Munich Cancer Registry

- Survival
- Selection Matrix
- Homepage
- *Deutsch*

ICD-10 C50: Breast cancer (men)

Incidence and Mortality

Year of diagnosis	1998-2020
Patients	630
Diseases	639
Creation date	12/21/2021
Database export	12/20/2021
Population (males)	2.45 m

Munich Cancer Registry
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Marchioninistr. 15
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https://www.tumorregister-muenchen.de/en

https://www.tumorregister-muenchen.de/en/facts/base/bC50m_E-ICD-10-C50-Breast-cancer-men-incidence-and-mortality.pdf

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

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

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

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

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

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

Munich Cancer Registry, December 2021

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

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

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

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

Code	Description
C50.-	Malignant neoplasm of breast
C50.0	Nipple and areola
C50.1	Central portion of breast
C50.2	Upper-inner quadrant of breast
C50.3	Lower-inner quadrant of breast
C50.4	Upper-outer quadrant of breast
C50.5	Lower-outer quadrant of breast
C50.6	Axillary tail of breast
C50.8	Overlapping lesion of breast
C50.9	Breast, unspecified

Sex: Male

INCIDENCE

Table 1

Cases with invasive cancer by year of diagnosis, proportions of DCO, further malignancies, deaths, and active follow-up (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	8	2	25.0	12.5	16.4	75.0	87.5
1999	12	2	16.7	20.0	16.2	83.3	100.0
2000	14	4	28.6	20.6	15.8	78.6	92.9
2001	13			17.0	15.7	46.2	84.6
2002	20	3	15.0	17.9	15.5	90.0	95.0 #
2003	36	1	2.8	15.5	15.3	75.0	100.0
2004	27	3	11.1	16.9	14.1	66.7	100.0
2005	24			15.6	13.8	62.5	95.8
2006	25	2	8.0	14.5	13.4	80.0	100.0
2007	41	2	4.9	15.9	12.3	68.3	95.1 #
2008	26	5	19.2	16.7	11.8	69.2	100.0
2009	25	1	4.0	16.2	10.5	48.0	100.0
2010	29			15.7	10.6	55.2	100.0
2011	33	2	6.1	15.3	9.7	51.5	100.0
2012	35	2	5.7	16.6	10.1	45.7	100.0
2013	45	2	4.4	18.6	8.7	57.8	100.0
2014	34			19.0	6.8	35.3	94.1
2015	32	1	3.1	19.4	7.0	37.5	96.9
2016	38	2	5.3	19.9	5.8	26.3	97.4
2017	40	2	5.0	21.0	5.0	30.0	100.0
2018	27	1	3.7	21.4	3.8	25.9	100.0
2019	24			21.5	5.6	12.5	100.0
2020	31			21.9	6.7	6.5	100.0 ##
1998-2020	639	37	5.8	21.9	16.4	50.4	98.1

639 cases diagnosed 1998-2020 are related to a total of 630 patients. Currently, in 224 (35.6 %) of these 630 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 163 / 46 / 15 (25.9 % / 7.3 % / 2.4 %) patients exist having 2 / 3 / 4+ malignancies.

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

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

How to interpret:
In 2018, a subgroup of 27 cases has been diagnosed, of which 21.4 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 3.8 % 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	Cases n	Incidence raw	Incidence WS	Incidence ES	Incidence BRD-S
1998	8	0.7	0.5	0.6	0.9
1999	12	1.1	0.6	1.0	1.2
2000	14	1.2	0.7	1.1	1.5
2001	13	1.1	0.7	1.0	1.2
2002	20	1.1	0.6	0.9	1.2
2003	36	1.9	1.0	1.6	2.1
2004	27	1.4	0.8	1.2	1.5
2005	24	1.3	0.7	1.0	1.3
2006	25	1.3	0.7	1.0	1.3
2007	41	1.9	0.9	1.4	1.9
2008	26	1.2	0.6	0.9	1.2
2009	25	1.1	0.6	0.9	1.1
2010	29	1.3	0.6	0.9	1.2
2011	33	1.5	0.7	1.1	1.4
2012	35	1.5	0.8	1.1	1.5
2013	45	2.0	0.9	1.4	1.7
2014	34	1.5	0.7	1.0	1.3
2015	32	1.3	0.7	1.1	1.2
2016	38	1.6	0.8	1.1	1.4
2017	40	1.7	0.8	1.2	1.5
2018	27	1.1	0.5	0.7	1.0
2019	24	1.0	0.5	0.7	0.9
2020	31	1.3	0.6	0.9	1.1
1998–2020	639	1.4	0.7	1.0	1.3

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

Table 3

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

Year of diagnosis	Cases n	Mean	Std. dev.	Min.	Max.	10%	25%	Median 50%	75%	90%
1998	8	62.7	12.3	47.9	82.8	47.9	53.8	60.9	70.5	82.8
1999	12	68.8	10.3	52.8	85.2	55.5	62.0	66.1	78.6	79.6
2000	14	66.7	14.9	41.2	87.8	44.4	56.6	68.2	79.7	84.7
2001	13	63.4	9.9	48.9	84.7	50.4	58.4	62.6	67.0	77.8
2002	20	66.1	12.1	34.5	82.5	49.4	60.7	67.5	75.7	79.8
2003	36	66.7	13.4	30.3	89.6	46.2	60.0	68.3	76.3	82.5
2004	27	68.2	10.7	45.7	89.6	55.1	62.7	70.3	74.3	85.4
2005	24	70.1	10.1	44.3	90.9	55.2	66.7	71.7	75.8	81.1
2006	25	66.2	12.6	45.7	86.1	47.4	58.1	66.8	74.0	84.7
2007	41	69.3	11.6	41.3	96.1	58.2	60.7	71.7	76.4	80.6
2008	26	68.8	9.2	44.9	83.8	60.3	62.6	66.1	77.1	80.6
2009	25	69.0	11.7	46.0	89.5	54.4	61.4	70.4	77.3	85.9
2010	29	69.6	11.8	44.0	91.0	47.7	64.1	70.5	75.2	87.6
2011	33	71.0	11.4	48.6	90.6	55.3	61.2	72.1	80.8	84.0
2012	35	67.5	11.0	46.8	89.3	49.9	59.8	68.3	77.1	79.0
2013	45	70.4	12.9	45.1	90.4	50.5	64.7	72.2	78.0	88.6
2014	34	69.1	10.8	41.7	83.6	54.2	59.4	70.9	78.0	81.4
2015	32	66.8	10.0	50.2	92.0	55.3	59.9	66.8	73.1	77.8
2016	38	70.7	12.3	33.1	97.2	56.0	64.5	69.1	78.1	86.3
2017	40	69.8	13.4	41.8	96.5	54.3	60.5	68.0	79.6	91.2
2018	27	70.1	12.0	44.0	84.1	50.7	64.1	72.4	80.7	83.1
2019	24	70.7	12.5	36.6	90.4	61.1	64.2	68.5	79.9	85.5
2020	31	70.8	11.7	53.6	89.8	55.1	61.4	71.0	80.9	87.5
1998–2020	639	68.8	11.7	30.3	97.2	53.6	61.1	69.4	77.2	83.3

Table 4

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

Age at diagnosis Years	Cases n	%	Cum.%
0-4			
5-9			
10-14			
15-19			
20-24			
25-29			
30-34	1	0.2	0.2
35-39	1	0.2	0.4
40-44	6	1.3	1.7
45-49	19	4.1	5.9
50-54	26	5.7	11.5
55-59	34	7.4	18.9
60-64	70	15.2	34.1
65-69	72	15.7	49.8
70-74	67	14.6	64.3
75-79	77	16.7	81.1
80-84	50	10.9	92.0
85+	37	8.0	100.0
All ages	460	100.0	

Table 5

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

Age at diagnosis Years	Cases n	Age-spec. incidence	DCO rate n=20 %	Prop. all cancers n=153686 %
0- 4		0.0		
5- 9		0.0		
10-14		0.0		
15-19		0.0		
20-24		0.0		
25-29		0.0		
30-34	1	0.0		0.1
35-39	1	0.0		0.1
40-44	6	0.2	16.7	0.2
45-49	19	0.7		0.4
50-54	26	1.0		0.3
55-59	33	1.6		0.3
60-64	70	4.0	2.9	0.4
65-69	72	4.4	1.4	0.3
70-74	66	4.4		0.2
75-79	77	6.4	6.5	0.3
80-84	49	6.8	10.2	0.3
85+	36	7.7	16.7	0.3
All ages	456		4.4	0.3
Incidence				
Raw		1.4		
WS		0.7		
ES		1.0		
BRD-S		1.3		

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).

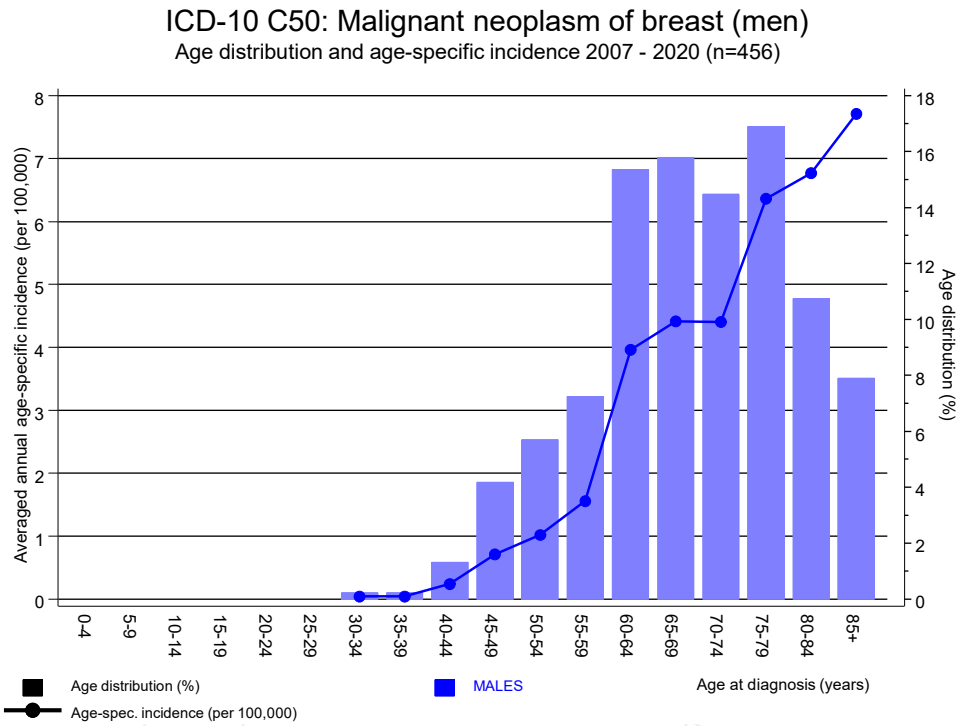

Figure 6. Age distribution (mean=69.5 yrs, median=70.0 yrs) and age-specific incidence.

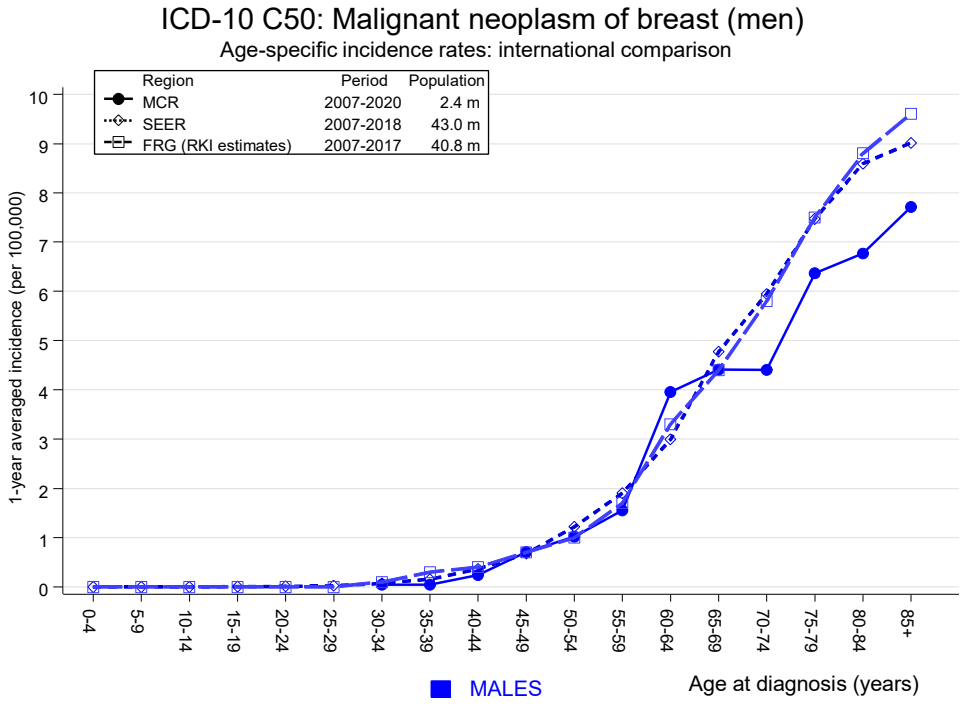

Figure 6a. Age-specific incidence in MCR registry areas compared to Germany (FRG, RKI estimates) and SEER (Surveillance, Epidemiology, and End Results, USA).

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 7

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

Diagnosis		Observed n	Expected n	SIR	CI 95%	CI 95%		EAR	DCO %
C09–C10	Oropharynx	3	0.4	7.3	1.5	21.4	#	10.1	
C15	Oesophagus	3	0.9	3.5	0.7	10.1		8.3	
C16	Stomach	7	1.8	3.9	1.6	8.1	#	20.3	14.3
C18	Colon	7	4.4	1.6	0.6	3.3		10.1	
C19–C20	Rectum	3	2.3	1.3	0.3	3.8		2.7	
C22	Liver	2	1.3	1.5	0.2	5.6		2.7	
C23–C24	Bile	3	0.5	6.1	1.3	17.9	#	9.8	
C25	Pancreas	8	1.8	4.4	1.9	8.7	#	24.1	12.5
C30–C31	Sinuses	1	0.1	12.7	0.3	70.8		3.6	
C32	Larynx	1	0.4	2.4	0.1	13.4		2.3	
C33–C34	Lung	10	5.2	1.9	0.9	3.6		18.8	20.0
C43	Malign. melanoma	3	2.0	1.5	0.3	4.3		3.8	33.3
C50	Breast	9	0.1	70.3	32.1	133.4	#	34.6	
C61	Prostate	32	12.3	2.6	1.8	3.7	#	76.8	12.5
C64	Kidney	5	1.5	3.3	1.1	7.8	#	13.7	
C66	Ureter	1	0.1	7.9	0.2	43.9		3.4	
C67	Bladder	4	2.2	1.8	0.5	4.6		7.0	
C81	Hodgkin lymphoma	1	0.1	10.2	0.3	57.1		3.5	
C82–C85	NHL	3	1.9	1.6	0.3	4.6		4.2	
C91–C96	Leukaemia	2	0.7	2.8	0.3	10.2		5.0	50.0
Not observed		0	4.7	0.0	0.0	0.8	#	-18.5	
All further malignancies		108	44.8	2.4	2.0	2.9	#	246.5	9.3

Patients	606
Median age at next malignancy (years)	72.9
Person-years	2563
Mean observation time (years)	4.2
Median observation time (years)	2.9

The occurrence of further specified malignancy is statistically significant.

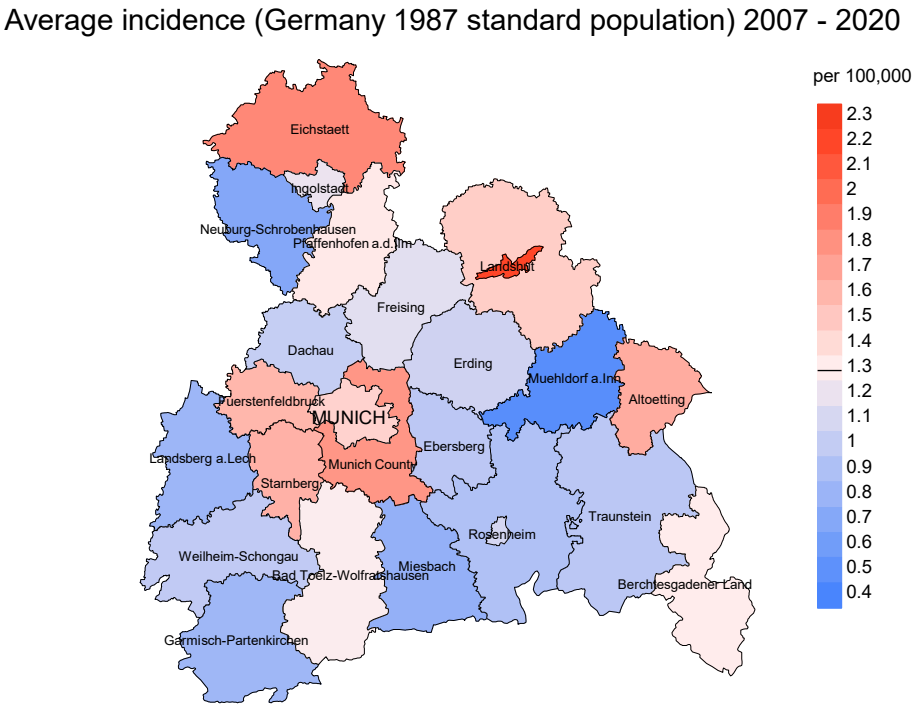

Figure 8a. Map of cancer incidence (german standard population, incl. DCO cases) by county averaged for period 2007 to 2020. According to their individual incidence rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (1.3/100,000 WS N=456).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 66,702 male residents (averaged) in the period from 2007 to 2020 a total of 10 men were identified with newly diagnosed breast cancer (men). Therefore, the mean incidence rate for this cancer type in this area can be calculated at 1.0/100,000 (german standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 0.4 and 2.1/100,000.

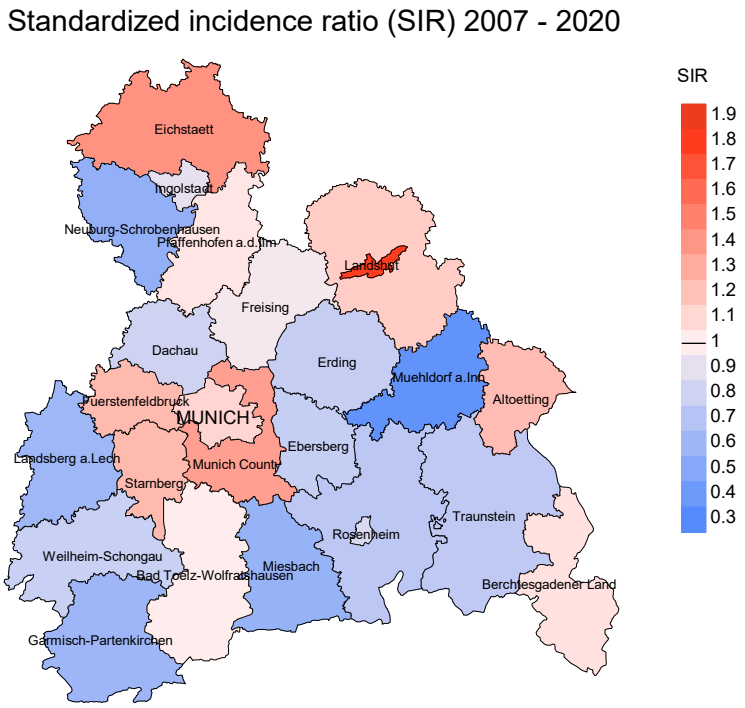

Figure 8b. Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2007 to 2020. According to their individual SIR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (N=456).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 65,991 male residents (averaged) in the period from 2007 to 2020 a total of 10 men were identified with newly diagnosed breast cancer (men). Therefore, the mean standardized incidence ratio (SIR) for this cancer type in this area can be calculated at 0.77. Though, the value of this parameter may vary with an underlying probability of 99% between 0.28 and 1.64, 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	8	87.5	25.0	6	75.0	83.3
1999	12	100.0	16.7	10	83.3	100.0
2000	14	92.9	28.6	11	78.6	100.0
2001	13	84.6		6	46.2	83.3
2002	20	95.0	15.0	18	90.0	100.0
2003	36	100.0	2.8	27	75.0	96.3
2004	27	100.0	11.1	18	66.7	100.0
2005	24	95.8		15	62.5	100.0
2006	25	100.0	8.0	20	80.0	80.0
2007	41	95.1	4.9	28	68.3	92.9
2008	26	100.0	19.2	18	69.2	100.0
2009	25	100.0	4.0	12	48.0	75.0
2010	29	100.0		16	55.2	87.5
2011	33	100.0	6.1	17	51.5	100.0
2012	35	100.0	5.7	16	45.7	93.8
2013	45	100.0	4.4	26	57.8	96.2
2014	34	94.1		12	35.3	75.0
2015	32	96.9	3.1	12	37.5	100.0
2016	38	97.4	5.3	10	26.3	100.0
2017	40	100.0	5.0	12	30.0	83.3
2018	27	100.0	3.7	7	25.9	100.0
2019	24	100.0		3	12.5	100.0
2020	31	100.0		2	6.5	
1998-2020	639	98.1	5.8	322	50.4	92.9

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	8	4	100.0	1	12.5
1999	12	3	100.0	1	8.3
2000	14	7	100.0	5	35.7
2001	13	12	83.3		
2002	20	9	88.9	4	20.0
2003	36	10	100.0	5	13.9
2004	27	12	100.0	2	7.4
2005	24	10	100.0	1	4.2
2006	25	12	100.0	2	8.0
2007	41	14	100.0	5	12.2
2008	26	13	100.0	5	19.2
2009	25	16	100.0	2	8.0
2010	29	13	100.0		
2011	33	21	100.0	2	6.1
2012	35	21	95.2	2	5.7
2013	45	24	100.0	7	15.6
2014	34	16	100.0	1	2.9
2015	32	20	95.0	2	6.3
2016	38	24	100.0	3	7.9
2017	40	21	100.0	3	7.5
2018	27	26	76.9	1	3.7
2019	24	24	58.3		
2020	31	24	100.0		
1998–2020	639	356	94.1	54	8.5

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	4	75.0	25.0	75.0
1999	3	66.7	33.3	66.7
2000	7	85.7	14.3	85.7
2001	12	83.3	16.7	90.0
2002	9	66.7	33.3	75.0
2003	10	70.0	30.0	90.0
2004	12	66.7	33.3	100.0
2005	10	70.0	30.0	90.0
2006	12	83.3	16.7	91.7
2007	14	50.0	50.0	71.4
2008	13	38.5	61.5	61.5
2009	16	81.3	18.8	93.8
2010	13	61.5	38.5	61.5
2011	21	90.5	9.5	85.7
2012	21	76.2	23.8	70.0
2013	24	37.5	62.5	62.5
2014	16	81.3	18.8	87.5
2015	20	70.0	30.0	63.2
2016	24	66.7	33.3	70.8
2017	21	61.9	38.1	76.2
2018	26	61.5	38.5	55.0
2019	24	41.7	58.3	64.3
2020	24	41.7	58.3	50.0
1998-2020	356	64.0	36.0	73.4

Table 10

Medians of age at death according to the grouping in Table 9

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	81.1	82.8	79.4	82.8
1999	3	68.0	67.3	79.7	67.3
2000	7	79.1	78.0	87.8	78.2
2001	12	71.9	69.1	84.5	70.2
2002	9	75.9	76.1	69.3	76.1
2003	10	71.9	70.2	88.4	71.4
2004	12	79.4	73.4	86.4	79.4
2005	10	80.8	79.5	84.5	82.1
2006	12	70.6	70.6	72.9	68.0
2007	14	78.4	69.1	87.6	76.4
2008	13	82.0	70.8	86.1	78.3
2009	16	70.7	72.1	66.9	69.3
2010	13	71.4	73.0	71.4	73.0
2011	21	74.1	74.1	84.6	74.6
2012	21	79.2	75.7	80.8	77.7
2013	24	80.3	76.9	80.9	82.8
2014	16	78.7	78.2	81.8	75.8
2015	20	78.2	76.2	78.9	76.2
2016	24	80.8	77.4	84.4	75.6
2017	21	76.3	75.1	79.1	77.6
2018	26	83.7	79.6	88.1	80.9
2019	24	81.4	74.3	82.8	79.4
2020	24	78.7	68.2	80.1	68.4
1998–2020	356	78.5	75.3	81.9	76.0

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 11

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

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	3	0.3	0.38	0.2	0.34	0.3	0.42	0.4	0.48
1999	2	0.2	0.17	0.1	0.20	0.2	0.18	0.2	0.15
2000	6	0.5	0.43	0.3	0.38	0.5	0.43	0.8	0.54
2001	10	0.9	0.77	0.5	0.74	0.8	0.79	1.0	0.89
2002	6	0.3	0.30	0.2	0.27	0.3	0.32	0.4	0.35
2003	7	0.4	0.19	0.2	0.20	0.3	0.20	0.4	0.21
2004	8	0.4	0.30	0.2	0.25	0.3	0.27	0.5	0.31
2005	7	0.4	0.29	0.2	0.27	0.3	0.31	0.5	0.35
2006	10	0.5	0.40	0.3	0.38	0.4	0.39	0.5	0.40
2007	7	0.3	0.17	0.2	0.17	0.2	0.18	0.3	0.16
2008	5	0.2	0.19	0.1	0.16	0.2	0.18	0.2	0.20
2009	13	0.6	0.52	0.3	0.50	0.5	0.52	0.6	0.55
2010	8	0.4	0.28	0.2	0.25	0.2	0.26	0.4	0.29
2011	19	0.8	0.59	0.4	0.59	0.6	0.60	0.8	0.58
2012	16	0.7	0.46	0.3	0.35	0.4	0.38	0.7	0.46
2013	9	0.4	0.21	0.1	0.16	0.2	0.19	0.4	0.22
2014	13	0.6	0.38	0.2	0.32	0.4	0.36	0.5	0.35
2015	14	0.6	0.44	0.2	0.34	0.4	0.38	0.5	0.44
2016	16	0.7	0.42	0.3	0.33	0.4	0.37	0.6	0.42
2017	13	0.5	0.33	0.2	0.27	0.3	0.28	0.5	0.33
2018	16	0.7	0.62	0.2	0.52	0.4	0.56	0.6	0.60
2019	10	0.4	0.42	0.2	0.33	0.3	0.37	0.4	0.40
2020	11	0.5	0.35	0.2	0.36	0.3	0.37	0.4	0.34
1998-2020	229	0.5	0.36	0.2	0.31	0.3	0.34	0.5	0.37

Table 12

Age distribution of age at death (cancer-related) for period 2007-2020
(**incl. multiple malignancies**)

Age at death Years	Cases n	%	Cum.%
0-4			
5-9			
10-14			
15-19			
20-24			
25-29			
30-34			
35-39			
40-44	2	1.2	1.2
45-49	3	1.8	2.9
50-54	5	2.9	5.9
55-59	10	5.9	11.8
60-64	10	5.9	17.6
65-69	26	15.3	32.9
70-74	24	14.1	47.1
75-79	29	17.1	64.1
80-84	30	17.6	81.8
85+	31	18.2	100.0
All ages	170	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	Cases n	Age-spec. mortality	MI-index	Prop. all cancers %
0- 4		0.0		
5- 9		0.0		
10-14		0.0		
15-19		0.0		
20-24		0.0		
25-29		0.0		
30-34		0.0		
35-39		0.0		
40-44	2	0.1	0.33	0.3
45-49	3	0.1	0.16	0.2
50-54	5	0.2	0.19	0.2
55-59	10	0.5	0.30	0.2
60-64	10	0.6	0.14	0.2
65-69	26	1.6	0.36	0.3
70-74	24	1.6	0.36	0.2
75-79	29	2.4	0.38	0.2
80-84	30	4.1	0.61	0.3
85+	31	6.6	0.86	0.3
All ages	170			0.2
Mortality				
Raw		0.5	0.37	
WS		0.2	0.32	
ES		0.4	0.35	
BRD-S		0.5	0.37	
PYLL-70				
per 100,000		1.7		
ES		1.4		
AYLL-70		8.5		

Table 14

Further malignancies in deaths in period 1998–2020

Diagnosis		Total n	Total %↓	Pre n	Pre ←%	Syn-chron ±30d n	Syn-chron ±30d ←%	Post n	Post ←%
C09–C10	Oropharynx	4	3.0	1	25.0			3	75.0
C12–C13	Hypopharynx	1	0.8					1	100.0
C15	Oesophagus	4	3.0	3	75.0			1	25.0
C16	Stomach	8	6.0	3	37.5			5	62.5
C18	Colon	12	9.0	7	58.3			5	41.7
C19–C20	Rectum	4	3.0	4	100.0				
C22	Liver	3	2.3	2	66.7			1	33.3
C25	Pancreas	7	5.3					7	100.0
C30–C31	Sinuses	1	0.8	1	100.0				
C32	Larynx	2	1.5	2	100.0				
C33–C34	Lung	17	12.8	2	11.8	3	17.6	12	70.6
C43	Malign. melanoma	2	1.5	2	100.0				
C44	Skin others	10	7.5	4	40.0	3	30.0	3	30.0
C46,C49	Soft tissue	1	0.8					1	100.0
C50	Breast	9	6.8			3	33.3	6	66.7
C61	Prostate	28	21.1	14	50.0	3	10.7	11	39.3
C64	Kidney	2	1.5					2	100.0
C67	Bladder	4	3.0	1	25.0			3	75.0
C76–C79	CUP	1	0.8	1	100.0				
C81	Hodgkin lymphoma	2	1.5	1	50.0			1	50.0
C82–C85	NHL	8	6.0	5	62.5			3	37.5
C91–C96	Leukaemia	3	2.3	1	33.3			2	66.7
All further malignancies		133	100.0	54	40.6	12	9.0	67	50.4

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

Table 15

Age-specific mortality (cancer-related) and proportion of all cancers
for period 2007-2020
(**First primaries only** *)

Age at death Years	Cases n	Age-spec. mortality	MI-index	Prop. all cancers %
0- 4		0.0		
5- 9		0.0		
10-14		0.0		
15-19		0.0		
20-24		0.0		
25-29		0.0		
30-34		0.0		
35-39		0.0		
40-44	1	0.0	0.20	0.2
45-49	2	0.1	0.13	0.2
50-54	4	0.2	0.16	0.2
55-59	9	0.4	0.36	0.2
60-64	8	0.5	0.15	0.1
65-69	22	1.3	0.42	0.3
70-74	14	0.9	0.31	0.2
75-79	21	1.7	0.38	0.2
80-84	22	3.0	0.69	0.3
85+	23	4.9	0.96	0.4
All ages	126			0.2
Mortality				
Raw		0.4	0.38	
WS		0.2	0.32	
ES		0.3	0.35	
BRD-S		0.4	0.37	
PYLL-70				
per 100,000		1.3		
ES		1.1		
AYLL-70		8.0		

* 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	Cases n	Age-spec. mortality	MI-index	Prop. all cancers %
0- 4		0.0		
5- 9		0.0		
10-14		0.0		
15-19		0.0		
20-24		0.0		
25-29		0.0		
30-34		0.0		
35-39		0.0		
40-44	1	0.0	0.20	0.2
45-49	2	0.1	0.13	0.2
50-54	4	0.2	0.17	0.2
55-59	9	0.4	0.39	0.2
60-64	6	0.3	0.12	0.1
65-69	18	1.1	0.41	0.3
70-74	11	0.7	0.28	0.1
75-79	14	1.2	0.27	0.2
80-84	8	1.1	0.30	0.1
85+	17	3.6	0.85	0.3
All ages	90			0.2
Mortality				
Raw		0.3	0.30	
WS		0.1	0.27	
ES		0.2	0.29	
BRD-S		0.3	0.30	
PYLL-70				
per 100,000		1.2		
ES		1.0		
AYLL-70		8.6		

* See corresponding tables with multiple malignancies.

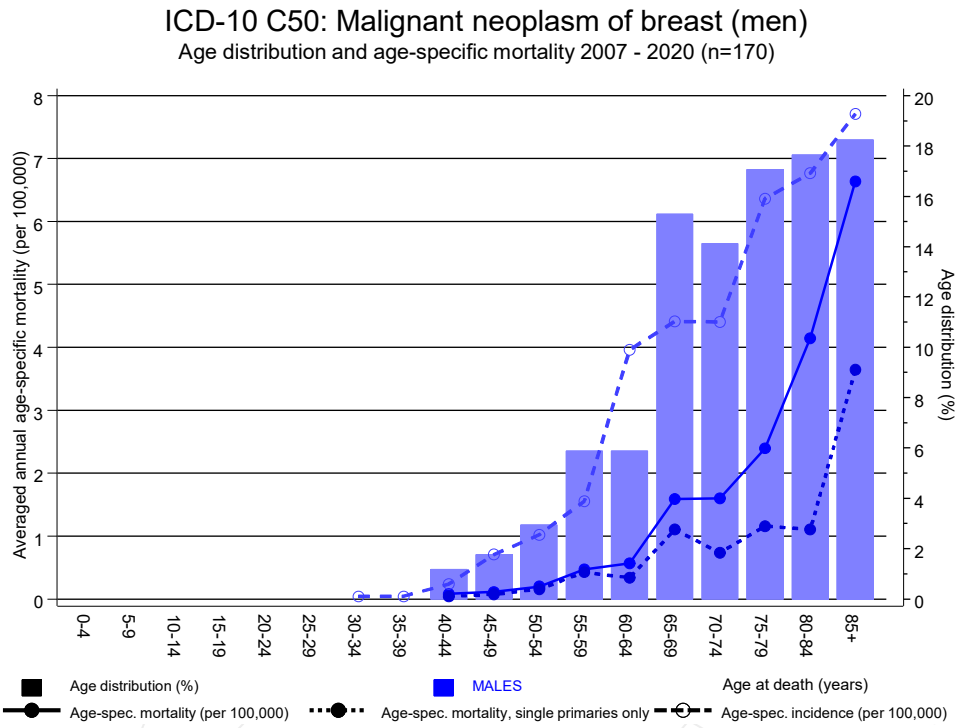

Figure 17. Distribution of age at death (bars; mean=68.5 yrs, median=68.5 yrs) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

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

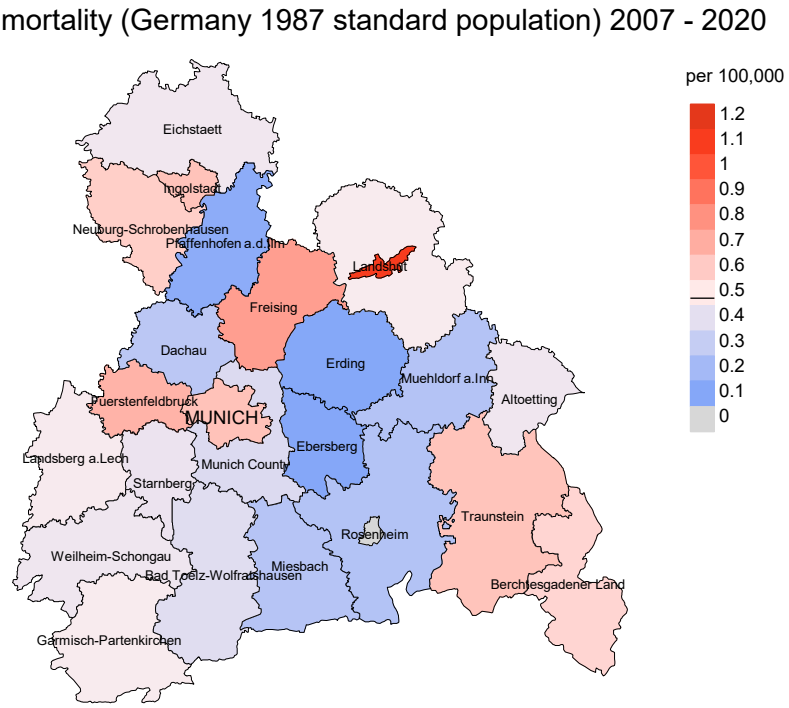

Figure 18a. Map of cancer mortality (german standard population) by county averaged for period 2007 to 2020. According to their individual mortality rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (0.5/100,000 WS N=170).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 66,702 male residents (averaged) in the period from 2007 to 2020 a total of 1 men died from breast cancer (men). Therefore, the mean mortality rate for this cancer type in this area can be calculated at 0.1/100,000 (german standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 0.0 and 0.8/100,000.

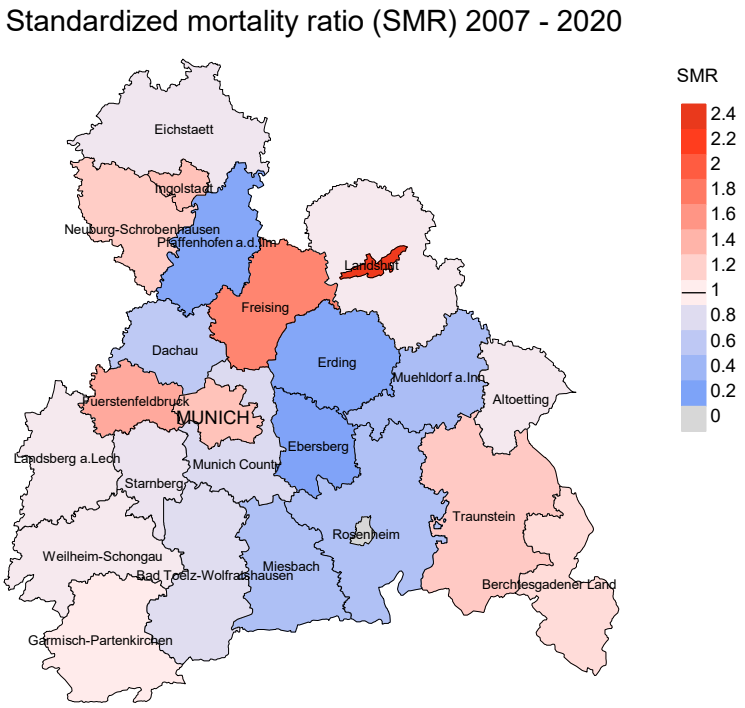

Figure 18b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2007 to 2020. According to their individual SMR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (N=170).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 65,991 male residents (averaged) in the period from 2007 to 2020 a total of 1 men died from breast cancer (men). Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 0.21. Though, the value of this parameter may vary with an underlying probability of 99% between 0.00 and 1.54, 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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