Munich Cancer Registry

- Incidence and Mortality
- Selection Matrix
- Homepage
- *Deutsch*

ICD-10 C34: Lung cancer

Survival

Year of diagnosis	1988-1997	1998-2020
Patients	4,505	41,830
Diseases	4,529	42,304
Cases evaluated	4,014	28,624

Creation date	04/15/2022
Database export	12/20/2021
Population	4.92 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/surv/sC34__E-ICD-10-C34-Lung-cancer-survival.pdf

Index of figures and tables

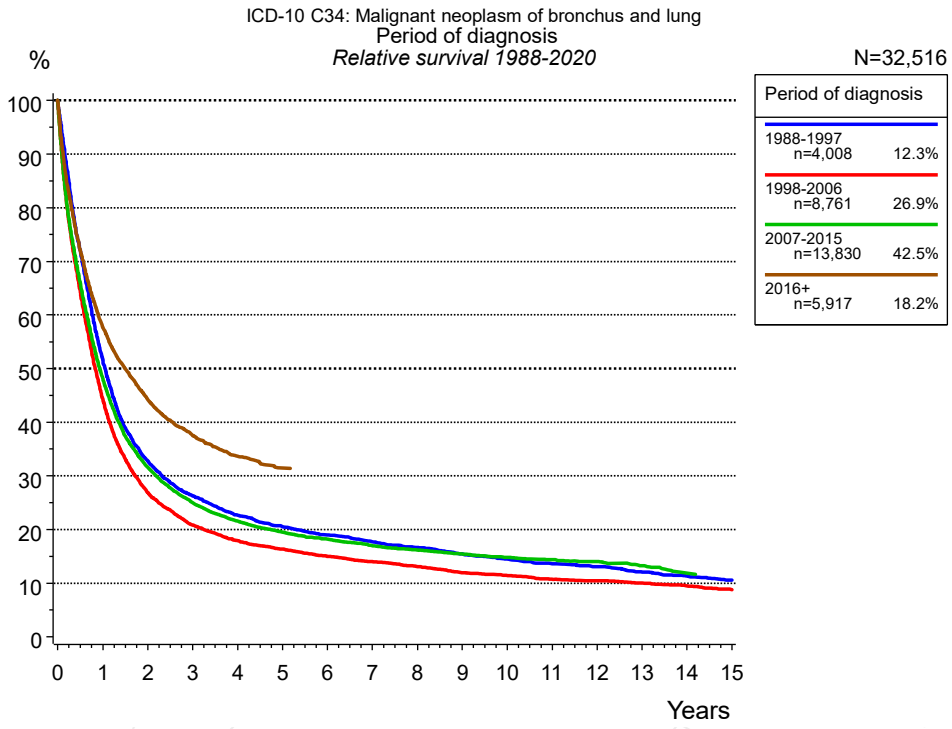

Figure 1a. Relative survival of patients with lung cancer by period of diagnosis. Included in the evaluation are 32,516 cases diagnosed between 1988 and 2020.

The presented survival curves are derived from clinical records with valid follow-up informations, which means that death certificate cases (DCO) cases are omitted from the analysis. With this one restriction, the MCR has provided population-based statistics since 1998, collecting data on all cancer cases in the region of southern Bavaria. Historical data of previous time periods can be heavily selected, therefore, univariate survival comparisons of the presented time periods must be carefully considered. Nonetheless, all calculable survival curves are depicted to facilitate the comparison of long time follow-up analyses of relative survival between particular cancers.

	Period of diagnosis							
	1988-1997 n=4,008		1998-2006 n=8,761		2007-2015 n=13,830		2016+ n=5,917	
Years	obs. %	rel. %	obs. %	rel. %	obs. %	rel. %	obs. %	rel. %
0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1	50.3	51.6	43.1	44.3	47.0	48.1	56.3	57.6
2	31.2	32.8	25.6	26.8	30.2	31.6	42.3	44.2
3	24.5	26.3	19.4	20.8	23.4	24.9	35.2	37.5
4	20.7	22.7	16.4	17.9	19.7	21.6	30.9	33.6
5	18.3	20.5	14.6	16.3	17.4	19.5	28.4	31.5
6	16.5	19.0	13.1	15.0	15.9	18.2		
7	15.1	17.7	11.9	14.0	14.4	16.9		
8	13.8	16.6	10.9	13.1	13.4	16.2		
9	12.5	15.4	9.7	12.0	12.5	15.4		
10	11.4	14.4	9.1	11.4	11.7	14.8		
11	10.5	13.6	8.3	10.7	11.1	14.4		
12	9.9	13.1	7.9	10.5	10.5	14.0		
13	8.8	12.1	7.4	10.0	9.6	13.2		
14	8.1	11.4	6.8	9.5	8.6	11.9		
15	7.4	10.6	6.1	8.8				
Median	1.0		0.8		0.9		1.4	

Table 1b. Observed (obs.) and relative (rel.) survival of patients with lung cancer by period of diagnosis for period 1988-2020 (N=32,516).

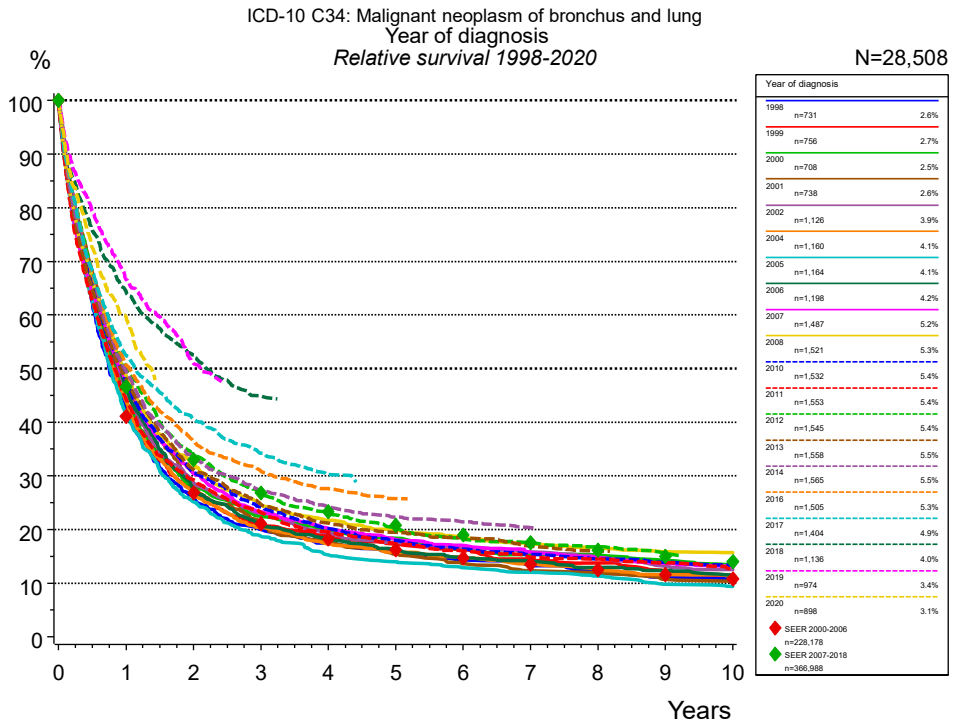

Figure 1c. Relative survival of patients with lung cancer by year of diagnosis. Included in the evaluation are 28,508 cases diagnosed between 1998 and 2020.

The survival results of the SEER program (Surveillance, Epidemiology, and End Results) of the American National Cancer Institute (NCI) are summarized as the period of diagnosis from 2000 to 2018, and are represented by colored diamonds in order to facilitate comparisons between MCR and SEER.

	Year of diagnosis													
	1998 n=731		1999 n=756		2000 n=708		2001 n=738		2002 n=1,126		2004 n=1,160		2005 n=1,164	
Years	obs. %	rel. %	obs. %	rel. %	obs. %	rel. %	obs. %	rel. %	obs. %	rel. %	obs. %	rel. %	obs. %	rel. %
0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1	41.4	42.6	42.9	44.1	43.0	44.1	47.4	48.5	44.6	45.7	42.9	44.0	40.6	41.5
2	24.9	26.1	26.1	27.4	26.9	28.2	27.0	28.2	27.3	28.6	25.4	26.5	24.1	25.1
3	18.7	20.0	19.2	20.7	21.2	22.5	20.0	21.4	21.5	23.1	19.1	20.4	17.6	18.7
4	15.9	17.4	17.0	18.8	18.2	19.9	16.4	17.7	17.7	19.4	16.0	17.3	14.1	15.3
5	14.2	15.9	15.3	17.2	16.6	18.4	13.9	15.4	15.8	17.6	14.1	15.8	12.7	14.0
6	12.4	14.3	14.0	16.2	14.5	16.4	12.1	13.6	14.4	16.5	12.9	14.7	11.4	12.9
7	11.4	13.3	12.2	14.4	13.2	15.3	10.8	12.3	13.4	15.8	11.7	13.6	10.5	12.0
8	9.8	12.0	11.4	13.8	12.9	15.2	10.3	12.0	12.3	14.7	10.5	12.6	9.7	11.3
9	8.9	11.1	9.7	12.0	11.7	14.2	9.0	10.7	10.7	13.2	9.4	11.6	8.2	9.8
10	8.3	10.5	9.1	11.5	10.7	13.4	8.5	10.4	9.9	12.5	8.9	11.2	7.7	9.4
Median	0.7		0.8		0.8		0.9		0.9		0.8		0.7	

	Year of diagnosis													
cont'd	2006 n=1,198		2007 n=1,487		2008 n=1,521		2010 n=1,532		2011 n=1,553		2012 n=1,545		2013 n=1,558	
Years	obs. %	rel. %	obs. %	rel. %	obs. %	rel. %	obs. %	rel. %	obs. %	rel. %	obs. %	rel. %	obs. %	rel. %
0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1	45.1	46.3	46.4	47.5	47.4	48.6	46.6	47.6	43.3	44.3	49.3	50.5	47.0	48.0
2	26.5	27.8	29.1	30.5	30.7	32.1	29.3	30.6	28.1	29.3	32.5	33.9	29.8	31.1
3	19.5	20.9	21.7	23.3	23.1	24.6	22.7	24.2	21.7	23.1	25.2	26.9	23.1	24.7
4	16.7	18.3	18.3	20.1	19.9	21.7	18.5	20.2	18.0	19.6	21.2	23.1	19.5	21.2
5	14.4	16.2	16.1	18.1	17.9	20.0	16.1	17.9	15.5	17.2	18.1	20.2	17.5	19.5
6	12.8	14.7	14.7	17.0	16.4	18.7	14.3	16.3	14.1	16.0	16.0	18.3	16.1	18.4
7	12.0	14.1	13.3	15.8	14.8	17.4	13.2	15.3	12.7	14.8	15.0	17.5	14.5	16.9
8	10.7	12.9	12.1	14.7	13.9	16.6	12.2	14.5	12.2	14.5	14.0	16.8	13.5	16.0
9	10.0	12.4	10.9	13.7	13.0	15.9	11.4	13.9	11.3	13.8	12.8	15.6		
10	9.0	11.4	10.3	13.2	12.5	15.7	10.7	13.4	10.1	12.7				
Median	0.9		0.9		0.9		0.9		0.8		1.0		0.9	

	Year of diagnosis											
cont'd	2014 n=1,565		2016 n=1,505		2017 n=1,404		2018 n=1,136		2019 n=974		2020 n=898	
Years	obs. %	rel. %	obs. %	rel. %	obs. %	rel. %	obs. %	rel. %	obs. %	rel. %	obs. %	rel. %
0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1	48.3	49.5	49.5	50.6	51.2	52.4	63.0	64.4	65.1	66.6	58.3	59.6
2	32.2	33.6	34.9	36.4	38.9	40.5	50.4	52.5	48.7	51.0		
3	25.7	27.4	29.1	30.8	32.1	34.2	42.1	44.9				
4	22.2	24.2	25.5	27.6	27.8	30.3						
5	20.0	22.3	23.4	25.7								
6	18.7	21.4										
7	17.3	20.3										
Median	0.9		1.0		1.1		2.0		1.9		1.3	

Table 1d. Observed (obs.) and relative (rel.) survival of patients with lung cancer by year of diagnosis for period 1998-2020 (N=28,508).

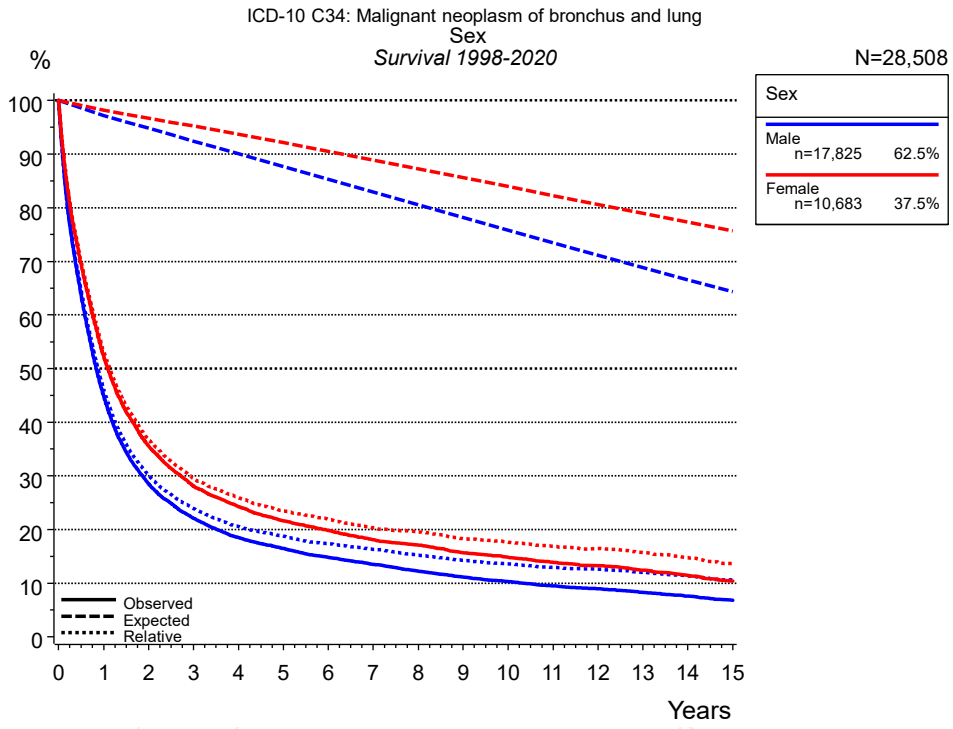

Figure 2a. Survival of patients with lung cancer by sex. Included in the evaluation are 28,508 cases diagnosed between 1998 and 2020.

	Sex			
	Male n=17,825		Female n=10,683	
Years	obs. %	rel. %	obs. %	rel. %
0	100.0	100.0	100.0	100.0
1	44.9	46.2	52.3	53.2
2	28.5	30.1	35.6	36.8
3	22.1	23.9	28.1	29.5
4	18.5	20.6	24.2	25.9
5	16.5	18.8	21.6	23.4
6	14.8	17.3	19.8	21.9
7	13.5	16.3	18.1	20.3
8	12.3	15.2	17.1	19.5
9	11.1	14.3	15.6	18.2
10	10.3	13.6	14.8	17.6
11	9.5	13.0	13.9	16.8
12	9.0	12.6	13.3	16.4
13	8.3	12.0	12.4	15.7
14	7.6	11.4	11.4	14.7
15	6.8	10.6	10.3	13.7
Median	0.8		1.1	

Table 2b. Observed (obs.) and relative (rel.) survival of patients with lung cancer by sex for period 1998-2020 (N=28,508).

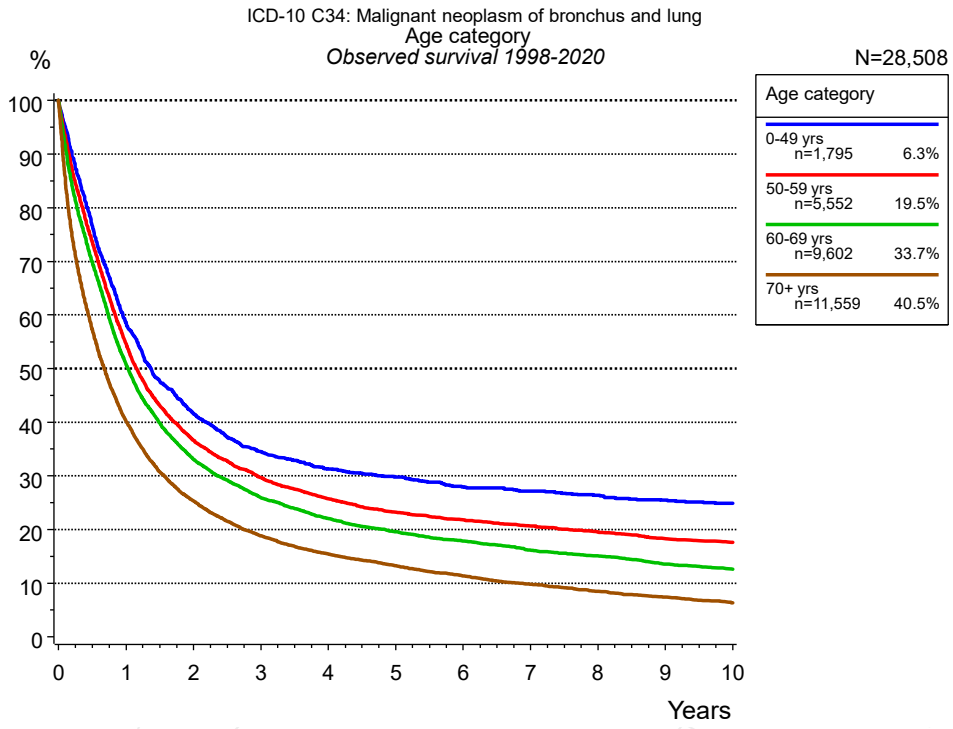

Figure 3a. Observed survival of patients with lung cancer by age category. Included in the evaluation are 28,508 cases diagnosed between 1998 and 2020.

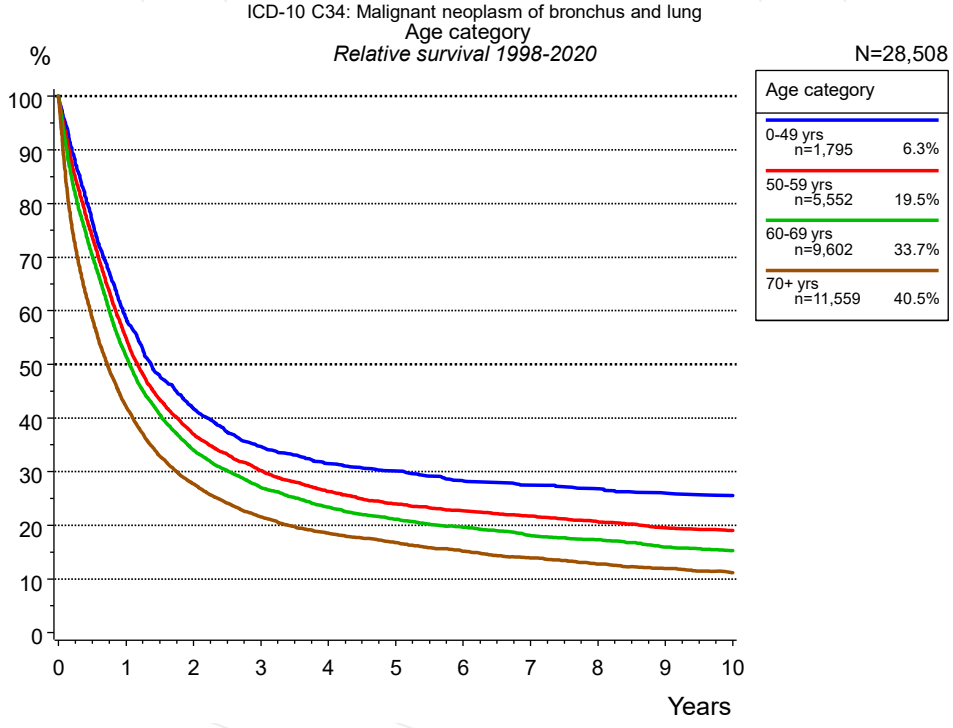

Figure 3b. Relative survival of patients with lung cancer by age category. Included in the evaluation are 28,508 cases diagnosed between 1998 and 2020.

	Age category							
	0-49 yrs n=1,795		50-59 yrs n=5,552		60-69 yrs n=9,602		70+ yrs n=11,559	
Years	obs. %	rel. %	obs. %	rel. %	obs. %	rel. %	obs. %	rel. %
0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1	58.5	58.6	54.6	54.9	50.8	51.4	40.2	42.1
2	41.6	41.7	36.6	37.0	33.1	34.0	25.3	27.7
3	34.5	34.6	29.7	30.2	25.9	27.1	18.8	21.6
4	31.3	31.5	25.7	26.3	22.0	23.4	15.4	18.5
5	29.8	30.1	23.2	24.0	19.6	21.2	13.2	16.7
6	28.0	28.3	21.8	22.7	17.9	19.7	11.3	15.2
7	27.1	27.5	20.7	21.7	16.1	18.1	9.8	13.9
8	26.3	26.8	19.5	20.7	15.0	17.3	8.5	12.8
9	25.4	26.0	18.3	19.6	13.5	15.9	7.4	12.0
10	24.9	25.5	17.6	19.1	12.6	15.2	6.3	11.1
Median	1.4		1.2		1.0		0.7	

Table 3c. Observed (obs.) and relative (rel.) survival of patients with lung cancer by age category for period 1998-2020 (N=28,508).

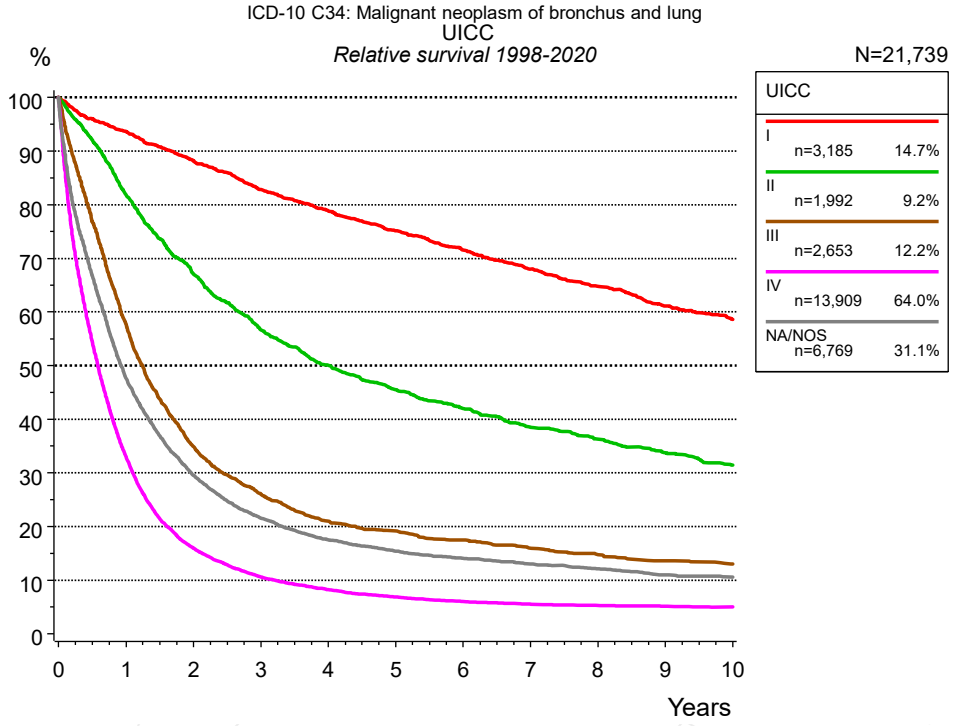

Figure 4a. Relative survival of patients with lung cancer by UICC. For 25,319 of 28,508 cases diagnosed between 1998 and 2020 valid data could be obtained for this item. For a total of 21,739 cases an evaluable classification was established. The grey line represents the subgroup of 6,769 patients with missing values regarding UICC (23.7 % of 28,508 patients, the percent values of all other categories are related to n=21,739).

	UICC									
	I		II		III		IV		NA/NOS	
	n=3,185		n=1,992		n=2,653		n=13,909		n=6,769	
Years	obs. %	rel. %	obs. %	rel. %	obs. %	rel. %	obs. %	rel. %	obs. %	rel. %
0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1	91.8	93.6	80.3	81.8	56.4	57.6	32.2	32.9	46.1	47.6
2	84.9	88.2	64.5	67.0	33.5	34.9	15.3	15.9	27.8	29.5
3	78.0	82.8	53.5	56.6	24.6	26.1	10.0	10.6	19.8	21.5
4	72.7	78.9	46.3	50.0	19.4	21.0	7.6	8.2	15.7	17.5
5	67.6	75.1	41.2	45.5	17.3	19.2	6.2	6.8	13.4	15.4
6	63.0	71.6	37.1	42.0	15.5	17.5	5.3	6.0	11.9	14.1
7	58.3	68.0	33.3	38.5	13.8	15.9	4.8	5.5	10.8	13.0
8	54.3	64.8	30.6	36.2	12.6	14.8	4.5	5.3	9.8	12.1
9	49.8	61.1	27.8	33.7	11.3	13.6	4.3	5.1	8.6	11.0
10	46.6	58.6	25.2	31.4	10.5	13.0	4.1	5.0	8.1	10.6
Median	9.0		3.4		1.2		0.6		0.9	

Table 4b. Observed (obs.) and relative (rel.) survival of patients with lung cancer by UICC for period 1998-2020 (N=21,739).

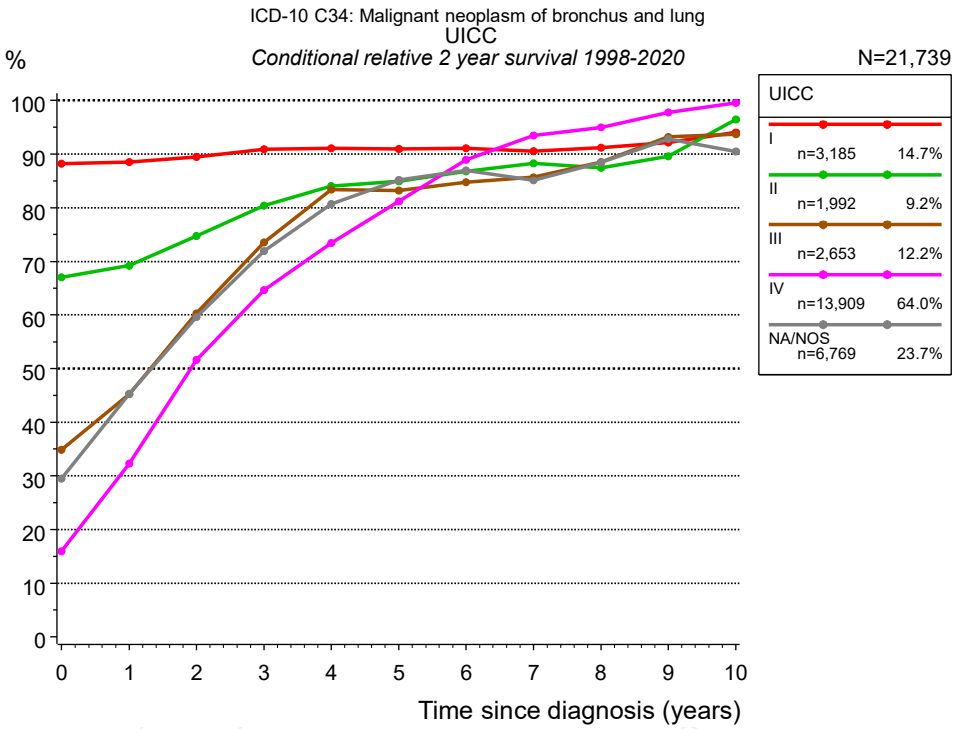

Figure 4c. Conditional relative 2-year survival of patients with lung cancer by UICC. For 25,319 of 28,508 cases diagnosed between 1998 and 2020 valid data could be obtained for this item. For a total of 21,739 cases an evaluable classification was established. The grey line represents the subgroup of 6,769 patients with missing values regarding UICC (23.7 % of 28,508 patients, the percent values of all other categories are related to n=21,739).

	UICC									
	I		II		III		IV		NA/NOS	
Years	n	Cond. surv. % 2 yrs	n	Cond. surv. % 2 yrs	n	Cond. surv. % 2 yrs	n	Cond. surv. % 2 yrs	n	Cond. surv. % 2 yrs
0	3,185	88.2	1,992	67.0	2,653	34.9	13,909	15.9	6,769	29.5
1	2,821	88.5	1,557	69.2	1,429	45.3	4,327	32.3	3,041	45.3
2	2,484	89.5	1,192	74.7	790	60.3	1,917	51.6	1,769	59.6
3	2,144	90.9	939	80.4	525	73.5	1,116	64.7	1,172	71.9
4	1,863	91.1	772	84.0	361	83.3	712	73.4	864	80.7
5	1,594	91.0	649	84.9	279	83.2	489	81.2	689	85.2
6	1,372	91.1	542	86.8	228	84.7	347	88.9	545	87.0
7	1,181	90.5	437	88.3	173	85.7	273	93.4	447	85.1
8	1,009	91.2	352	87.4	143	88.5	218	95.0	376	88.4
9	835	92.1	287	89.6	112	93.2	167	97.8	305	92.8
10	709	94.0	228	96.5	89	93.7	135	99.5	265	90.5

Table 4d. Conditional relative 2-year survival of patients with lung cancer by UICC for period 1998-2020 (N=21,739).

Conditional relative survival rates refer to the relative survival probability, in this case for 2 years after cancer diagnosis, compared to the age- and sex-matched population (=100 %) under the condition of being alive for a certain time period (x-axis in Figure 4a). The results illustrate to what extent the cancer induced mortality of particular subgroups declines in the subsequent years after detection of the malignancy. For instance, according to the presented survival statistics, patients in the subgroup UICC="I", who are alive at least 3 years after cancer diagnosis, the conditional relative 2-year survival rate is 90.9% (n=2,144).

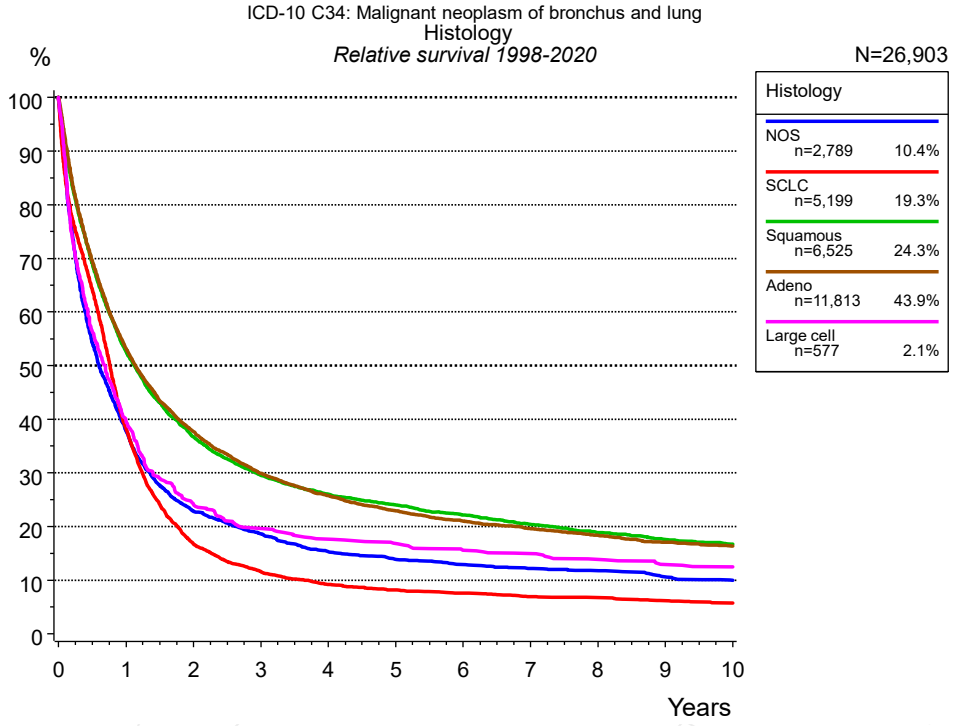

Figure 4g. Relative survival of patients with lung cancer by histology. For 26,903 of 28,508 cases diagnosed between 1998 and 2020 valid data could be obtained for this item.

	Histology									
	NOS n=2,789		SCLC n=5,199		Squamous n=6,525		Adeno n=11,813		Large cell n=577	
Years	obs. %	rel. %	obs. %	rel. %	obs. %	rel. %	obs. %	rel. %	obs. %	rel. %
0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1	36.8	37.8	37.4	38.2	51.2	52.6	51.9	53.1	38.9	39.5
2	21.7	22.8	16.1	16.7	34.9	36.8	36.1	37.7	23.1	24.0
3	17.3	18.6	11.0	11.5	27.3	29.6	28.1	29.9	18.7	19.6
4	13.9	15.3	8.6	9.2	23.4	26.0	23.7	25.8	16.5	17.7
5	12.3	13.9	7.5	8.2	21.0	24.0	20.7	22.9	15.3	16.8
6	11.2	12.9	6.8	7.6	18.9	22.1	18.5	21.0	13.8	15.6
7	10.3	12.2	6.1	6.9	16.9	20.4	16.9	19.6	13.0	14.9
8	9.8	11.8	5.9	6.8	15.2	18.9	15.4	18.4	11.7	13.9
9	8.6	10.6	5.2	6.2	13.7	17.5	14.0	17.1	10.6	12.9
10	7.9	9.9	4.8	5.7	12.6	16.7	13.0	16.3	10.1	12.5
Median	0.6		0.7		1.0		1.1		0.7	

Table 4h. Observed (obs.) and relative (rel.) survival of patients with lung cancer by histology for period 1998-2020 (N=26,903).

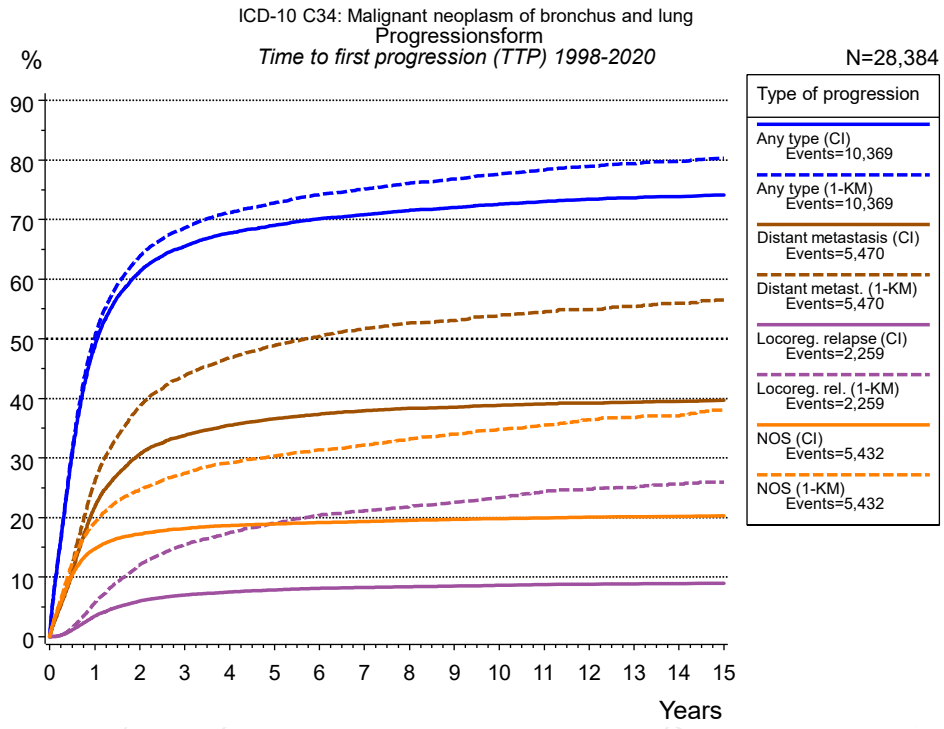

Figure 5a. Time to first progression of 28,384 patients with lung cancer diagnosed between 1998 and 2020 (in solid cancers M0 only) estimated by cumulative incidence function (CI, solid line) accounting for death as competing risk and by inverse Kaplan-Meier estimate (1-KM, dashed line). The frequency of events may be underestimated due to underreporting.

	Type of progression						
	Any type (CI)	Any type (1-KM)	Distant metastasis (CI)	Distant metast. (1-KM)	Locoreg. relapse (CI)	Locoreg. rel. (1-KM)	NOS (CI)
N	14,830	14,830	14,836	14,836	28,383	28,383	28,379
Events	10,352	10,352	5,459	5,459	2,252	2,252	5,425
compet.	1,797		6,178		21,683		18,677
Years	%	%	%	%	%	%	%
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	48.8	50.3	21.8	26.1	3.5	5.7	14.7
2	61.3	63.8	30.6	38.7	6.0	12.1	17.2
3	65.5	68.6	33.8	43.8	7.0	15.4	18.2
4	67.8	71.2	35.5	46.8	7.5	17.5	18.7
5	69.1	72.8	36.6	48.9	7.8	19.1	18.9
6	70.2	74.2	37.3	50.4	8.1	20.4	19.2
7	70.9	75.1	37.9	51.7	8.3	21.1	19.4
8	71.5	76.1	38.3	52.6	8.4	21.8	19.5
9	72.1	76.8	38.5	53.1	8.5	22.6	19.7
10	72.6	77.7	38.8	54.0	8.6	23.3	19.8
11	73.0	78.3	39.0	54.5	8.7	24.3	20.0
12	73.4	79.0	39.2	55.0	8.8	24.8	20.1
13	73.7	79.4	39.3	55.5	8.8	25.0	20.1
14	73.9	79.8	39.5	56.0	8.9	25.6	20.2
15	74.1	80.3	39.6	56.5	8.9	25.9	20.3

Type of progression	
cont'd	NOS (1-KM)
N	28,379
Events	5,425
compet.	
Years	%
0	0.0
1	19.2
2	24.7
3	27.5
4	29.2
5	30.3
6	31.4
7	32.2
8	33.2
9	34.0
10	34.8
11	35.6
12	36.4
13	36.8
14	37.1
15	38.0

Table 5b. Time to first progression of patients with lung cancer for period 1998-2020 (N=28,384), also showing the total of progression events (Events) and of deaths as competing risk (compet.).

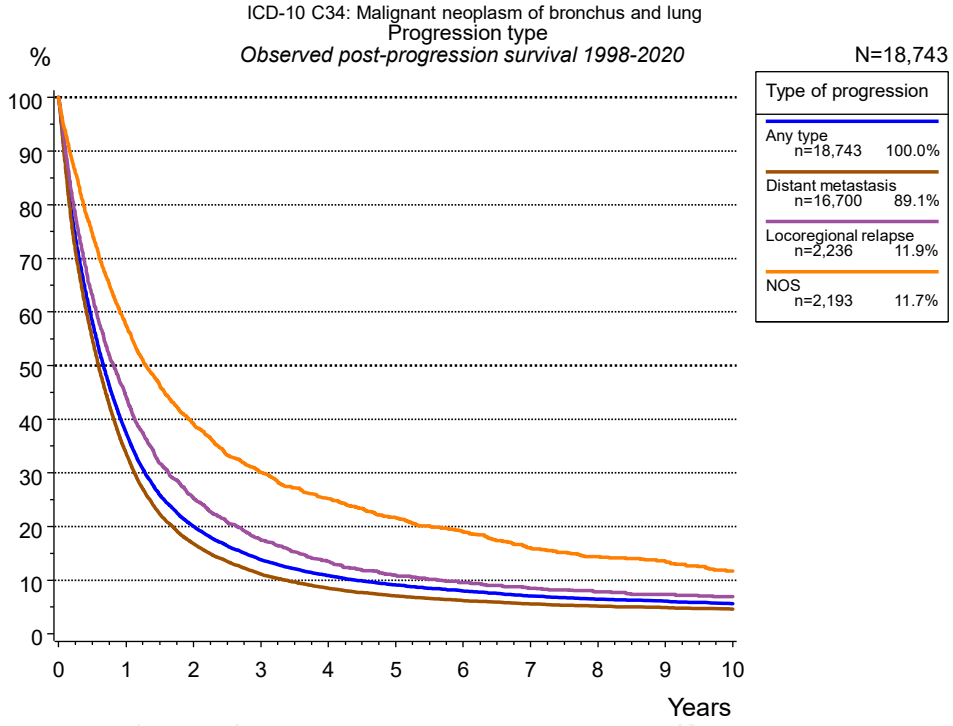

Figure 5c. Observed post-progression survival of 18,743 patients with lung cancer diagnosed between 1998 and 2020. These 18,743 patients with documented progression events during their course of disease represent 66.0 % of the totally 28,384 evaluated cases (incl. M1, n=13,554, 47.8 %). Patients with cancer relapse documented via death certificates only were excluded (n=5,180, 18.2 %). Multiple progression types on different sites are included in the evaluation even when not occuring synchronously. The NOS (not otherwise specified) class is included under the condition, that it is the one and only progression type during the course of disease.

Medical record documentation often lacks the linguistic severity to distinguish between local relapse, regional lymph node metastasis and distant spread in solid cancers. Frequently, the statement “not specified” is the only information in registries regarding relapse of the disease. The category “Any type” denotes all cases who suffered from at least one relapse during the course of disease (incl. primary M1-status). Although, the real number of relapsed patients is likely to be much higher. The accumulated percentage of patients with local relapse or distant metastasis exceeds the 100 % value because patients are potientially considered in more than one subgroup.

	Type of progression			
Years	Any type n=18,743 %	Distant metastasis n=16,700 %	Locoregional relapse n=2,236 %	NOS n=2,193 %
0	100.0	100.0	100.0	100.0
1	37.4	33.6	44.2	57.4
2	20.0	16.7	25.3	39.1
3	13.8	11.1	17.5	30.1
4	10.9	8.5	13.5	25.1
5	9.1	7.0	10.9	21.6
6	7.9	6.2	9.6	19.0
7	7.0	5.6	8.5	15.9
8	6.4	5.1	7.8	14.4
9	6.1	4.9	7.3	13.5
10	5.6	4.6	6.9	11.7

Table 5d. Observed post-progression survival of patients with lung cancer for period 1998-2020 (N=18,743).

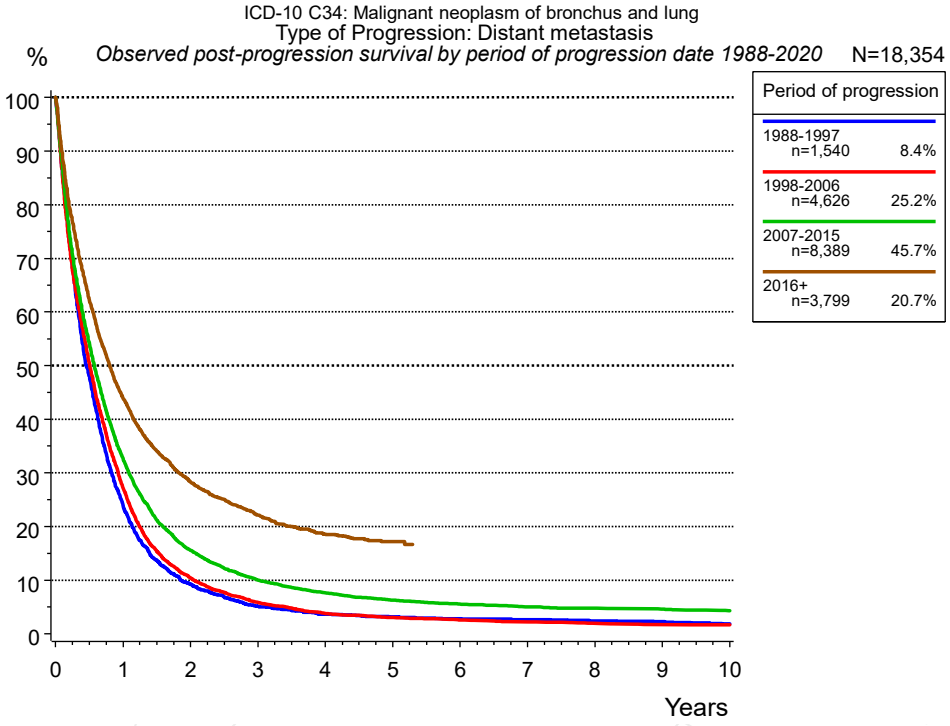

Figure 5e. Observed post-progression (distant metastasis) survival of 18,354 patients with lung cancer diagnosed between 1988 and 2020 by period of progression.

	Period of progression			
	1988-1997 n=1,540	1998-2006 n=4,626	2007-2015 n=8,389	2016+ n=3,799
Years	%	%	%	%
0	100.0	100.0	100.0	100.0
1	23.8	27.1	32.5	43.9
2	9.3	10.4	15.5	28.3
3	5.2	5.8	10.0	22.1
4	3.7	3.8	7.6	18.6
5	3.2	3.0	6.3	17.1
6	2.8	2.6	5.5	
7	2.7	2.2	5.0	
8	2.4	1.9	4.8	
9	2.3	1.7	4.6	
10	1.9	1.7	4.3	

Table 5f. Observed post-progression (distant metastasis) survival of patients with lung cancer for period 1988-2020 by period of progression (N=18,354).

Shortcuts

MCR	Munich Cancer Registry, Germany	
NCI	National Cancer Institute, USA	
SEER	Surveillance, Epidemiology, and End Results, USA	
UICC	Union for International Cancer Control, Geneva	
DCO	Death certificate only	Death certificate provides the only notification to the registry.
NA	Not available	
NOS	Not otherwise specified	
OS	Overall/Observed survival	Overall/Observed survival (Kaplan-Meier estimate) Date of entry: diagnosis Event: death from any cause
RS	Relative survival	Survival compared to “general population”, ratio of observed to expected survival (Ederer II method), reflecting cancer specific survival
AS	Assembled survival	Assembled chart of observed, expected, relative survival
CS	Conditional survival	Survival probability under the condition of surviving a given period of time
TTP	Time to progression	Time to first progression / relapse Date of entry: diagnosis Event: (progression / relapse): first local-, lymph node recurrence, distant metastasis or unspecified progression
	1-KM	1 minus Kaplan-Meier estimator (“inverse” Kaplan-Meier estimator)
	CI	Cumulative incidence Death as competing risk (according to Kalbfleisch und Prentice)
PPS	Post-progression survival	Survival since first progression / relapse (Kaplan-Meier estimate) Date of entry (progression / relapse): first local-, lymph node recurrence, distant metastasis or unspecified progression Event: death from any cause

Recommended Citation

Munich Cancer Registry. Survival ICD-10 C34: Lung cancer [Internet]. 2022 [updated 2022 Apr 15; cited 2022 Jun 1]. Available from: https://www.tumorregister-muenchen.de/en/facts/surv/sC34__E-ICD-10-C34-Lung-cancer-survival.pdf

Copyright

Disclaimer