Munich Cancer Registry

- Survival
- Selection Matrix
- Homepage
- *Deutsch*

ICD-10 C21: Anal cancer

Incidence and Mortality

Year of diagnosis	1998-2020
Patients	2,057
Diseases	2,057
Creation date	12/20/2021
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/bC21__E-ICD-10-C21-Anal-cancer-incidence-and-mortality.pdf

Index of figures and tables

Fig./Tbl.		Page
1	Annual cases, DCO, mult. malignancies, follow-up / yr	4
2	Incidence by year of diagnosis	7
3	Age distribution parameters by year of diagnosis	8
4	Age distribution by 5-year age group and sex	11
5	Age-specific incidence, DCO rate, proportion malignancies	12
6	Age distribution and age-specific incidence (chart)	13
6a	Age-specific incidence internationally (chart)	14
7	Standardized incidence ratio of further malignancies	15
8a	Map of cancer incidence (BRD-S) by county (chart)	17
8b	Standardized incidence ratio (SIR) by county (chart)	18
9a	Pts incident cohorts and mortality / yr	19
9b	Incidence and mortality by year of diagnosis	20
9c	Cancer-related deaths, death certification available / yr	21
10	Medians of age at death / yr	22
11	Mortality by year of death	24
12	Distribution of age at death	26
13	Age-specific mortality	27
14	Further malignancies in deaths	28
15	Age-specific mortality (first primaries)	30
16	Age-specific mortality (single primaries)	31
17	Age distribution and age-specific mortality (chart)	32
18a	Map of cancer mortality (BRD-S) by county (chart)	33
18b	Standardized mortality ratio (SMR) by county (chart)	34

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
C21.-	Malignant neoplasm of anus and anal canal
C21.0	Anus, unspecified
C21.1	Anal canal
C21.2	Cloacogenic zone
C21.8	Overlapping lesion of rectum, anus and anal canal

INCIDENCE

Table 1

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

Year of diagnosis	All cases n	DCO cases n	Prop. DCO %	Prop. at least 1 further malign. prior + synchron. %	Prop. at least 1 further malign. after %	Prop. deaths %	Prop. actively followed %
1998	70			11.4	13.5	78.6	98.6
1999	50	3	6.0	8.3	13.2	78.0	96.0
2000	51			8.8	12.9	80.4	98.0
2001	66	3	4.5	9.3	12.8	69.7	93.9
2002	71	2	2.8	10.4	12.5	73.2	97.2 #
2003	67	1	1.5	10.4	12.0	56.7	92.5
2004	75	2	2.7	11.3	11.6	50.7	97.3
2005	78	1	1.3	13.1	11.2	70.5	94.9
2006	82	4	4.9	14.3	11.0	58.5	95.1
2007	95	4	4.2	15.0	10.4	65.3	97.9 #
2008	88	1	1.1	14.9	10.1	58.0	95.5
2009	114	1	0.9	15.5	9.9	52.6	98.2
2010	120	6	5.0	16.4	8.8	58.3	99.2
2011	105	2	1.9	16.1	8.7	47.6	97.1
2012	108			16.7	7.8	49.1	97.2
2013	112			17.7	8.1	39.3	98.2
2014	115	4	3.5	17.7	7.4	39.1	94.8
2015	126	2	1.6	18.0	6.8	34.9	88.1
2016	119	3	2.5	18.2	6.2	37.8	99.2
2017	121	3	2.5	18.2	4.8	27.3	100.0
2018	81	1	1.2	18.2	4.6	22.2	100.0
2019	88	1	1.1	18.5	3.6	23.9	100.0
2020	55			18.6	3.7	23.6	100.0 ##
1998-2020	2057	44	2.1	18.6	13.5	49.6	96.9

2,057 cases diagnosed 1998-2020 are related to a total of 2,057 patients. Currently, in 639 (31.1 %) of these 2,057 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 485 / 117 / 37 (23.6 % / 5.7 % / 1.8 %) patients exist having 2 / 3 / 4+ malignancies.

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

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

How to interpret:
In 2018, a subgroup of 81 cases has been diagnosed, of which 18.2 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 4.6 % 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 1a

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

Year of diagnosis	Males n	Males %	DCO cases n	Prop. DCO %	Prop. at least 1 further malign. prior + synchron. %	Prop. at least 1 further malign. after %	Prop. deaths %	Prop. actively followed %
1998	28	40.0			3.6	14.8	82.1	96.4
1999	19	38.0	1	5.3	4.3	14.4	89.5	100.0
2000	18	35.3			4.6	13.8	72.2	94.4
2001	29	43.9	1	3.4	7.4	14.0	86.2	96.6
2002	20	28.2			8.8	13.4	90.0	100.0 #
2003	21	31.3	1	4.8	9.6	12.9	71.4	95.2
2004	18	24.0			9.2	12.5	55.6	94.4
2005	17	21.8			10.6	12.3	82.4	88.2
2006	26	31.7			12.2	11.9	76.9	96.2
2007	35	36.8			12.6	11.3	65.7	100.0 #
2008	28	31.8			12.7	11.3	53.6	92.9
2009	43	37.7	1	2.3	12.6	11.1	58.1	100.0
2010	41	34.2	3	7.3	13.4	10.2	80.5	97.6
2011	43	41.0	1	2.3	13.5	10.2	55.8	97.7
2012	29	26.9			14.7	8.6	65.5	96.6
2013	41	36.6			15.8	8.8	43.9	100.0
2014	39	33.9			15.8	7.8	48.7	97.4
2015	48	38.1			15.8	6.7	47.9	91.7
2016	39	32.8			15.8	6.2	48.7	100.0
2017	45	37.2	2	4.4	16.1	3.7	33.3	100.0
2018	21	25.9			16.4	4.7	38.1	100.0
2019	28	31.8	1	3.6	16.6	2.3	32.1	100.0
2020	16	29.1			16.5	6.3	43.8	100.0 ##
1998-2020	692	33.6	11	1.6	16.5	14.8	59.5	97.4

692 cases diagnosed 1998-2020 are related to a total of 692 patients. Currently, in 209 (30.2 %) of these 692 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 156 / 40 / 13 (22.5 % / 5.8 % / 1.9 %) 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 21 cases has been diagnosed, of which 16.4 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 4.7 % 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 1b

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

Year of diagnosis	Females n	Females %	DCO cases n	Prop. DCO %	Prop. at least 1 further malign. prior + synchron. %	Prop. at least 1 further malign. after %	Prop. deaths %	Prop. actively followed %	
1998	42	60.0			16.7	12.8	76.2	100.0	
1999	31	62.0	2	6.5	11.0	12.7	71.0	93.5	
2000	33	64.7			11.3	12.4	84.8	100.0	
2001	37	56.1	2	5.4	10.5	12.2	56.8	91.9	
2002	51	71.8	2	3.9	11.3	12.0	66.7	96.1	#
2003	46	68.7			10.8	11.5	50.0	91.3	
2004	57	76.0	2	3.5	12.5	11.2	49.1	98.2	
2005	61	78.2	1	1.6	14.2	10.7	67.2	96.7	
2006	56	68.3	4	7.1	15.2	10.5	50.0	94.6	
2007	60	63.2	4	6.7	16.2	9.9	65.0	96.7	#
2008	60	68.2	1	1.7	15.9	9.5	60.0	96.7	
2009	71	62.3			17.0	9.3	49.3	97.2	
2010	79	65.8	3	3.8	17.8	8.1	46.8	100.0	
2011	62	59.0	1	1.6	17.4	8.0	41.9	96.8	
2012	79	73.1			17.7	7.5	43.0	97.5	
2013	71	63.4			18.6	7.8	36.6	97.2	
2014	76	66.1	4	5.3	18.6	7.2	34.2	93.4	
2015	78	61.9	2	2.6	19.1	6.8	26.9	85.9	
2016	80	67.2	3	3.8	19.5	6.2	32.5	98.8	
2017	76	62.8	1	1.3	19.3	5.3	23.7	100.0	
2018	60	74.1	1	1.7	19.2	4.5	16.7	100.0	
2019	60	68.2			19.5	4.2	20.0	100.0	
2020	39	70.9			19.6	2.6	15.4	100.0	##
1998-2020	1365	66.4	33	2.4	19.6	12.8	44.6	96.6	

1,365 cases diagnosed 1998-2020 are related to a total of 1,365 patients. Currently, in 430 (31.5 %) of these 1,365 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 329 / 77 / 24 (24.1 % / 5.6 % / 1.8 %) patients exist having 2 / 3 / 4+ malignancies.

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

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

How to interpret:
In 2018, a subgroup of 60 cases has been diagnosed, of which 19.2 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 4.5 % 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 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	28	42	2.5	3.6	1.6	1.7	2.2	2.5	2.7	3.1
1999	19	31	1.7	2.6	1.0	1.2	1.5	1.7	2.0	2.1
2000	18	33	1.6	2.7	0.9	1.5	1.4	2.1	1.8	2.4
2001	29	37	2.5	3.0	1.5	1.5	2.1	2.2	2.6	2.6
2002	20	51	1.1	2.6	0.6	1.3	0.9	1.9	1.2	2.2
2003	21	46	1.1	2.3	0.7	1.3	1.0	1.7	1.1	2.0
2004	18	57	1.0	2.9	0.6	1.5	0.8	2.0	1.0	2.5
2005	17	61	0.9	3.1	0.5	1.4	0.8	2.0	0.9	2.6
2006	26	56	1.4	2.8	0.8	1.5	1.1	2.1	1.2	2.4
2007	35	60	1.6	2.6	0.9	1.2	1.3	1.7	1.6	2.1
2008	28	60	1.3	2.6	0.7	1.2	1.0	1.7	1.2	2.1
2009	43	71	1.9	3.1	1.1	1.7	1.6	2.3	1.8	2.6
2010	41	79	1.8	3.4	0.9	1.6	1.3	2.3	1.7	2.8
2011	43	62	1.9	2.7	1.0	1.4	1.5	2.0	1.8	2.2
2012	29	79	1.3	3.3	0.6	1.7	0.9	2.4	1.2	2.7
2013	41	71	1.8	3.0	1.0	1.4	1.4	2.1	1.6	2.4
2014	39	76	1.7	3.2	0.9	1.7	1.3	2.3	1.5	2.6
2015	48	78	2.0	3.2	1.2	1.5	1.7	2.2	1.8	2.6
2016	39	80	1.6	3.3	0.9	1.6	1.3	2.3	1.4	2.6
2017	45	76	1.9	3.1	0.9	1.6	1.3	2.2	1.7	2.5
2018	21	60	0.9	2.4	0.5	1.3	0.7	1.8	0.8	2.0
2019	28	60	1.2	2.4	0.6	1.2	0.8	1.7	1.0	2.0
2020	16	39	0.7	1.6	0.3	0.9	0.5	1.2	0.6	1.3
1998–2020	692	1365	1.5	2.8	0.8	1.4	1.2	2.0	1.4	2.3

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	70	66.4	13.6	34.3	92.4	49.0	57.3	65.1	78.2	85.3
1999	50	68.9	16.1	30.8	94.8	43.8	61.9	69.0	82.5	89.5
2000	51	64.4	12.4	34.7	89.8	51.4	56.1	64.0	72.7	80.0
2001	66	65.0	14.7	35.3	92.5	43.7	55.2	63.4	77.0	85.5
2002	71	67.1	12.6	41.6	89.2	51.6	58.7	65.5	78.7	84.0
2003	67	62.4	15.4	35.2	91.9	41.9	49.4	62.7	74.4	85.6
2004	75	65.2	14.3	28.1	95.9	46.6	54.6	63.9	78.2	82.8
2005	78	67.4	13.2	32.2	91.7	46.4	59.6	68.2	78.1	83.2
2006	82	63.7	13.0	28.5	93.2	45.3	54.4	63.9	70.4	82.0
2007	95	67.9	14.4	28.6	94.9	47.5	56.5	68.1	80.0	87.2
2008	88	66.5	14.0	33.6	93.9	46.2	57.4	68.0	75.7	85.7
2009	114	63.9	13.5	23.8	102	47.1	54.2	64.4	72.2	82.0
2010	120	67.5	13.6	36.9	94.4	48.6	57.7	68.2	77.5	85.4
2011	105	64.5	13.4	22.8	101	47.4	54.7	63.8	73.9	82.3
2012	108	67.7	14.3	37.2	96.5	49.3	55.3	68.3	80.0	86.5
2013	112	66.0	13.7	32.1	96.7	48.7	56.4	65.7	75.5	84.4
2014	115	64.5	14.3	1.4	93.5	45.8	55.2	65.2	74.9	82.0
2015	126	65.2	12.8	30.9	92.7	49.5	55.5	65.8	74.4	80.7
2016	119	66.0	13.3	36.4	95.6	52.0	57.1	64.0	77.1	84.6
2017	121	65.6	13.4	26.3	89.9	48.3	53.9	67.3	77.2	83.6
2018	81	64.7	11.3	40.1	94.2	50.4	57.2	63.3	72.8	79.3
2019	88	66.1	13.0	26.5	92.2	49.0	57.1	66.6	75.8	82.4
2020	55	64.9	13.8	30.6	92.3	46.0	57.2	64.2	77.9	81.6
1998-2020	2057	65.7	13.6	1.4	102	47.7	55.9	65.6	76.2	84.1

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	28	62.6	12.6	34.3	86.6	48.4	56.1	62.1	71.1	79.0
1999	19	68.1	15.8	30.8	94.0	36.6	63.5	67.5	82.5	86.7
2000	18	65.3	11.4	44.7	82.4	50.8	56.3	64.2	76.9	80.0
2001	29	63.4	13.3	37.4	92.4	42.8	56.4	62.1	69.8	82.1
2002	20	67.7	11.1	51.4	87.8	52.5	58.0	66.1	78.8	80.7
2003	21	60.3	13.5	35.2	85.9	41.3	51.2	59.0	69.5	76.3
2004	18	59.0	16.0	28.1	82.8	40.8	44.9	55.5	70.6	81.2
2005	17	63.5	9.7	47.8	82.6	50.6	59.0	62.3	69.3	80.3
2006	26	61.5	11.4	38.6	84.6	43.5	54.2	63.6	67.1	74.1
2007	35	66.0	13.2	45.4	93.9	47.5	56.1	65.3	78.8	87.2
2008	28	62.1	11.9	36.9	76.9	43.9	54.3	62.4	73.4	75.7
2009	43	63.7	13.4	37.5	102	46.3	54.1	65.5	70.8	79.0
2010	41	67.4	12.9	42.4	93.5	49.1	58.0	70.5	77.6	82.0
2011	43	64.4	12.4	33.3	89.4	49.6	54.5	64.9	74.1	79.1
2012	29	72.6	13.3	47.4	96.5	54.8	62.9	73.8	82.2	91.6
2013	41	64.1	13.7	32.1	88.4	45.3	53.5	64.6	73.1	80.6
2014	39	63.7	12.2	40.1	84.1	42.7	53.9	65.2	72.5	79.4
2015	48	62.7	12.7	33.8	92.1	49.5	53.4	61.7	69.9	79.5
2016	39	63.3	12.8	44.3	87.0	47.5	52.5	61.4	75.5	84.4
2017	45	68.5	14.8	26.3	89.9	48.3	55.3	71.6	79.2	86.0
2018	21	66.0	10.3	47.4	86.7	50.0	60.0	68.2	72.8	77.1
2019	28	67.3	9.9	48.6	84.5	53.0	59.2	69.8	75.2	79.3
2020	16	69.3	11.6	46.0	85.9	51.3	61.2	69.4	79.1	82.5
1998–2020	692	64.9	12.9	26.3	102	47.5	55.5	65.4	74.3	81.4

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	42	68.9	13.7	44.6	92.4	49.6	58.7	69.8	80.0	87.1
1999	31	69.4	16.6	34.3	94.8	47.5	57.7	70.5	85.6	89.8
2000	33	63.9	13.0	34.7	89.8	51.4	56.1	63.7	71.1	81.4
2001	37	66.4	15.9	35.3	92.5	45.0	54.6	65.4	79.0	87.9
2002	51	66.9	13.2	41.6	89.2	49.2	58.8	65.5	78.3	87.0
2003	46	63.4	16.2	36.1	91.9	42.7	49.4	62.9	76.7	86.8
2004	57	67.2	13.3	39.6	95.9	48.8	58.1	65.5	78.2	83.2
2005	61	68.4	13.8	32.2	91.7	46.2	62.2	70.8	79.3	83.4
2006	56	64.7	13.7	28.5	93.2	49.0	54.7	64.5	77.8	83.6
2007	60	69.0	15.1	28.6	94.9	46.3	58.3	70.7	80.3	87.2
2008	60	68.5	14.5	33.6	93.9	47.9	58.3	68.9	80.2	86.9
2009	71	64.0	13.7	23.8	88.9	47.3	54.4	63.2	74.1	82.9
2010	79	67.6	14.0	36.9	94.4	48.1	57.5	67.0	76.8	87.1
2011	62	64.6	14.2	22.8	101	47.4	54.8	62.3	72.8	83.4
2012	79	65.9	14.3	37.2	92.5	49.2	53.8	63.9	79.2	86.0
2013	71	67.2	13.6	39.2	96.7	52.0	56.7	65.8	76.5	86.8
2014	76	64.9	15.3	1.4	93.5	45.8	56.2	65.0	75.3	83.5
2015	78	66.8	12.7	30.9	92.7	47.7	58.6	68.3	76.3	81.2
2016	80	67.3	13.4	36.4	95.6	53.4	57.7	66.6	77.2	85.8
2017	76	63.9	12.3	41.4	89.6	48.2	53.5	63.5	74.6	80.2
2018	60	64.3	11.7	40.1	94.2	50.7	56.9	62.4	72.6	80.0
2019	60	65.6	14.2	26.5	92.2	47.2	56.2	65.8	77.9	82.9
2020	39	63.1	14.3	30.6	92.3	41.1	54.9	62.0	76.3	81.6
1998-2020	1365	66.2	14.0	1.4	101	47.8	56.2	65.9	76.9	84.9

Table 4

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

Age at diagnosis Years	Cases n	%	Cum.%	Males n	%	Cum.%	Females n	%	Cum.%
0-4	1	0.1	0.1			0.0	1	0.1	0.1
5-9	0	0.0	0.1			0.0			0.1
10-14	0	0.0	0.1			0.0			0.1
15-19	0	0.0	0.1			0.0			0.1
20-24	2	0.1	0.2			0.0	2	0.2	0.3
25-29	3	0.2	0.4	1	0.2	0.2	2	0.2	0.5
30-34	8	0.6	1.0	3	0.6	0.8	5	0.5	1.1
35-39	18	1.2	2.2	4	0.8	1.6	14	1.5	2.5
40-44	51	3.5	5.7	16	3.2	4.8	35	3.7	6.2
45-49	95	6.6	12.3	41	8.3	13.1	54	5.7	11.9
50-54	158	10.9	23.2	53	10.7	23.8	105	11.0	22.9
55-59	178	12.3	35.5	60	12.1	35.9	118	12.4	35.3
60-64	177	12.2	47.8	52	10.5	46.4	125	13.1	48.5
65-69	185	12.8	60.5	71	14.3	60.7	114	12.0	60.5
70-74	176	12.2	72.7	71	14.3	75.0	105	11.0	71.5
75-79	161	11.1	83.8	61	12.3	87.3	100	10.5	82.0
80-84	117	8.1	91.9	32	6.5	93.8	85	8.9	91.0
85+	117	8.1	100.0	31	6.3	100.0	86	9.0	100.0
All ages	1447	100.0		496	100.0		951	100.0	

Table 5

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

Age at diagnosis Years	Males n	Females n	Males Age-spec. incid.	Females Age-spec. incid.	Males DCO rate n=8 %	Females DCO rate n=20 %	Males Prop.all cancers n=153686 %	Females Prop.all cancers n=155051 %
0- 4		1		0.1		100.0		0.6
5- 9								
10-14								
15-19								
20-24		2		0.1				0.4
25-29	1	2	0.0	0.1			0.1	0.2
30-34	3	5	0.1	0.2			0.2	0.2
35-39	4	14	0.2	0.6			0.2	0.4
40-44	16	35	0.6	1.4			0.6	0.6
45-49	41	54	1.5	2.1			0.8	0.6
50-54	53	105	2.1	4.2			0.6	0.8
55-59	60	118	2.8	5.4			0.5	0.9
60-64	52	125	2.9	6.6			0.3	0.8
65-69	71	114	4.3	6.3	2.8		0.3	0.6
70-74	71	105	4.7	6.1	4.2	1.0	0.3	0.5
75-79	61	100	5.0	6.7	4.9	1.0	0.3	0.5
80-84	32	85	4.4	8.0		8.2	0.2	0.6
85+	31	86	6.6	8.2		11.6	0.3	0.5
All ages	496	951			1.6	2.1	0.3	0.6
Incidence								
Raw			1.5	2.8				
WS			0.8	1.4				
ES			1.2	2.0				
BRD-S			1.4	2.3				

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).

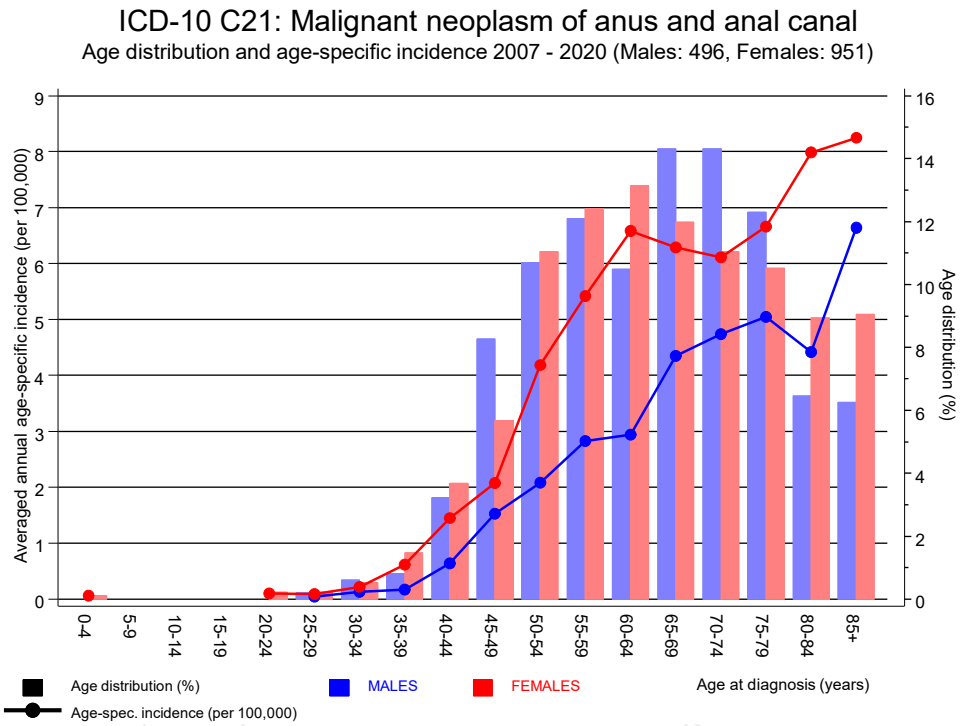


Figure 6. Age distribution (males: mean=65.5 yrs, median=66.1 yrs; females: mean=66.0 yrs, median=65.6 yrs) and age-specific incidence.

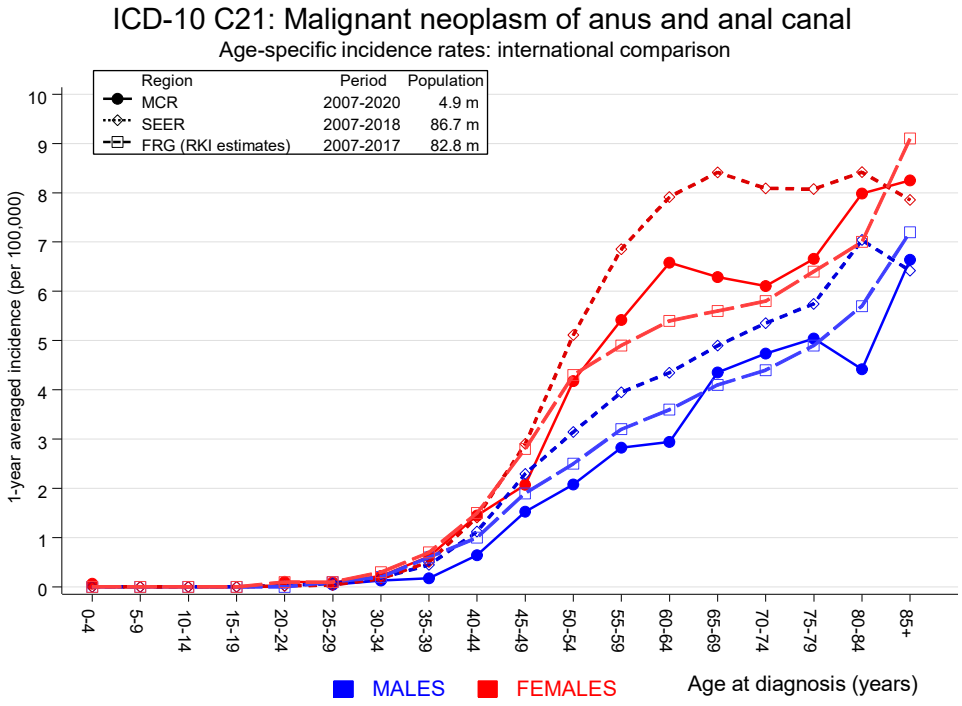


Figure 6a. Age-specific incidence in MCR registry areas compared to Germany (FRG, RKI estimates) and SEER (Surveillance, Epidemiology, and End Results, USA).

Reference:

Estimated age-specific patient population of Germany, latest update: 16 March 2021. German Centre for Cancer Registry Data, Robert Koch Institute (RKI), based on data of the population based cancer registries. http://www.krebsdaten.de. Last access: 08/17/2021
Surveillance, Epidemiology, and End Results (SEER) Program SEER*Stat Database: Incidence - SEER 21 Regs Research Data, released April 2021, based on the November 2020 submission. http://www.seer.cancer.gov.

Table 7a

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

MALES

Diagnosis		Observed n	Expected n	SIR	CI 95%	CI 95%		EAR	DCO %
C00	Lip	1	0.0	24.6	0.6	136.8		3.9	
C03–C06	Oral cavity	1	0.3	3.1	0.1	17.4		2.8	
C09–C10	Oropharynx	4	0.4	10.2	2.8	26.0	#	14.6	
C12–C13	Hypopharynx	1	0.2	4.7	0.1	26.3		3.2	
C15	Oesophagus	5	0.7	6.8	2.2	15.8	#	17.3	
C16	Stomach	4	1.5	2.7	0.7	7.0		10.3	25.0
C17	Small intestine	1	0.2	4.5	0.1	25.1		3.2	
C18	Colon	11	3.6	3.1	1.5	5.5	#	30.2	27.3
C19–C20	Rectum	6	2.0	3.1	1.1	6.7	#	16.4	
C23–C24	Bile	1	0.4	2.6	0.1	14.3		2.5	
C25	Pancreas	1	1.4	0.7	0.0	3.8		-1.8	
C30–C31	Sinuses	1	0.1	14.4	0.4	80.1		3.8	
C32	Larynx	1	0.4	2.7	0.1	14.9		2.5	
C33–C34	Lung	22	4.3	5.1	3.2	7.7	#	71.7	
C43	Malign. melanoma	3	1.7	1.8	0.4	5.2		5.3	33.3
C46,C49	Soft tissue	1	0.2	4.6	0.1	25.7		3.2	
C60	Penis	1	0.1	10.4	0.3	58.1		3.7	100.0
C61	Prostate	14	10.4	1.3	0.7	2.3		14.5	
C62	Testis	1	0.1	8.7	0.2	48.5		3.6	
C64	Kidney	3	1.3	2.4	0.5	6.9		7.0	
C65	Renal pelvis	1	0.2	6.1	0.2	34.0		3.4	
C67	Bladder	4	1.7	2.3	0.6	5.9		9.2	
C68	Urethra	1	0.0	28.6	0.7	159.5		3.9	
C69	Eye carcinoma	1	0.0	74.2	1.9	413.2	#	4.0	
C69	Eye melanoma	1	0.0	24.0	0.6	133.8		3.9	
C70–C72	CNS cancer	3	0.5	6.4	1.3	18.6	#	10.3	
C73	Thyroid	1	0.3	4.0	0.1	22.2		3.0	
C76–C79	CUP	4	0.6	6.4	1.7	16.4	#	13.7	
C91–C96	Leukaemia	1	0.6	1.8	0.0	9.9		1.8	
Not observed		0	4.1	0.0	0.0	0.9	#	-16.7	
All further malignancies		100	37.3	2.7	2.2	3.3	#	254.2	6.0

Patients	681
Median age at next malignancy (years)	68.9
Person-years	2465
Mean observation time (years)	3.6
Median observation time (years)	2.0

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 %
C03–C06	Oral cavity	3	0.3	9.1	1.9	26.7	#	5.1	
C09–C10	Oropharynx	2	0.2	8.3	1.0	29.9	#	3.4	50.0
C11	Nasopharynx	1	0.0	50.2	1.3	280.0	#	1.9	
C15	Oesophagus	2	0.4	5.3	0.6	19.1		3.1	
C16	Stomach	4	1.9	2.1	0.6	5.3		4.0	25.0
C17	Small intestine	2	0.3	6.6	0.8	23.8		3.3	
C18	Colon	23	5.4	4.2	2.7	6.4	#	33.8	21.7
C19–C20	Rectum	8	2.2	3.6	1.6	7.1	#	11.1	
C22	Liver	1	0.7	1.4	0.0	8.0		0.6	
C23–C24	Bile	1	0.8	1.3	0.0	7.1		0.4	
C25	Pancreas	4	2.6	1.5	0.4	3.9		2.7	
C32	Larynx	1	0.1	9.7	0.2	54.1		1.7	
C33–C34	Lung	29	4.3	6.8	4.5	9.7	#	47.6	3.4
C43	Malign. melanoma	5	2.2	2.3	0.7	5.3		5.4	40.0
C46,C49	Soft tissue	1	0.3	3.2	0.1	17.6		1.3	
C48	Peritoneal	1	0.2	4.3	0.1	24.1		1.5	
C50	Breast	38	17.5	2.2	1.5	3.0	#	39.5	5.3
C51	Vulva	10	0.6	16.8	8.0	30.8	#	18.1	
C52	Vagina	2	0.1	19.1	2.3	68.8	#	3.6	
C53	Cervix uteri	3	0.7	4.0	0.8	11.8		4.3	33.3
C54	Corpus uteri	7	3.1	2.3	0.9	4.6		7.5	
C55,C57	Fem. genitals un	1	0.1	7.6	0.2	42.6		1.7	
C56	Ovary	4	2.2	1.8	0.5	4.6		3.4	25.0
C64	Kidney	1	1.3	0.8	0.0	4.4		−0.5	
C67	Bladder	2	1.1	1.8	0.2	6.5		1.7	
C73	Thyroid	4	0.9	4.4	1.2	11.2	#	5.9	
C76–C79	CUP	1	1.0	1.0	0.0	5.4		−0.1	
C81	Hodgkin lymphoma	2	0.1	20.3	2.5	73.3	#	3.7	
C82–C85	NHL	8	2.2	3.7	1.6	7.2	#	11.2	
C90	Mult. myeloma	1	0.7	1.5	0.0	8.3		0.6	
C91–C96	Leukaemia	5	0.8	6.1	2.0	14.3	#	8.1	20.0
Not observed		0	2.2	0.0	0.0	1.6		−4.3	
All further malignancies		177	56.8	3.1	2.7	3.6	#	231.6	8.5

Patients	1334
Median age at next malignancy (years)	72.5
Person-years	5192
Mean observation time (years)	3.9
Median observation time (years)	2.2

The occurrence of further specified malignancy is statistically significant.

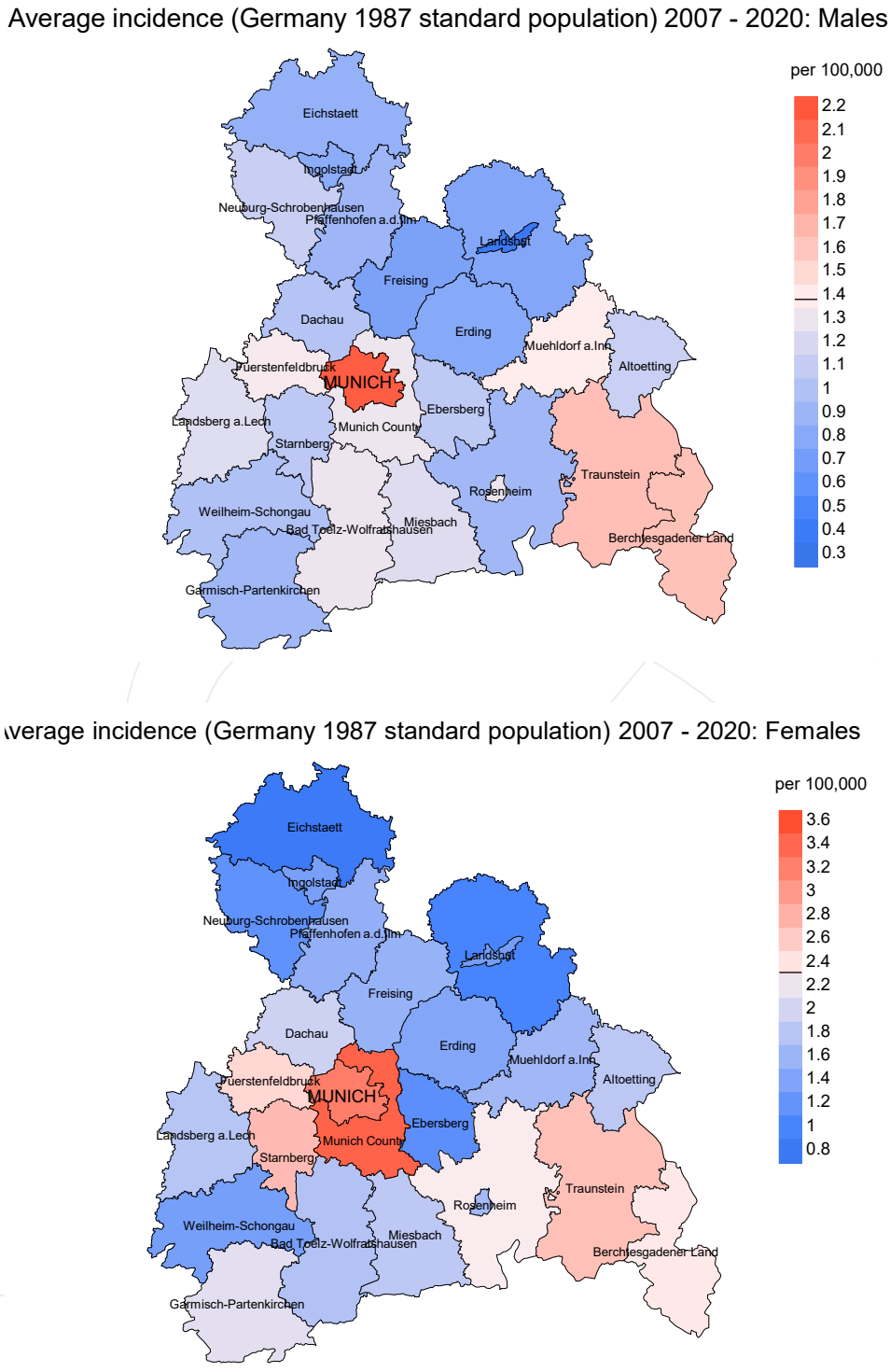
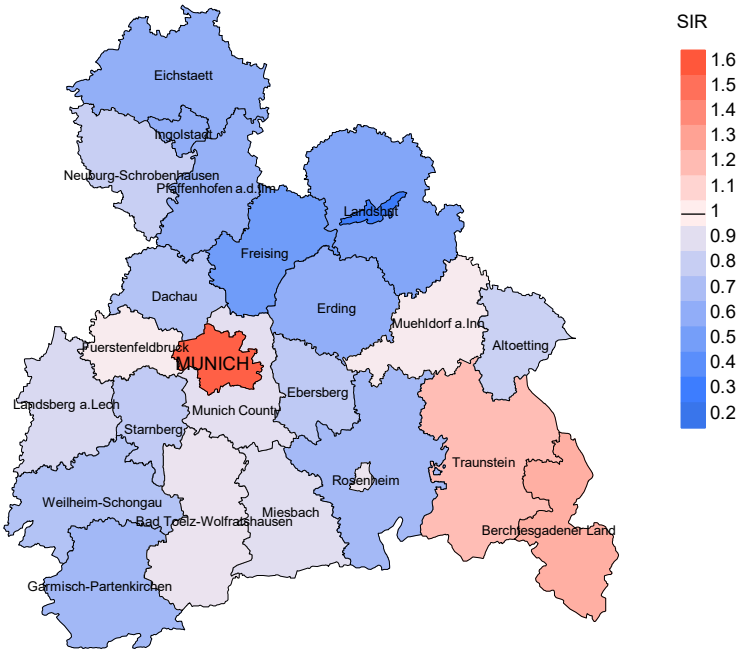


Figure 8a. Map of cancer incidence (german standard population, incl. DCO cases) by county averaged for period 2007 to 2020. According to their individual incidence rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (males 1.4/100,000 WS N=496, females 2.3/100,000 WS N=951).

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 13 women were identified with newly diagnosed anal cancer. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 1.1/100,000 (german standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 0.5 and 2.3/100,000.

Standardized incidence ratio (SIR) 2007 - 2020: Males



Standardized incidence ratio (SIR) 2007 - 2020: Females

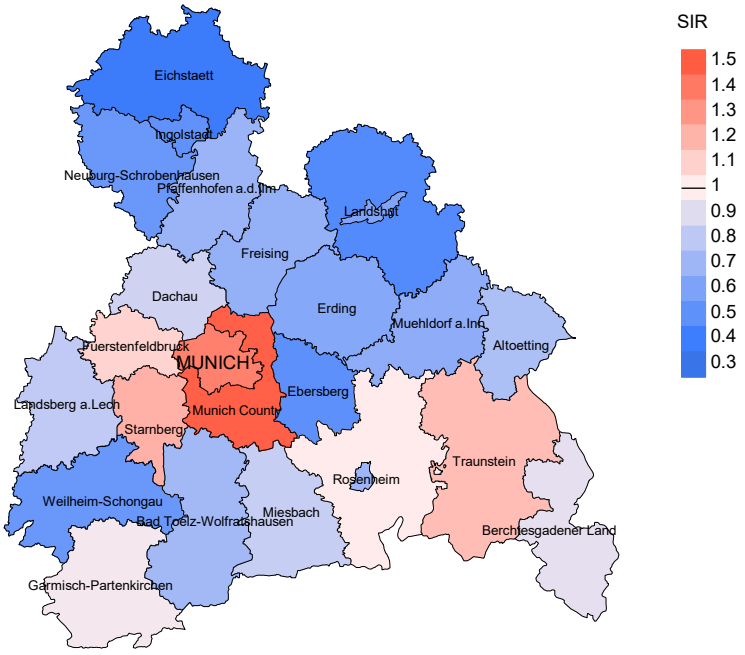


Figure 8b. Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2007 to 2020. According to their individual SIR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (males N=496, females N=951).

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 13 women were identified with newly diagnosed anal cancer. Therefore, the mean standardized incidence ratio (SIR) for this cancer type in this area can be calculated at 0.49. Though, the value of this parameter may vary with an underlying probability of 99% between 0.21 and 0.97.

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	70	98.6		55	78.6	87.3
1999	50	96.0	6.0	39	78.0	92.3
2000	51	98.0		41	80.4	95.1
2001	66	93.9	4.5	46	69.7	91.3
2002	71	97.2	2.8	52	73.2	98.1
2003	67	92.5	1.5	38	56.7	97.4
2004	75	97.3	2.7	38	50.7	92.1
2005	78	94.9	1.3	55	70.5	94.5
2006	82	95.1	4.9	48	58.5	97.9
2007	95	97.9	4.2	62	65.3	98.4
2008	88	95.5	1.1	51	58.0	98.0
2009	114	98.2	0.9	60	52.6	95.0
2010	120	99.2	5.0	70	58.3	94.3
2011	105	97.1	1.9	50	47.6	90.0
2012	108	97.2		53	49.1	96.2
2013	112	98.2		44	39.3	93.2
2014	115	94.8	3.5	45	39.1	95.6
2015	126	88.1	1.6	44	34.9	88.6
2016	119	99.2	2.5	45	37.8	91.1
2017	121	100.0	2.5	33	27.3	78.8
2018	81	100.0	1.2	18	22.2	83.3
2019	88	100.0	1.1	21	23.9	76.2
2020	55	100.0		13	23.6	92.3
1998-2020	2057	96.9	2.1	1021	49.6	93.0

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	70	16	87.5	5	7.1
1999	50	30	80.0	4	8.0
2000	51	28	89.3	4	7.8
2001	66	45	97.8	8	12.1
2002	71	41	97.6	9	12.7
2003	67	39	100.0	5	7.5
2004	75	44	100.0	5	6.7
2005	78	56	96.4	11	14.1
2006	82	49	98.0	6	7.3
2007	95	48	93.8	8	8.4
2008	88	47	97.9	6	6.8
2009	114	44	100.0	4	3.5
2010	120	77	100.0	20	16.7
2011	105	72	97.2	10	9.5
2012	108	59	100.0	11	10.2
2013	112	53	100.0	5	4.5
2014	115	60	93.3	7	6.1
2015	126	67	98.5	8	6.3
2016	119	69	100.0	14	11.8
2017	121	75	98.7	8	6.6
2018	81	53	71.7	3	3.7
2019	88	50	42.0	8	9.1
2020	55	71	91.5	8	14.5
1998–2020	2057	1193	93.5	177	8.6

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	16	68.8	31.3	92.9
1999	30	70.0	30.0	87.5
2000	28	82.1	17.9	96.0
2001	45	73.3	26.7	90.9
2002	41	85.4	14.6	92.5
2003	39	84.6	15.4	89.7
2004	44	79.5	20.5	88.6
2005	56	80.4	19.6	87.0
2006	49	67.3	32.7	81.3
2007	48	64.6	35.4	80.0
2008	47	83.0	17.0	91.3
2009	44	65.9	34.1	88.6
2010	77	72.7	27.3	85.7
2011	72	81.9	18.1	90.0
2012	59	69.5	30.5	76.3
2013	53	62.3	37.7	69.8
2014	60	71.7	28.3	85.7
2015	67	67.2	32.8	80.3
2016	69	52.2	47.8	76.8
2017	75	64.0	36.0	78.4
2018	53	52.8	47.2	71.1
2019	50	38.0	62.0	61.9
2020	71	52.1	47.9	76.9
1998-2020	1193	68.1	31.9	83.0

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	4	61.7	60.2	61.7	61.7
1999	11	68.0	71.7	59.1	73.8
2000	9	68.6	68.6	88.4	74.9
2001	18	74.0	73.4	82.1	74.7
2002	14	66.0	58.3	67.5	65.8
2003	18	66.2	63.8	77.2	64.4
2004	16	70.4	70.1	71.2	69.3
2005	23	71.8	68.4	78.1	68.4
2006	17	63.5	63.3	65.6	63.4
2007	15	71.6	70.5	71.6	71.8
2008	14	69.7	69.1	73.3	70.2
2009	11	72.9	66.6	82.0	68.9
2010	37	70.8	71.6	67.1	71.6
2011	24	72.3	72.3	67.6	72.0
2012	20	72.6	70.3	83.1	74.0
2013	24	80.5	72.9	86.3	72.9
2014	21	68.4	66.2	73.2	66.4
2015	27	74.5	76.6	74.1	71.5
2016	26	70.7	70.5	71.8	70.0
2017	37	75.2	75.1	78.0	74.9
2018	23	76.5	72.8	82.7	76.6
2019	28	77.5	76.9	78.2	78.9
2020	27	77.2	76.1	82.6	76.1
1998-2020	464	72.6	70.8	75.8	71.7

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	12	73.8	72.0	86.4	72.5
1999	19	84.0	79.0	87.8	78.1
2000	19	76.5	76.5	79.6	78.4
2001	27	80.6	73.3	86.5	80.6
2002	27	82.4	82.9	60.4	82.9
2003	21	81.0	78.1	89.3	81.0
2004	28	77.3	74.8	91.9	75.4
2005	33	80.4	80.0	89.4	80.0
2006	32	79.9	77.1	82.2	80.0
2007	33	80.0	76.2	84.5	77.8
2008	33	81.7	80.8	84.9	81.7
2009	33	74.7	73.6	83.3	74.0
2010	40	83.9	79.8	86.0	83.3
2011	48	76.4	74.3	85.1	75.0
2012	39	79.6	77.3	86.5	77.7
2013	29	80.7	79.2	84.2	80.6
2014	39	74.4	70.7	82.2	73.6
2015	40	77.7	75.0	85.8	76.3
2016	43	80.8	77.3	84.6	77.8
2017	38	81.6	74.2	85.7	80.5
2018	30	82.5	80.5	87.0	82.8
2019	22	78.4	69.6	79.6	73.5
2020	44	81.3	74.8	83.6	79.3
1998–2020	729	80.2	76.9	85.2	78.5

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	2	0.2	0.07	0.1	0.09	0.2	0.08	0.2	0.08
1999	7	0.6	0.37	0.4	0.35	0.6	0.39	0.8	0.40
2000	8	0.7	0.44	0.4	0.48	0.7	0.47	0.8	0.46
2001	15	1.3	0.52	0.7	0.48	1.2	0.55	1.6	0.64
2002	9	0.5	0.45	0.3	0.55	0.4	0.47	0.5	0.40
2003	15	0.8	0.71	0.5	0.66	0.7	0.65	0.8	0.73
2004	12	0.6	0.67	0.3	0.53	0.5	0.61	0.7	0.70
2005	17	0.9	1.00	0.4	0.79	0.6	0.84	0.9	0.99
2006	11	0.6	0.42	0.4	0.43	0.5	0.47	0.6	0.50
2007	8	0.4	0.23	0.2	0.21	0.3	0.22	0.3	0.21
2008	13	0.6	0.46	0.3	0.42	0.5	0.44	0.6	0.48
2009	6	0.3	0.14	0.1	0.13	0.2	0.13	0.2	0.13
2010	28	1.2	0.68	0.6	0.64	0.9	0.67	1.2	0.68
2011	20	0.9	0.47	0.4	0.42	0.7	0.45	0.9	0.50
2012	16	0.7	0.55	0.3	0.58	0.5	0.57	0.7	0.56
2013	15	0.7	0.37	0.3	0.27	0.4	0.30	0.6	0.37
2014	18	0.8	0.46	0.4	0.43	0.6	0.45	0.7	0.47
2015	19	0.8	0.40	0.4	0.30	0.5	0.33	0.7	0.41
2016	12	0.5	0.31	0.2	0.26	0.4	0.28	0.5	0.31
2017	26	1.1	0.58	0.5	0.55	0.7	0.55	1.0	0.58
2018	14	0.6	0.67	0.3	0.50	0.4	0.54	0.5	0.61
2019	10	0.4	0.36	0.2	0.27	0.3	0.31	0.3	0.34
2020	14	0.6	0.88	0.2	0.69	0.4	0.76	0.5	0.85
1998-2020	315	0.7	0.46	0.3	0.40	0.5	0.43	0.7	0.47

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	9	0.8	0.21	0.3	0.19	0.5	0.20	0.6	0.20
1999	14	1.2	0.45	0.4	0.33	0.7	0.38	0.9	0.44
2000	15	1.2	0.45	0.5	0.32	0.7	0.35	1.0	0.44
2001	18	1.5	0.49	0.6	0.41	1.0	0.44	1.2	0.47
2002	26	1.3	0.51	0.4	0.33	0.7	0.37	0.9	0.42
2003	18	0.9	0.39	0.3	0.26	0.5	0.29	0.7	0.33
2004	23	1.2	0.40	0.5	0.33	0.7	0.36	0.9	0.37
2005	28	1.4	0.46	0.5	0.34	0.8	0.37	1.1	0.42
2006	22	1.1	0.39	0.5	0.29	0.6	0.31	0.8	0.35
2007	23	1.0	0.38	0.4	0.33	0.6	0.35	0.8	0.36
2008	26	1.1	0.43	0.4	0.29	0.6	0.33	0.8	0.39
2009	23	1.0	0.32	0.4	0.23	0.6	0.25	0.7	0.27
2010	28	1.2	0.35	0.5	0.28	0.7	0.29	0.8	0.30
2011	39	1.7	0.63	0.6	0.44	1.0	0.49	1.2	0.54
2012	25	1.1	0.32	0.4	0.22	0.6	0.24	0.8	0.28
2013	18	0.8	0.25	0.2	0.17	0.4	0.18	0.5	0.23
2014	25	1.0	0.33	0.4	0.24	0.6	0.28	0.8	0.29
2015	26	1.1	0.33	0.4	0.25	0.6	0.27	0.8	0.30
2016	24	1.0	0.30	0.3	0.21	0.5	0.23	0.7	0.26
2017	22	0.9	0.29	0.3	0.21	0.5	0.22	0.6	0.25
2018	14	0.6	0.23	0.2	0.13	0.3	0.15	0.4	0.19
2019	9	0.4	0.15	0.2	0.14	0.2	0.14	0.3	0.15
2020	23	0.9	0.59	0.4	0.42	0.5	0.46	0.7	0.52
1998-2020	498	1.0	0.36	0.4	0.27	0.6	0.29	0.8	0.32

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									
35-39	1	0.2	0.2	1	0.5	0.5			0.0
40-44	6	1.1	1.3	2	0.9	1.4	4	1.2	1.2
45-49	20	3.7	5.0	8	3.7	5.0	12	3.7	4.9
50-54	22	4.0	9.0	13	5.9	11.0	9	2.8	7.7
55-59	42	7.7	16.7	19	8.7	19.6	23	7.1	14.8
60-64	50	9.2	25.9	21	9.6	29.2	29	8.9	23.7
65-69	68	12.5	38.4	31	14.2	43.4	37	11.4	35.1
70-74	73	13.4	51.8	31	14.2	57.5	42	12.9	48.0
75-79	76	14.0	65.8	38	17.4	74.9	38	11.7	59.7
80-84	82	15.1	80.9	31	14.2	89.0	51	15.7	75.4
85+	104	19.1	100.0	24	11.0	100.0	80	24.6	100.0
All ages	544	100.0		219	100.0		325	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								
35-39	1		0.0	0.25			0.4	
40-44	2	4	0.1	0.13	0.2	0.11	0.3	0.5
45-49	8	12	0.3	0.20	0.5	0.22	0.6	0.7
50-54	13	9	0.5	0.25	0.4	0.09	0.5	0.3
55-59	19	23	0.9	0.32	1.1	0.19	0.4	0.6
60-64	21	29	1.2	0.40	1.5	0.23	0.3	0.6
65-69	31	37	1.9	0.44	2.0	0.32	0.3	0.5
70-74	31	42	2.1	0.44	2.4	0.40	0.3	0.5
75-79	38	38	3.1	0.62	2.5	0.38	0.3	0.4
80-84	31	51	4.3	0.97	4.8	0.60	0.3	0.5
85+	24	80	5.1	0.77	7.7	0.93	0.3	0.7
All ages	219	325					0.3	0.5
Mortality								
Raw			0.7	0.44	1.0	0.34		
WS			0.3	0.38	0.4	0.25		
ES			0.5	0.41	0.5	0.27		
BRD-S			0.6	0.45	0.7	0.30		
PYLL-70								
per 100,000			3.4		4.0			
ES			2.9		3.3			
AYLL-70			10.2		10.0			

Table 14a

Further malignancies in deaths in period 1998–2020
MALES

Diagnosis		Total n	Total %↓	Pre n	Pre ←%	Syn-chron ±30d n	Syn-chron ±30d ←%	Post n	Post ←%
C03–C06	Oral cavity	2	1.6	1	50.0			1	50.0
C09–C10	Oropharynx	4	3.1	1	25.0	1	25.0	2	50.0
C11	Nasopharynx	1	0.8	1	100.0				
C12–C13	Hypopharynx	2	1.6	1	50.0			1	50.0
C15	Oesophagus	7	5.4	2	28.6			5	71.4
C16	Stomach	4	3.1	1	25.0			3	75.0
C18	Colon	16	12.4	7	43.8	3	18.8	6	37.5
C19–C20	Rectum	9	7.0	2	22.2	3	33.3	4	44.4
C25	Pancreas	1	0.8					1	100.0
C32	Larynx	2	1.6	2	100.0				
C33–C34	Lung	18	14.0	1	5.6	3	16.7	14	77.8
C43	Malign. melanoma	5	3.9	2	40.0			3	60.0
C44	Skin others	7	5.4	3	42.9	1	14.3	3	42.9
C46,C49	Soft tissue	1	0.8					1	100.0
C60	Penis	2	1.6	1	50.0			1	50.0
C61	Prostate	23	17.8	14	60.9	1	4.3	8	34.8
C62	Testis	1	0.8	1	100.0				
C64	Kidney	4	3.1	3	75.0	1	25.0		
C65	Renal pelvis	1	0.8					1	100.0
C67	Bladder	6	4.7	2	33.3	1	16.7	3	50.0
C68	Urethra	1	0.8			1	100.0		
C70–C72	CNS cancer	2	1.6					2	100.0
C73	Thyroid	2	1.6	1	50.0			1	50.0
C76–C79	CUP	3	2.3	1	33.3			2	66.7
C81	Hodgkin lymphoma	2	1.6	2	100.0				
C82–C85	NHL	3	2.3	2	66.7			1	33.3
All further malignancies		129	100.0	51	39.5	15	11.6	63	48.8

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

Table 14b

Further malignancies in deaths in period 1998–2020
FEMALES

Diagnosis	Total n	Total %↓	Pre n	Pre ←%	Syn-chron ±30d n	Syn-chron ±30d ←%	Post n	Post ←%
C03–C06 Oral cavity	3	1.3	3	100.0				
C09–C10 Oropharynx	4	1.7	1	25.0			3	75.0
C15 Oesophagus	2	0.8			1	50.0	1	50.0
C16 Stomach	12	5.1	3	25.0	1	8.3	8	66.7
C17 Small intestine	1	0.4					1	100.0
C18 Colon	28	11.8	8	28.6	8	28.6	12	42.9
C19–C20 Rectum	7	3.0	1	14.3	5	71.4	1	14.3
C21 Anus/canal	1	0.4					1	100.0
C23–C24 Bile	1	0.4					1	100.0
C25 Pancreas	3	1.3					3	100.0
C33–C34 Lung	30	12.7	3	10.0	3	10.0	24	80.0
C43 Malign. melanoma	5	2.1	2	40.0			3	60.0
C44 Skin others	11	4.6	4	36.4			7	63.6
C46,C49 Soft tissue	1	0.4					1	100.0
C48 Peritoneal	1	0.4					1	100.0
C50 Breast	38	16.0	24	63.2	5	13.2	9	23.7
C51 Vulva	8	3.4	4	50.0			4	50.0
C52 Vagina	2	0.8	1	50.0			1	50.0
C53 Cervix uteri	22	9.3	20	90.9			2	9.1
C54 Corpus uteri	11	4.6	4	36.4			7	63.6
C55,C57 Fem. genitals un	1	0.4					1	100.0
C56 Ovary	8	3.4	3	37.5	1	12.5	4	50.0
C64 Kidney	2	0.8	1	50.0	1	50.0		
C67 Bladder	4	1.7	1	25.0			3	75.0
C70–C72 CNS cancer	1	0.4					1	100.0
C73 Thyroid	5	2.1	1	20.0			4	80.0
C76–C79 CUP	3	1.3	1	33.3			2	66.7
C81 Hodgkin lymphoma	1	0.4	1	100.0				
C82–C85 NHL	13	5.5	9	69.2			4	30.8
C90 Mult. myeloma	4	1.7	1	25.0			3	75.0
C91–C96 Leukaemia	4	1.7					4	100.0
All further malignancies	237	100.0	96	40.5	25	10.5	116	48.9

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								
35-39	1		0.0	0.25			0.4	
40-44	2	3	0.1	0.13	0.1	0.10	0.4	0.4
45-49	6	11	0.2	0.17	0.4	0.23	0.5	0.8
50-54	13	6	0.5	0.28	0.2	0.07	0.6	0.3
55-59	16	21	0.8	0.29	1.0	0.22	0.4	0.7
60-64	17	25	1.0	0.37	1.3	0.26	0.3	0.6
65-69	24	25	1.5	0.45	1.4	0.29	0.3	0.5
70-74	21	31	1.4	0.43	1.8	0.44	0.2	0.5
75-79	27	27	2.2	0.61	1.8	0.38	0.3	0.4
80-84	25	32	3.5	1.14	3.0	0.55	0.3	0.4
85+	18	60	3.9	0.90	5.8	0.88	0.3	0.6
All ages	170	241					0.3	0.5
Mortality								
Raw			0.5	0.43	0.7	0.33		
WS			0.2	0.36	0.3	0.24		
ES			0.4	0.39	0.4	0.26		
BRD-S			0.5	0.43	0.5	0.29		
PYLL-70								
per 100,000			2.9		3.4			
ES			2.5		2.7			
AYLL-70			10.6		10.4			

* 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.	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								
35-39	1		0.0	0.25			0.4	
40-44	2	2	0.1	0.13	0.1	0.07	0.4	0.3
45-49	5	11	0.2	0.17	0.4	0.24	0.4	0.8
50-54	10	6	0.4	0.24	0.2	0.07	0.4	0.3
55-59	12	17	0.6	0.24	0.8	0.20	0.3	0.5
60-64	10	19	0.6	0.24	1.0	0.22	0.2	0.5
65-69	17	18	1.0	0.35	1.0	0.24	0.2	0.3
70-74	15	26	1.0	0.34	1.5	0.43	0.2	0.4
75-79	24	21	2.0	0.63	1.4	0.32	0.3	0.3
80-84	16	23	2.2	0.80	2.2	0.46	0.2	0.3
85+	16	46	3.4	0.80	4.4	0.74	0.3	0.5
All ages	128	189					0.2	0.4
Mortality								
Raw			0.4	0.36	0.6	0.29		
WS			0.2	0.30	0.2	0.21		
ES			0.3	0.33	0.3	0.23		
BRD-S			0.4	0.36	0.4	0.25		
PYLL-70								
per 100,000			2.2		2.9			
ES			1.9		2.3			
AYLL-70			11.3		11.1			

* See corresponding tables with multiple malignancies.

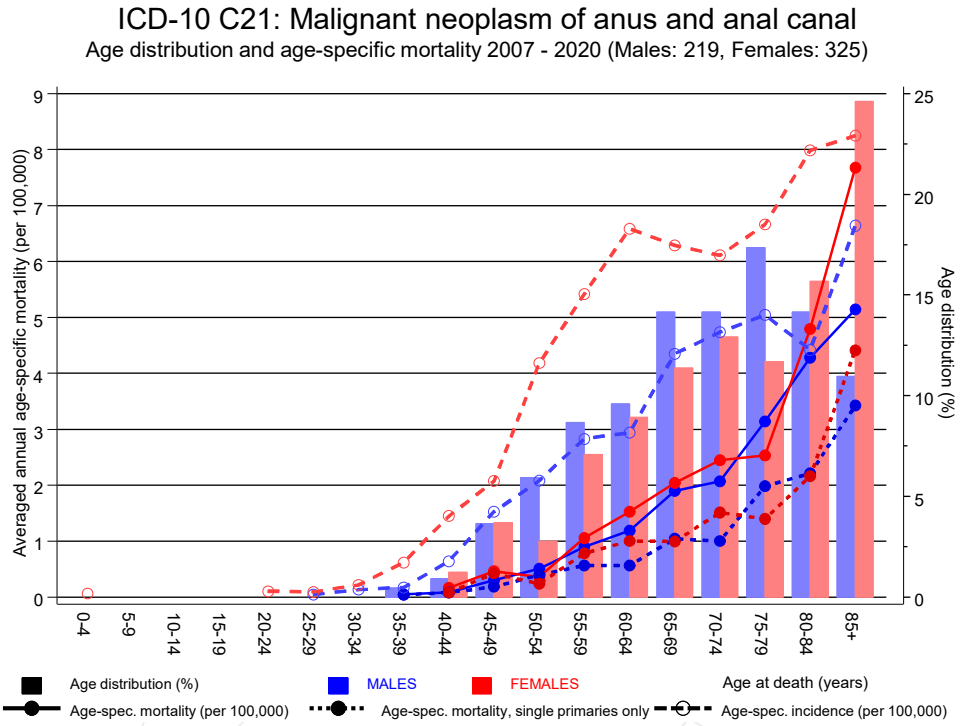


Figure 17. Distribution of age at death (bars; males: mean=67.1 yrs, median=67.1 yrs; females: mean=70.3 yrs, median=70.7 yrs) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

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

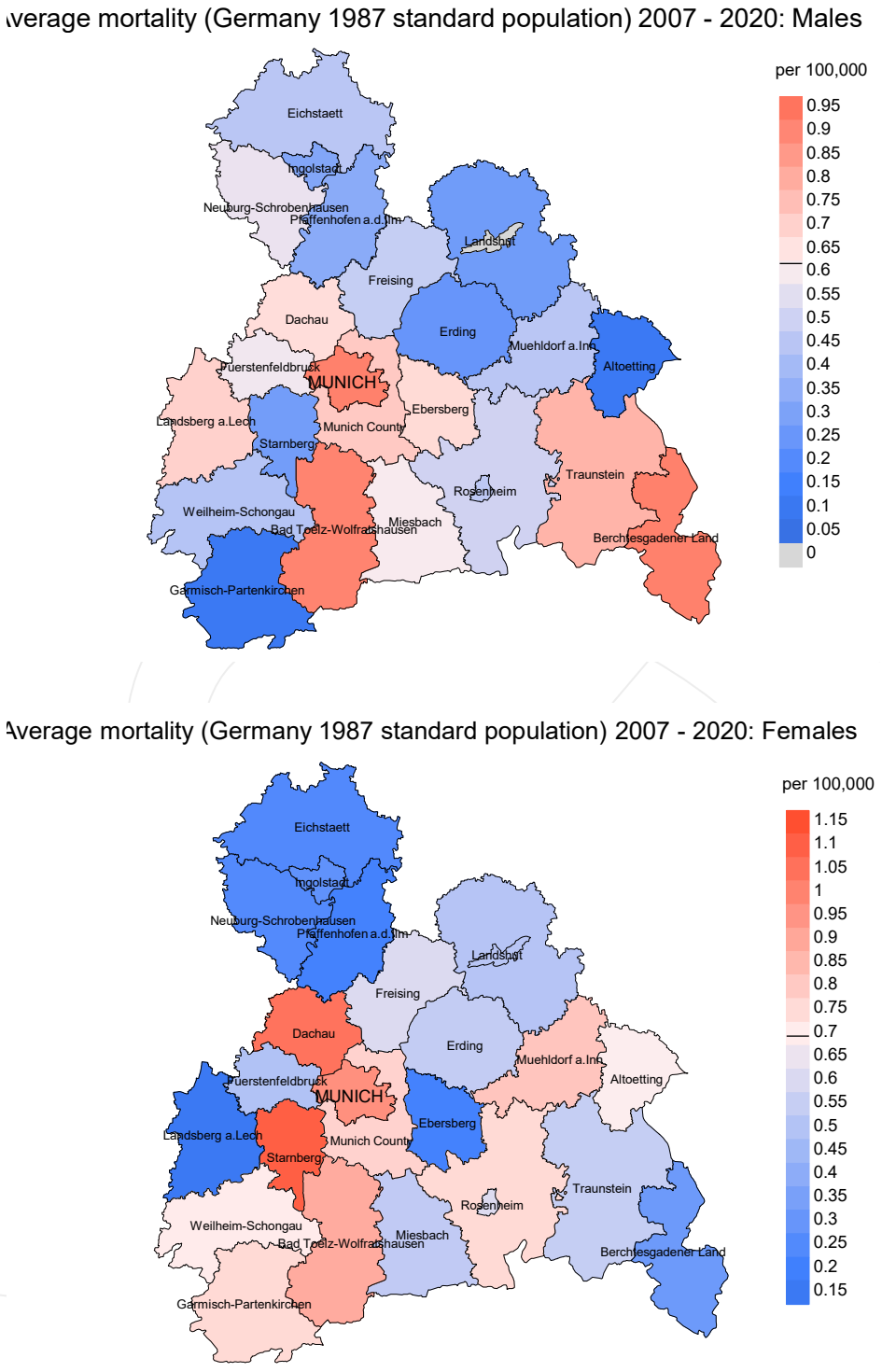
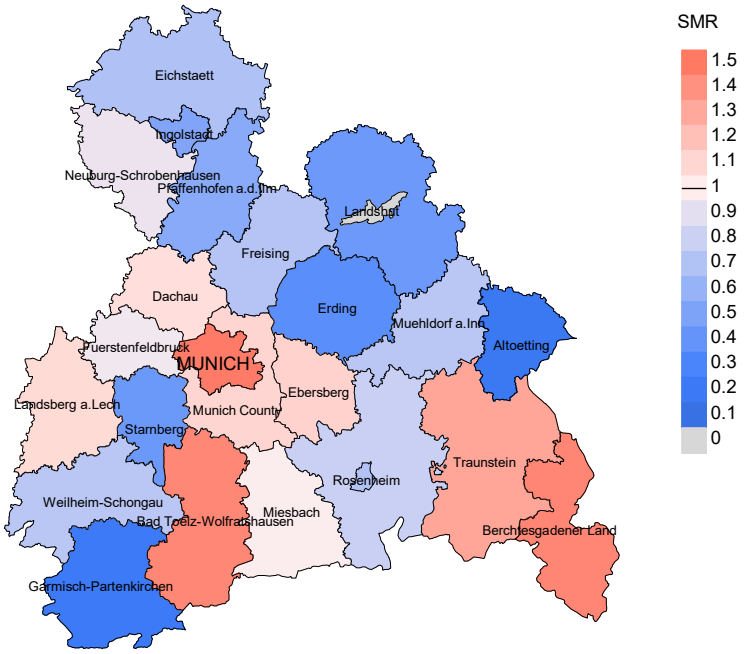


Figure 18a. Map of cancer mortality (german standard population) by county averaged for period 2007 to 2020. According to their individual mortality rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (males 0.6/100,000 WS N=219, females 0.7/100,000 WS N=325).

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 anal cancer. Therefore, the mean mortality rate for this cancer type in this area can be calculated at 0.2/100,000 (german standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 0.0 and 0.9/100,000.

Standardized mortality ratio (SMR) 2007 - 2020: Males



Standardized mortality ratio (SMR) 2007 - 2020: Females

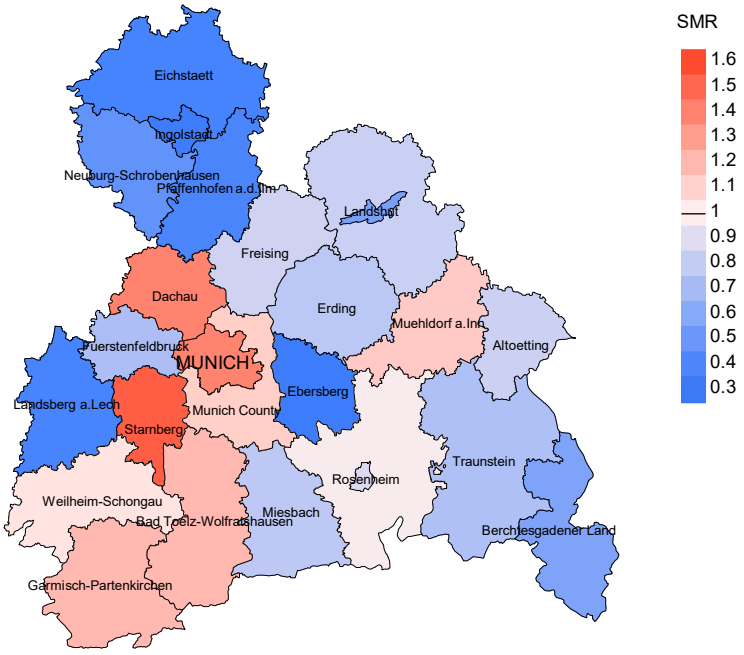


Figure 18b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2007 to 2020. According to their individual SMR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (males N=219, females N=325).

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 anal cancer. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 0.34. Though, the value of this parameter may vary with an underlying probability of 99% between 0.04 and 1.26, 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 C21: Anal cancer - Incidence and Mortality [Internet]. 2021 [updated 2021 Dec 20; cited 2022 Feb 1]. Available from: https://www.tumorregister-muenchen.de/en/facts/base/bC21__E-ICD-10-C21-Anal-cancer-incidence-and-mortality.pdf

Copyright

Disclaimer