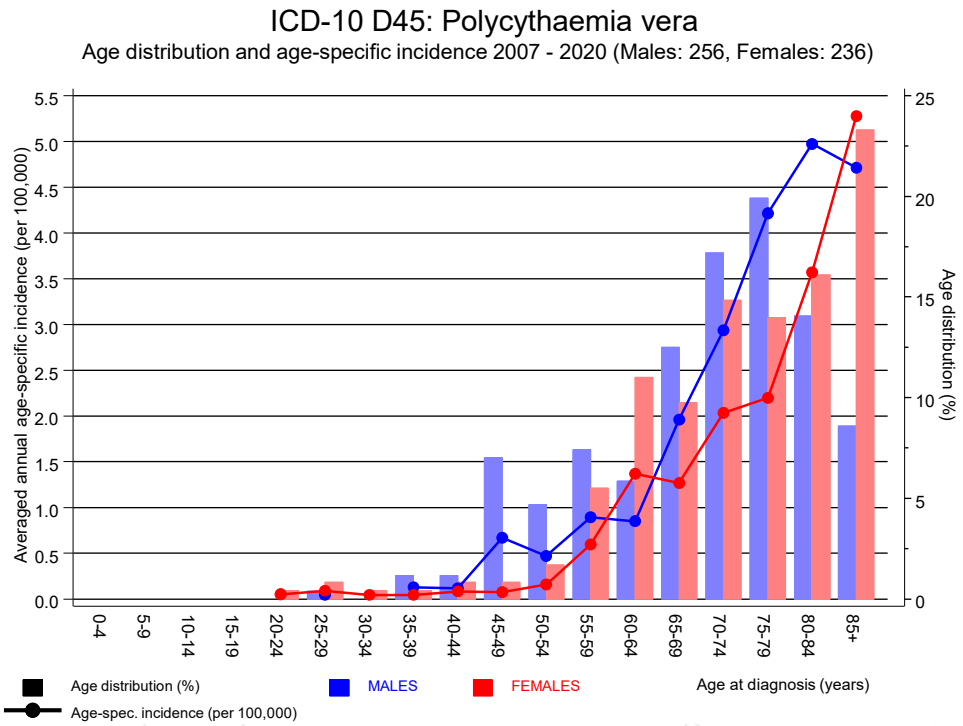


Figure 6. Age distribution (males: mean=70.4 yrs, median=72.3 yrs; females: mean=74.7 yrs, median=76.3 yrs) and age-specific incidence.

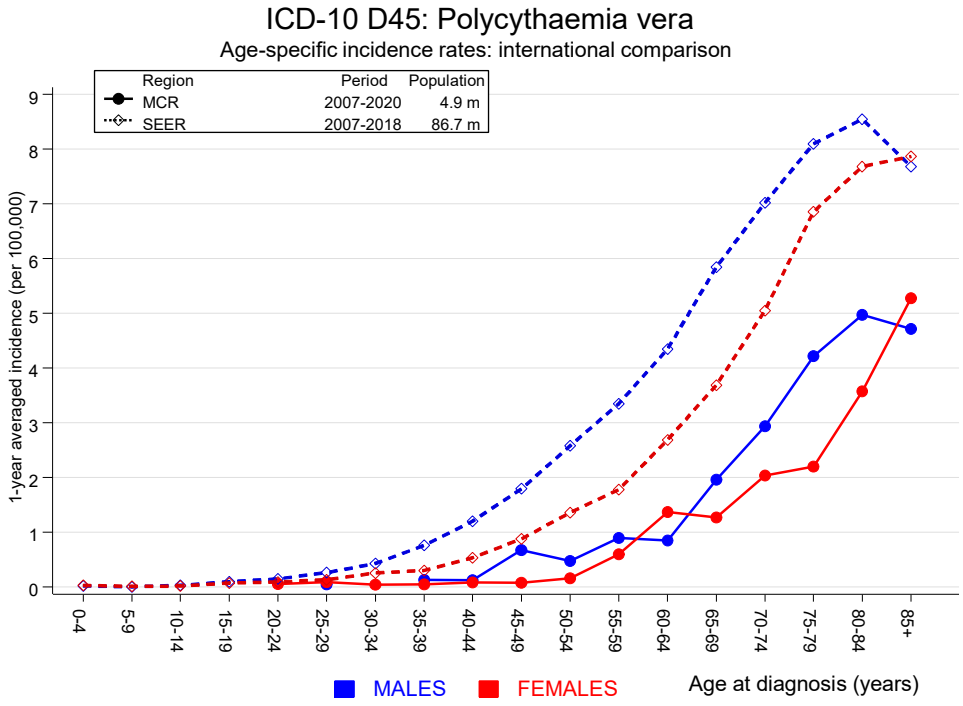


Figure 6a. Age-specific incidence in MCR registry areas compared to SEER (Surveillance, Epidemiology, and End Results, USA).

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 %
C03–C06	Oral cavity	3	0.2	13.1	2.7	38.3	#	16.6	
C09–C10	Oropharynx	1	0.3	3.5	0.1	19.7		4.3	
C15	Oesophagus	2	0.6	3.6	0.4	13.0		8.7	50.0
C16	Stomach	3	1.1	2.8	0.6	8.0		11.5	
C18	Colon	2	2.7	0.7	0.1	2.7		−4.2	
C19–C20	Rectum	2	1.5	1.4	0.2	4.9		3.2	
C25	Pancreas	2	1.1	1.8	0.2	6.6		5.4	
C33–C34	Lung	9	3.3	2.7	1.2	5.2	#	34.2	22.2
C38,C45	Mesothelioma	2	0.2	9.9	1.2	35.8	#	10.8	50.0
C43	Malign. melanoma	2	1.3	1.6	0.2	5.6		4.3	
C50	Breast	1	0.1	13.4	0.3	74.7		5.6	
C61	Prostate	11	7.9	1.4	0.7	2.5		18.3	
C64	Kidney	2	1.0	2.1	0.2	7.4		6.2	
C67	Bladder	4	1.3	3.1	0.8	7.8		16.2	
C70–C72	CNS cancer	1	0.4	2.8	0.1	15.5		3.8	
C73	Thyroid	1	0.2	5.7	0.1	31.6		4.9	
C76–C79	CUP	3	0.5	6.4	1.3	18.7	#	15.2	
C81	Hodgkin lymphoma	1	0.1	15.6	0.4	86.9		5.6	
C82–C85	NHL	4	1.2	3.4	0.9	8.6		16.9	
C90	Mult. myeloma	3	0.4	8.1	1.7	23.7	#	15.8	
C91–C96	Leukaemia	7	0.4	16.4	6.6	33.9	#	39.5	
Not observed		0	2.7	0.0	0.0	1.3		−16.4	
All further malignancies		66	28.3	2.3	1.8	3.0	#	226.4	6.1

Patients	319
Median age at next malignancy (years)	76.2
Person-years	1665
Mean observation time (years)	5.2
Median observation time (years)	3.9

The occurrence of further specified malignancy is statistically significant.

Table 7b

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

Diagnosis		Observed n	Expected n	SIR	CI 95%	CI 95%		EAR	DCO %
C16	Stomach	1	0.6	1.8	0.0	10.0		3.3	
C18	Colon	4	1.6	2.5	0.7	6.4		17.9	
C25	Pancreas	2	0.8	2.6	0.3	9.3		9.1	
C30–C31	Sinuses	1	0.0	45.4	1.1	253.0	#	7.2	
C33–C34	Lung	3	1.2	2.4	0.5	7.2		13.1	
C38,C45	Mesothelioma	1	0.0	31.7	0.8	176.8		7.2	
C46,C49	Soft tissue	2	0.1	21.8	2.6	78.8	#	14.1	
C50	Breast	7	4.7	1.5	0.6	3.0		16.7	
C51	Vulva	1	0.2	5.8	0.1	32.5		6.1	
C64	Kidney	3	0.4	7.8	1.6	22.9	#	19.4	
C67	Bladder	1	0.3	3.1	0.1	17.1		5.0	
C76–C79	CUP	3	0.3	10.0	2.1	29.3	#	20.0	
C82–C85	NHL	3	0.6	4.7	1.0	13.8		17.5	33.3
C91–C96	Leukaemia	3	0.2	12.6	2.6	36.8	#	20.4	
Not observed		0	4.9	0.0	0.0	0.7	#	-36.5	
All further malignancies		35	16.0	2.2	1.5	3.0	#	140.5	2.9

Patients	226
Median age at next malignancy (years)	74.2
Person-years	1350
Mean observation time (years)	6.0
Median observation time (years)	5.1

The occurrence of further specified malignancy is statistically significant.

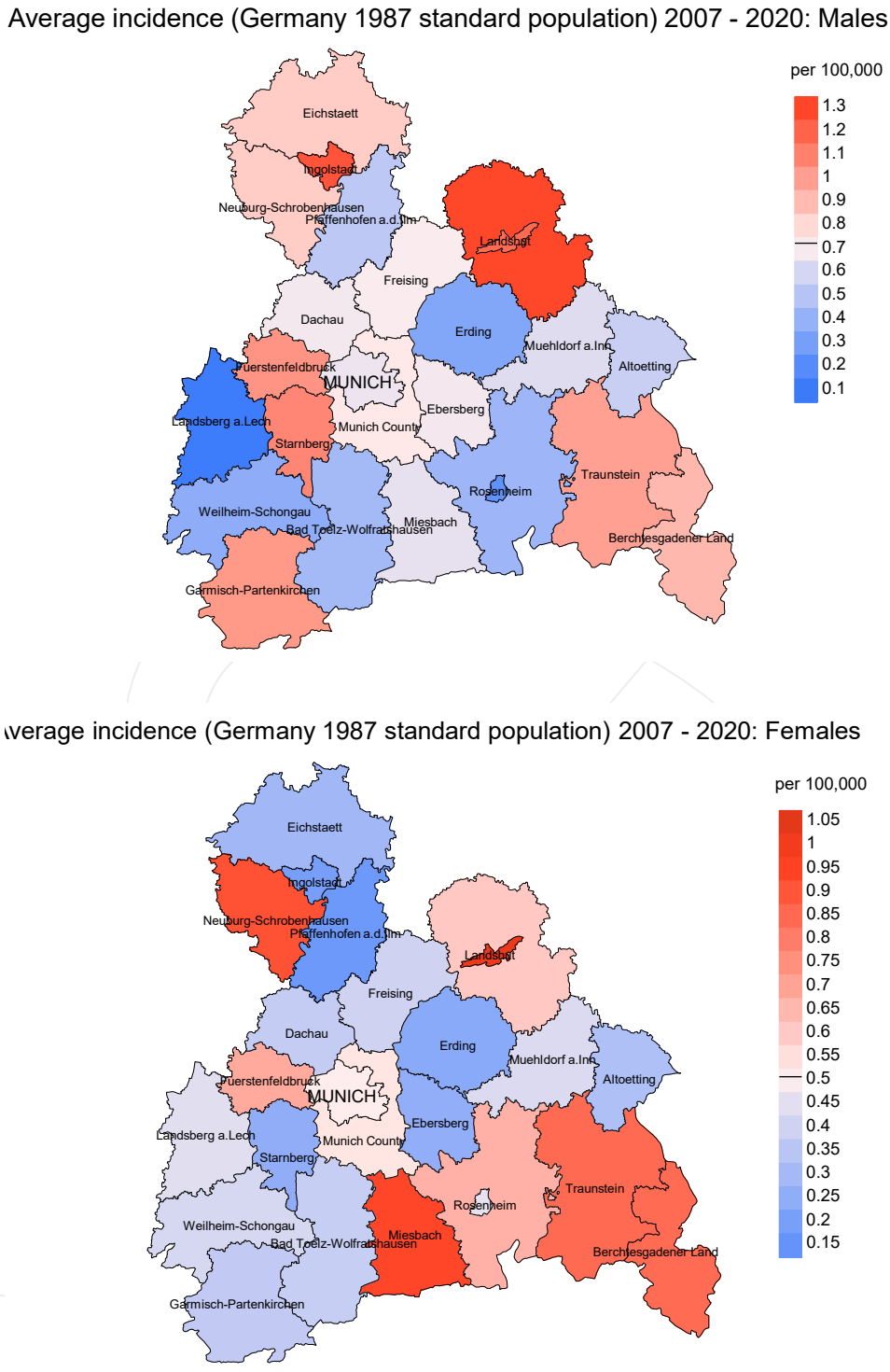
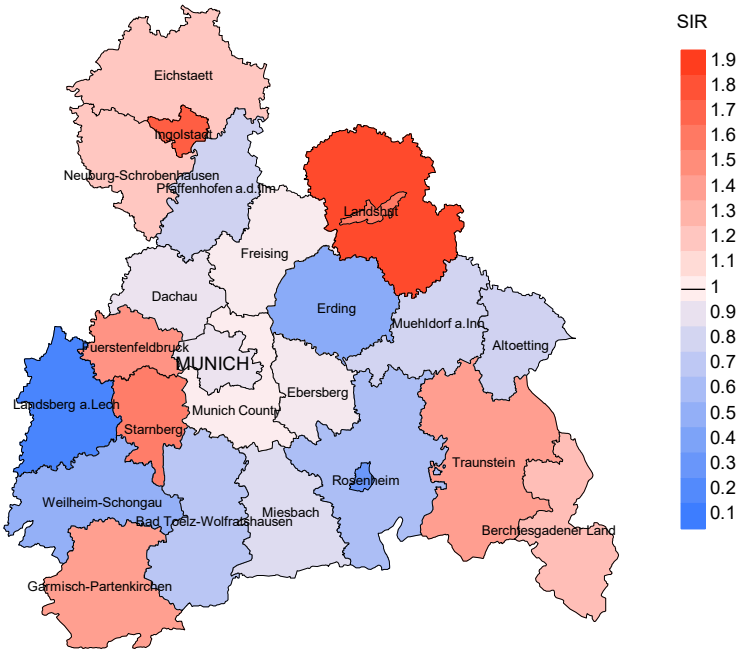


Figure 8a. Map of cancer incidence (german standard population, incl. DCO cases) by county averaged for period 2007 to 2020. According to their individual incidence rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (males 0.7/100,000 WS N=256, females 0.5/100,000 WS N=236).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 67,727 female residents (averaged) in the period from 2007 to 2020 a total of 3 women were identified with newly diagnosed polycythaemia vera. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 0.3/100,000 (german standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 0.0 and 1.0/100,000.

Standardized incidence ratio (SIR) 2007 - 2020: Males



Standardized incidence ratio (SIR) 2007 - 2020: Females

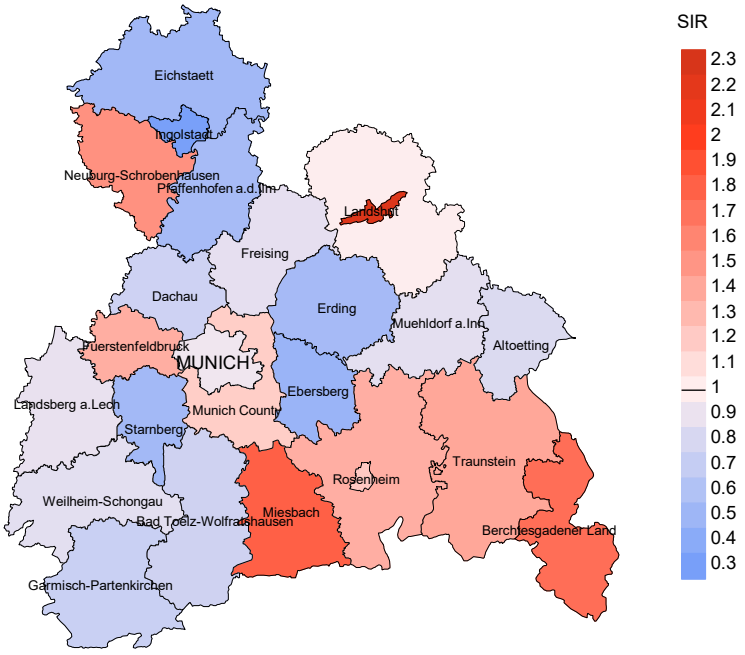


Figure 8b. Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2007 to 2020. According to their individual SIR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (males N=256, females N=236).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 67,153 female residents (averaged) in the period from 2007 to 2020 a total of 3 women were identified with newly diagnosed polycythaemia vera. Therefore, the mean standardized incidence ratio (SIR) for this cancer type in this area can be calculated at 0.48. Though, the value of this parameter may vary with an underlying probability of 99% between 0.05 and 1.75, 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	22	100.0	18.2	19	86.4	89.5
1999	24	100.0	20.8	20	83.3	95.0
2000	24	95.8	37.5	20	83.3	95.0
2001	24	95.8	37.5	16	66.7	93.8
2002	30	100.0	30.0	24	80.0	100.0
2003	40	95.0	37.5	29	72.5	93.1
2004	32	100.0	46.9	24	75.0	100.0
2005	40	97.5	22.5	30	75.0	100.0
2006	49	95.9	36.7	41	83.7	95.1
2007	61	96.7	32.8	44	72.1	95.5
2008	47	100.0	29.8	34	72.3	97.1
2009	49	98.0	24.5	32	65.3	96.9
2010	44	100.0	36.4	31	70.5	93.5
2011	46	97.8	23.9	25	54.3	92.0
2012	43	95.3	25.6	29	67.4	93.1
2013	44	93.2	22.7	27	61.4	88.9
2014	43	90.7	37.2	27	62.8	96.3
2015	32	96.9	46.9	22	68.8	90.9
2016	37	89.2	40.5	24	64.9	87.5
2017	23	95.7	56.5	14	60.9	100.0
2018	12	100.0	16.7	4	33.3	75.0
2019	9	88.9	11.1	1	11.1	100.0
2020	2	100.0				
1998-2020	777	96.5	32.0	537	69.1	94.6

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	22	6	83.3	4	18.2
1999	24	11	90.9	4	16.7
2000	24	17	88.2	9	37.5
2001	24	12	100.0	9	37.5
2002	30	12	100.0	10	33.3
2003	40	20	100.0	14	35.0
2004	32	15	100.0	16	50.0
2005	40	22	100.0	11	27.5
2006	49	27	100.0	19	38.8
2007	61	23	100.0	20	32.8
2008	47	20	95.0	11	23.4
2009	49	21	100.0	12	24.5
2010	44	26	100.0	17	38.6
2011	46	27	96.3	12	26.1
2012	43	27	100.0	13	30.2
2013	44	29	96.6	14	31.8
2014	43	23	95.7	15	34.9
2015	32	31	100.0	15	46.9
2016	37	34	100.0	17	45.9
2017	23	35	97.1	13	56.5
2018	12	30	76.7	4	33.3
2019	9	29	48.3	1	11.1
2020	2	24	95.8		
1998–2020	777	521	93.9	260	33.5

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	6	16.7	83.3	100.0
1999	11	18.2	81.8	70.0
2000	17	23.5	76.5	86.7
2001	12	41.7	58.3	91.7
2002	12	58.3	41.7	91.7
2003	20	40.0	60.0	85.0
2004	15	60.0	40.0	100.0
2005	22	59.1	40.9	95.5
2006	27	40.7	59.3	88.9
2007	23	60.9	39.1	91.3
2008	20	55.0	45.0	84.2
2009	21	61.9	38.1	81.0
2010	26	46.2	53.8	73.1
2011	27	51.9	48.1	92.3
2012	27	55.6	44.4	74.1
2013	29	51.7	48.3	89.3
2014	23	43.5	56.5	72.7
2015	31	51.6	48.4	80.6
2016	34	61.8	38.2	79.4
2017	35	42.9	57.1	67.6
2018	30	43.3	56.7	52.2
2019	29	37.9	62.1	64.3
2020	24	45.8	54.2	60.9
1998-2020	521	48.2	51.8	80.2

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	1	67.8		67.8	67.8
1999	4	69.9		69.9	74.0
2000	12	76.4	77.1	76.0	76.7
2001	5	79.9	79.9	71.7	79.9
2002	5	64.5	62.3	68.5	63.4
2003	6	75.5	78.7	62.1	75.1
2004	5	81.8	88.2	76.3	81.8
2005	17	74.5	73.5	78.2	74.1
2006	13	74.8	72.8	82.3	74.8
2007	8	82.1	82.1	80.1	82.0
2008	9	71.1	70.7	75.2	70.9
2009	7	78.2	75.6	96.9	73.1
2010	16	79.5	80.9	78.0	78.0
2011	13	78.1	71.8	79.6	75.0
2012	15	75.5	70.2	75.5	70.2
2013	16	77.4	75.6	81.2	75.8
2014	12	80.4	80.0	87.2	80.8
2015	14	80.2	77.6	80.7	80.2
2016	22	78.8	77.7	80.1	79.0
2017	23	78.0	77.9	82.2	76.5
2018	18	77.7	76.0	79.6	74.4
2019	16	79.2	70.8	82.6	80.4
2020	16	79.9	80.0	79.9	77.7
1998-2020	273	77.7	76.5	79.3	76.7

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	5	81.7	83.4	74.6	74.6
1999	7	78.8	76.6	78.8	78.8
2000	5	81.9	81.9	82.2	80.5
2001	7	80.7	69.9	84.9	82.8
2002	7	83.9	81.0	85.7	83.9
2003	14	81.1	74.2	81.1	81.6
2004	10	84.8	84.1	84.8	84.8
2005	5	79.0	72.8	86.9	79.0
2006	14	79.3	77.2	80.1	80.4
2007	15	79.9	80.2	69.5	79.8
2008	11	81.8	79.9	81.8	85.6
2009	14	76.5	69.1	80.6	71.8
2010	10	84.0	83.1	86.8	85.2
2011	14	81.3	76.1	86.1	81.3
2012	12	81.4	77.9	89.9	81.4
2013	13	87.4	77.7	87.8	85.1
2014	11	81.9	81.9	80.6	83.0
2015	17	82.3	75.5	85.6	82.3
2016	12	81.5	76.5	87.4	80.5
2017	12	81.1	77.5	86.5	79.6
2018	12	76.1	68.4	82.9	68.4
2019	13	74.9	76.7	72.9	83.8
2020	8	82.8	91.5	77.6	85.8
1998–2020	248	80.5	78.7	82.7	80.8

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									
1999									
2000	3	0.3	0.21	0.1	0.18	0.2	0.22	0.4	0.25
2001	3	0.3	0.21	0.1	0.18	0.2	0.23	0.4	0.28
2002	3	0.2	0.25	0.1	0.29	0.1	0.25	0.2	0.23
2003	4	0.2	0.18	0.1	0.14	0.2	0.18	0.3	0.23
2004	3	0.2	0.18	0.1	0.17	0.2	0.21	0.2	0.22
2005	10	0.5	0.38	0.3	0.36	0.4	0.37	0.6	0.38
2006	7	0.4	0.28	0.2	0.25	0.3	0.27	0.4	0.26
2007	4	0.2	0.13	0.1	0.08	0.1	0.11	0.2	0.16
2008	7	0.3	0.30	0.2	0.34	0.2	0.31	0.3	0.30
2009	6	0.3	0.29	0.1	0.33	0.2	0.31	0.3	0.30
2010	7	0.3	0.29	0.1	0.24	0.2	0.30	0.3	0.33
2011	7	0.3	0.30	0.1	0.24	0.2	0.27	0.3	0.31
2012	6	0.3	0.26	0.1	0.27	0.2	0.28	0.2	0.25
2013	10	0.4	0.40	0.2	0.33	0.3	0.37	0.4	0.38
2014	5	0.2	0.24	0.1	0.22	0.1	0.23	0.2	0.26
2015	9	0.4	0.45	0.1	0.40	0.2	0.42	0.3	0.45
2016	13	0.5	0.62	0.2	0.55	0.3	0.57	0.5	0.62
2017	9	0.4	0.82	0.1	0.77	0.2	0.77	0.3	0.83
2018	9	0.4	0.90	0.1	0.77	0.2	0.84	0.3	0.88
2019	6	0.2	2.00	0.1	1.71	0.2	1.68	0.2	2.15
2020	8	0.3	8.00	0.1	13.7	0.2	11.8	0.3	8.40
1998-2020	139	0.3	0.34	0.1	0.29	0.2	0.32	0.3	0.35

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	1	0.1	0.07	0.0	0.03	0.0	0.05	0.1	0.08
1999	2	0.2	0.15	0.1	0.11	0.1	0.13	0.2	0.17
2000	1	0.1	0.10	0.0	0.04	0.0	0.06	0.1	0.10
2001	2	0.2	0.20	0.1	0.27	0.1	0.26	0.2	0.24
2002	4	0.2	0.22	0.1	0.15	0.1	0.18	0.2	0.20
2003	4	0.2	0.22	0.1	0.22	0.1	0.21	0.1	0.20
2004	6	0.3	0.40	0.1	0.32	0.1	0.36	0.2	0.37
2005	3	0.2	0.21	0.1	0.25	0.1	0.27	0.1	0.26
2006	4	0.2	0.17	0.1	0.17	0.1	0.16	0.2	0.18
2007	10	0.4	0.32	0.1	0.19	0.2	0.24	0.4	0.33
2008	4	0.2	0.17	0.1	0.11	0.1	0.12	0.1	0.12
2009	7	0.3	0.25	0.1	0.33	0.2	0.30	0.3	0.30
2010	5	0.2	0.25	0.1	0.17	0.1	0.21	0.2	0.26
2011	7	0.3	0.30	0.1	0.24	0.2	0.27	0.2	0.31
2012	9	0.4	0.45	0.1	0.42	0.2	0.46	0.3	0.49
2013	5	0.2	0.26	0.0	0.16	0.1	0.19	0.1	0.23
2014	5	0.2	0.23	0.0	0.15	0.1	0.18	0.1	0.21
2015	7	0.3	0.58	0.1	0.51	0.1	0.53	0.2	0.59
2016	8	0.3	0.50	0.1	0.55	0.1	0.52	0.2	0.51
2017	6	0.2	0.50	0.1	0.36	0.1	0.42	0.2	0.49
2018	4	0.2	2.00	0.1	2.69	0.1	2.45	0.1	2.59
2019	5	0.2	0.83	0.1	0.42	0.1	0.53	0.1	0.62
2020	3	0.1	3.00	0.0	3.00	0.0	3.00	0.0	3.00
1998-2020	112	0.2	0.30	0.1	0.24	0.1	0.26	0.2	0.29

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	0.5	0.5	1	0.9	0.9			0.0
35-39	0	0.0	0.5			0.9			0.0
40-44	0	0.0	0.5			0.9			0.0
45-49	1	0.5	1.0	1	0.9	1.9			0.0
50-54	2	1.0	2.1	1	0.9	2.8	1	1.2	1.2
55-59	3	1.6	3.7	2	1.9	4.7	1	1.2	2.4
60-64	13	6.8	10.5	7	6.6	11.3	6	7.1	9.4
65-69	17	8.9	19.4	10	9.4	20.8	7	8.2	17.6
70-74	33	17.3	36.6	21	19.8	40.6	12	14.1	31.8
75-79	50	26.2	62.8	28	26.4	67.0	22	25.9	57.6
80-84	37	19.4	82.2	19	17.9	84.9	18	21.2	78.8
85+	34	17.8	100.0	16	15.1	100.0	18	21.2	100.0
All ages	191	100.0		106	100.0		85	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
0– 4						
5– 9						
10–14						
15–19						
20–24						
25–29						
30–34	1		0.0	1.00		
35–39						
40–44						
45–49	1		0.0	0.06		
50–54	1	1	0.0	0.08	0.0	0.25
55–59	2	1	0.1	0.11	0.0	0.08
60–64	7	6	0.4	0.47	0.3	0.23
65–69	10	7	0.6	0.31	0.4	0.30
70–74	21	12	1.4	0.48	0.7	0.34
75–79	28	22	2.3	0.55	1.5	0.67
80–84	19	18	2.6	0.53	1.7	0.47
85+	16	18	3.4	0.73	1.7	0.33
All ages	106	85				
Mortality						
Raw			0.3	0.41	0.3	0.36
WS			0.1	0.35	0.1	0.29
ES			0.2	0.38	0.1	0.31
BRD-S			0.3	0.42	0.2	0.35
PYLL-70						
per 100,000			0.6		0.3	
ES			0.5		0.3	
AYLL-70			8.2		6.2	

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 ←%
C00	Lip	1	1.0					1	100.0
C03–C06	Oral cavity	1	1.0					1	100.0
C15	Oesophagus	2	1.9			1	50.0	1	50.0
C16	Stomach	2	1.9	1	50.0			1	50.0
C18	Colon	4	3.8	2	50.0			2	50.0
C19–C20	Rectum	1	1.0					1	100.0
C22	Liver	1	1.0	1	100.0				
C25	Pancreas	1	1.0					1	100.0
C32	Larynx	1	1.0	1	100.0				
C33–C34	Lung	12	11.5	1	8.3	3	25.0	8	66.7
C38,C45	Mesothelioma	2	1.9					2	100.0
C40–C41	Bone	1	1.0	1	100.0				
C43	Malign. melanoma	6	5.8	3	50.0	1	16.7	2	33.3
C44	Skin others	23	22.1	2	8.7	2	8.7	19	82.6
C46,C49	Soft tissue	1	1.0					1	100.0
C61	Prostate	15	14.4	9	60.0			6	40.0
C64	Kidney	3	2.9	1	33.3			2	66.7
C67	Bladder	4	3.8					4	100.0
C70–C72	CNS cancer	2	1.9	1	50.0			1	50.0
C73	Thyroid	1	1.0					1	100.0
C76–C79	CUP	4	3.8			2	50.0	2	50.0
C81	Hodgkin lymphoma	1	1.0			1	100.0		
C82–C85	NHL	2	1.9			2	100.0		
C90	Mult. myeloma	2	1.9					2	100.0
C91–C96	Leukaemia	11	10.6			1	9.1	10	90.9
All further malignancies		104	100.0	23	22.1	13	12.5	68	65.4

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 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 ←%
C16	Stomach	1	1.5					1	100.0
C18	Colon	5	7.7	1	20.0			4	80.0
C21	Anus/canal	3	4.6	2	66.7			1	33.3
C25	Pancreas	4	6.2	1	25.0			3	75.0
C32	Larynx	1	1.5	1	100.0				
C33–C34	Lung	2	3.1	1	50.0			1	50.0
C38,C45	Mesothelioma	1	1.5					1	100.0
C43	Malign. melanoma	3	4.6	2	66.7			1	33.3
C44	Skin others	12	18.5	3	25.0			9	75.0
C46,C49	Soft tissue	2	3.1					2	100.0
C50	Breast	13	20.0	6	46.2			7	53.8
C54	Corpus uteri	2	3.1	1	50.0			1	50.0
C64	Kidney	1	1.5	1	100.0				
C70–C72	CNS cancer	1	1.5					1	100.0
C76–C79	CUP	5	7.7			3	60.0	2	40.0
C82–C85	NHL	4	6.2			1	25.0	3	75.0
C91–C96	Leukaemia	5	7.7					5	100.0
All further malignancies		65	100.0	19	29.2	4	6.2	42	64.6

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
0- 4						
5- 9						
10-14						
15-19						
20-24						
25-29						
30-34	1		0.0	1.00		
35-39						
40-44						
45-49	1		0.0	0.06		
50-54	1	1	0.0	0.09	0.0	0.25
55-59	2	1	0.1	0.11	0.0	0.09
60-64	6	6	0.3	0.43	0.3	0.23
65-69	8	6	0.5	0.35	0.3	0.40
70-74	16	12	1.1	0.50	0.7	0.50
75-79	21	16	1.7	0.68	1.1	0.67
80-84	16	15	2.2	0.53	1.4	0.52
85+	12	16	2.6	1.09	1.5	0.42
All ages	84	73				
Mortality						
Raw			0.3	0.43	0.2	0.41
WS			0.1	0.36	0.1	0.31
ES			0.2	0.39	0.1	0.35
BRD-S			0.2	0.44	0.2	0.38
PYLL-70						
per 100,000			0.6		0.3	
ES			0.5		0.3	
AYLL-70			8.8		6.4	

* 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
0- 4						
5- 9						
10-14						
15-19						
20-24						
25-29						
30-34	1		0.0	1.00		
35-39						
40-44						
45-49	1		0.0	0.06		
50-54	1	1	0.0	0.09	0.0	0.25
55-59	2		0.1	0.13		
60-64	4	1	0.2	0.44	0.1	0.07
65-69	4	3	0.2	0.21	0.2	0.25
70-74	10	6	0.7	0.40	0.3	0.32
75-79	10	12	0.8	0.43	0.8	0.55
80-84	9	12	1.2	0.43	1.1	0.44
85+	6	12	1.3	0.60	1.2	0.32
All ages	48	47				
Mortality						
Raw			0.1	0.31	0.1	0.31
WS			0.1	0.26	0.0	0.22
ES			0.1	0.28	0.1	0.25
BRD-S			0.1	0.31	0.1	0.29
PYLL-70						
per 100,000			0.5		0.1	
ES			0.4		0.1	
AYLL-70			11.0		6.5	

* See corresponding tables with multiple malignancies.

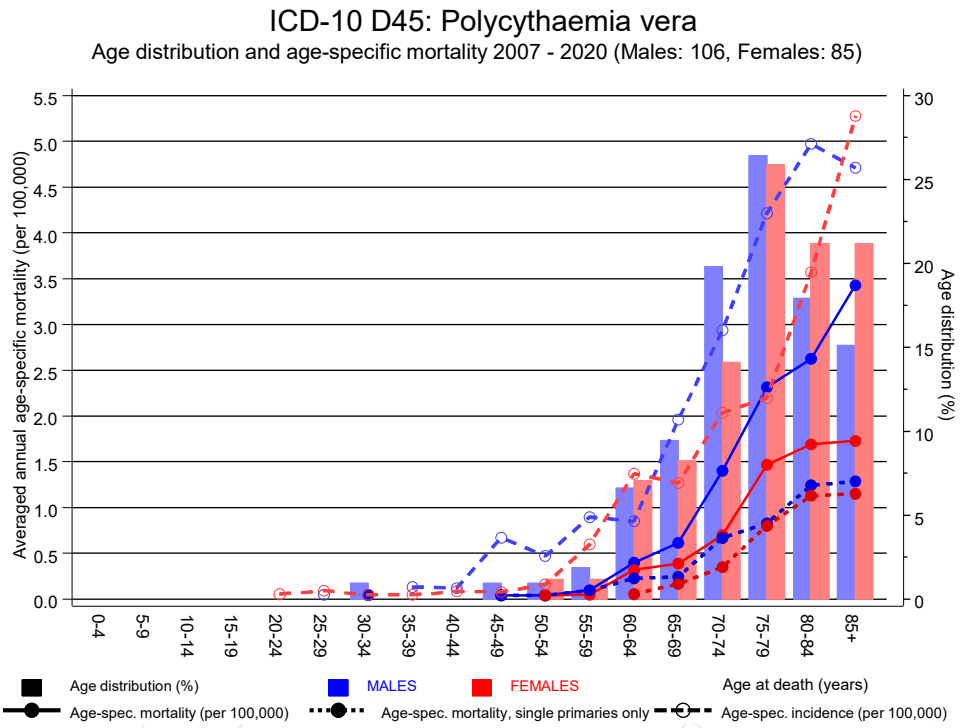


Figure 17. Distribution of age at death (bars; males: mean=66.9 yrs, median=68.0 yrs; females: mean=69.0 yrs, median=70.5 yrs) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

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

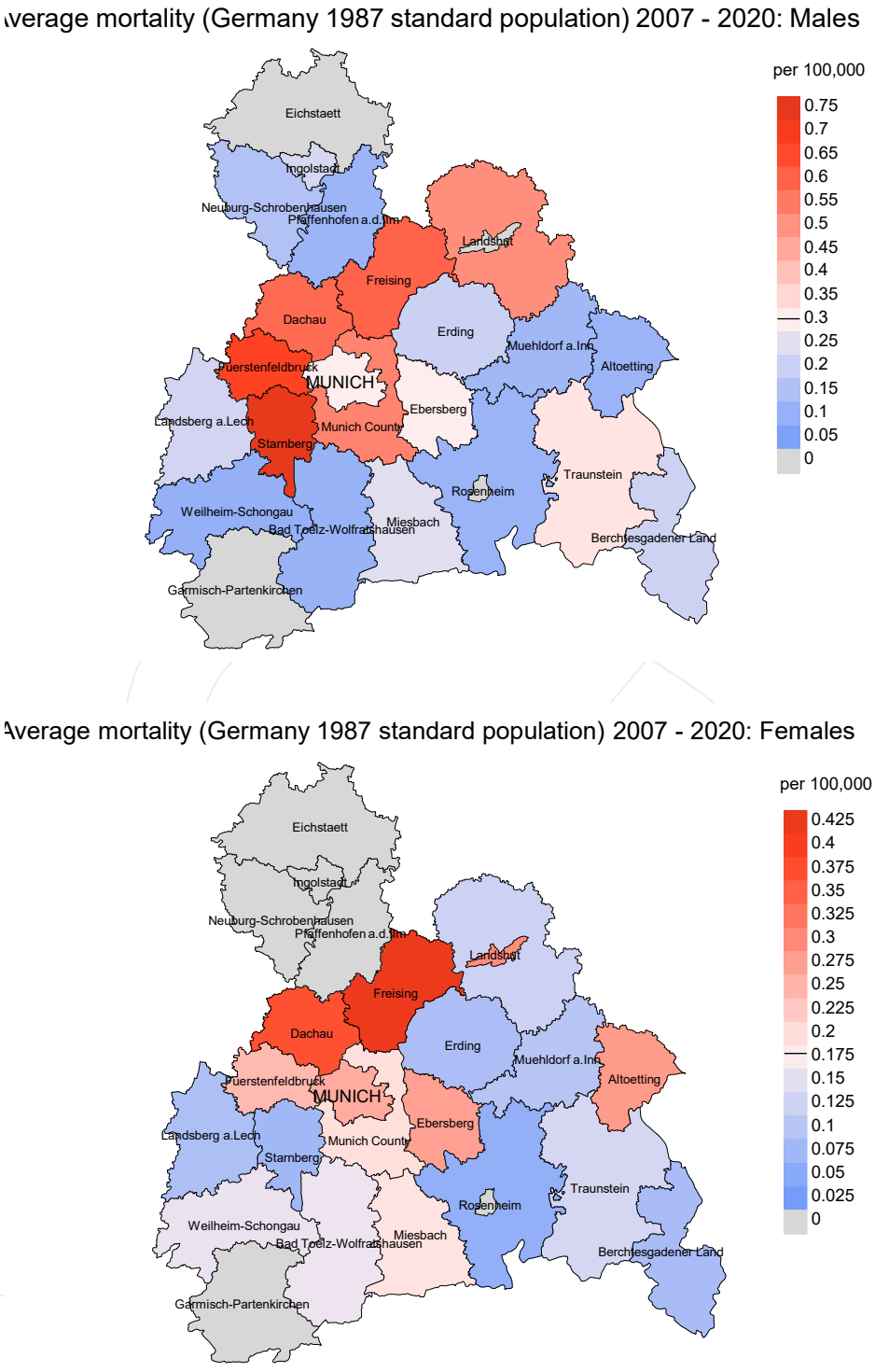
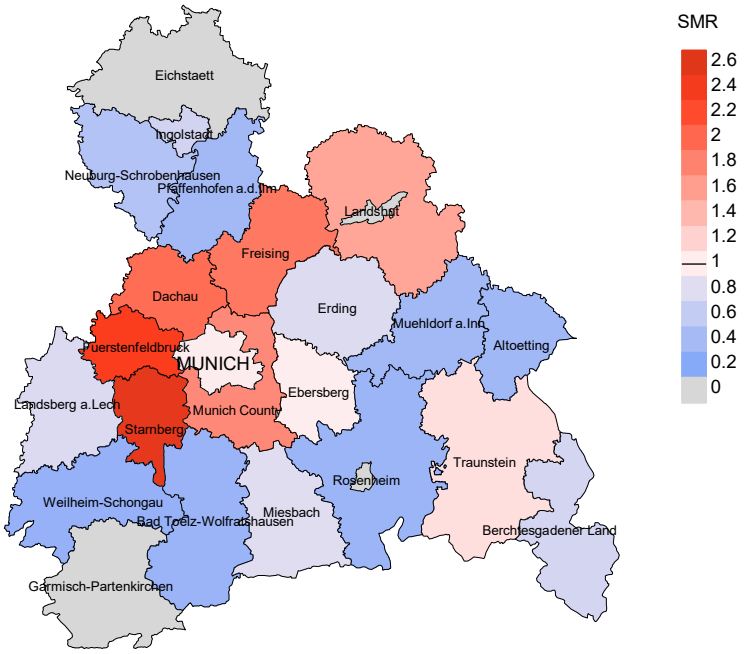


Figure 18a. Map of cancer mortality (german standard population) by county averaged for period 2007 to 2020. According to their individual mortality rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (males 0.3/100,000 WS N=106, females 0.2/100,000 WS N=85).

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

Standardized mortality ratio (SMR) 2007 - 2020: Males



Standardized mortality ratio (SMR) 2007 - 2020: Females

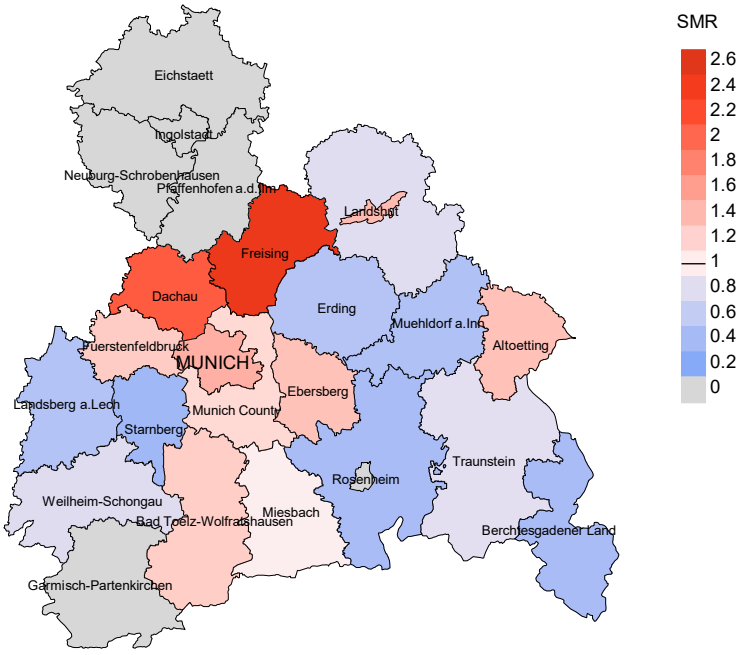


Figure 18b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2007 to 2020. According to their individual SMR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (males N=106, females N=85).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 67,153 female residents (averaged) in the period from 2007 to 2020 a total of 3 women died from polycythaemia vera. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 1.33. Though, the value of this parameter may vary with an underlying probability of 99% between 0.15 and 4.85, 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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