



# **Lung cancer survival rates in Poland**

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## 2. Materials and methods

Poland's population in 2021 was approximately 38 million, and the crude rates of lung cancer incidence were 67.2 per 100,000 men and 42.0 per 100,000 women (Didkowska et al., 2024).

### 2.1. Data set

Data for survival analysis were obtained from the Polish National Cancer Registry database and Statistics Poland<sup>1</sup>. Life tables were downloaded from the website [lifetable.de](http://lifetable.de), whose main source of data from Poland is Statistics Poland. All selected patients were diagnosed with lung cancer in the years 2000-2021, coded according to the ICD-10 classification, code range C34.0-C34.9. The set included information on birth dates, date of diagnosis and vital status, stage of disease at diagnosis, and morphological type of cancer. The initial set consisted of 472,041 incidence cases. Patients under 20 and over 99 years of age were excluded from the set. Six hundred and seven patients (0.13% of the set) were excluded due to the inability to determine the correct age of the patient and their vital status in patients without a personal identification number (PESEL). Patients who survived for less than 31 days were also excluded from the set. The final set consisted of 408,662 incidence cases. The end date of observation was December 31, 2022.

### 2.2. Stage

A stage code was established using three fields in the patient's record: TNM, if it was not reported - stage (by the TNM classification), and in other cases, a stage code with three categories of cancer advancement: local, regional, and distant. The code "no data" was entered if the above information was missing.

To recodify the stage of cancer from the TNM classification (and the stage code resulting from the TNM code), extensive conversion rules were used, which, in simple terms, are consistent with the principle below: stage I - localized; stage II and III – regional; stage IV – distant.

### 2.3. Morphological type of tumor

The morphological type of cancer dividing cases into non-small and small cell lung cancer was coded according to the rule: M8041 - M8045 small cell lung cancer, the remaining cases - non-small cell lung cancer.

### 2.4. Methods

The nonparametric relative survival analysis with the Pohar Perme Estimator (PPE) was used to calculate the net survival of patients diagnosed with lung cancer. The R software was used to perform the analyses, using the R Package *relsurv* (Perme & Pavlic, 2018) for analyses with a total follow-up period and *stnet* (Coviello et al., 2015) command using STATA 18 software for estimating survival analysis using a life-table approach. A one-year survival analysis was performed, considering the years of observation from 2000 to 2021. For 3-year survival, the cohort net survival analysis method was performed for the years 2000-2019, and for 5-year survival, for the years 2000-2017. The estimating net survival approach was used to estimate 3- and 5-year survival for 2020-2021 and 2018-2021, respectively. All survival rates have been age-standardized according to the International Cancer Survival Standard (ICSS).

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<sup>1</sup> <https://stat.gov.pl/en/>

### 3. Results

Table 1. Number of patients diagnosed in Poland (all ages, men+women), by stage and year

	Stage localized	Stage regional	Stage distant	Unknown stage	Total
2000	3108	4518	4662	4355	16643
2001	3195	4587	4934	4146	16862
2002	3111	4597	4812	4315	16835
2003	3220	4900	5179	3871	17170
2004	3086	5044	5352	4200	17682
2005	2927	4886	5713	4468	17994
2006	3106	4990	5677	4231	18004
2007	3385	5216	6275	3604	18480
2008	3401	5235	6684	3285	18605
2009	3413	5505	7042	3236	19196
2010	3241	5359	6930	3443	18973
2011	3188	5247	7234	3438	19107
2012	3471	5268	7681	3455	19875
2013	3200	5054	7603	3696	19553
2014	3380	5151	7716	3681	19928
2015	3638	5309	7546	3686	20179
2016	4243	5411	7681	3229	20564
2017	3994	4802	7835	2976	19607
2018	4116	5033	7746	2347	19242
2019	4278	4806	7736	3001	19821
2020	3443	4128	6754	2133	16458
2021	3530	4597	6913	2844	17884

Table 2. Number of patients diagnosed with small cell lung cancer in Poland (all ages, men+women), by stage and year

	Stage localized	Stage regional	Stage distant	Unknown stage	Total
<b>2000</b>	281	607	691	336	1915
<b>2001</b>	352	675	900	557	2484
<b>2002</b>	343	671	917	570	2501
<b>2003</b>	358	759	977	495	2589
<b>2004</b>	304	665	962	523	2454
<b>2005</b>	276	698	1009	503	2486
<b>2006</b>	321	658	945	511	2435
<b>2007</b>	346	677	1087	390	2500
<b>2008</b>	337	764	1209	331	2641
<b>2009</b>	331	820	1277	381	2809
<b>2010</b>	301	801	1220	347	2669
<b>2011</b>	288	763	1242	381	2674
<b>2012</b>	290	745	1362	387	2784
<b>2013</b>	234	763	1298	370	2665
<b>2014</b>	216	770	1415	420	2821
<b>2015</b>	202	846	1384	470	2902
<b>2016</b>	250	808	1335	339	2732
<b>2017</b>	239	750	1322	285	2596
<b>2018</b>	288	829	1360	203	2680
<b>2019</b>	235	751	1420	278	2684
<b>2020</b>	173	657	1219	189	2238
<b>2021</b>	168	751	1311	290	2520

Table 3. Number of patients diagnosed with non-small cell lung cancer in Poland (all ages, men+women), by stage and year

	Stage localized	Stage regional	Stage distant	Unknown stage	Total
<b>2000</b>	2827	3911	3971	4019	14728
<b>2001</b>	2843	3912	4034	3589	14378
<b>2002</b>	2768	3926	3895	3745	14334
<b>2003</b>	2862	4141	4202	3376	14581
<b>2004</b>	2782	4379	4390	3677	15228
<b>2005</b>	2651	4188	4704	3965	15508
<b>2006</b>	2785	4332	4732	3720	15569
<b>2007</b>	3039	4539	5188	3214	15980
<b>2008</b>	3064	4471	5475	2954	15964
<b>2009</b>	3082	4685	5765	2855	16387
<b>2010</b>	2940	4558	5710	3096	16304
<b>2011</b>	2900	4484	5992	3057	16433
<b>2012</b>	3181	4523	6319	3068	17091
<b>2013</b>	2966	4291	6305	3326	16888
<b>2014</b>	3164	4381	6301	3261	17107
<b>2015</b>	3436	4463	6162	3216	17277
<b>2016</b>	3993	4603	6346	2890	17832
<b>2017</b>	3755	4052	6513	2691	17011
<b>2018</b>	3828	4204	6386	2144	16562
<b>2019</b>	4043	4055	6316	2723	17137
<b>2020</b>	3270	3471	5535	1944	14220
<b>2021</b>	3362	3846	5602	2554	15364

**Table 4.** *Survival rates in Poland for all stages (all ages, men+women), by year*

	<b>1-year survival</b>	<b>3-year survival</b>	<b>5-year survival</b>
<b>2000</b>	40,279%	18,092%	15,198%
<b>2001</b>	41,112%	17,866%	14,273%
<b>2002</b>	40,166%	17,937%	14,301%
<b>2003</b>	39,649%	17,552%	13,946%
<b>2004</b>	39,415%	16,868%	13,322%
<b>2005</b>	41,685%	19,780%	16,071%
<b>2006</b>	41,788%	20,039%	16,266%
<b>2007</b>	42,546%	20,362%	16,730%
<b>2008</b>	43,193%	20,217%	16,440%
<b>2009</b>	41,481%	18,837%	14,698%
<b>2010</b>	42,316%	18,808%	14,902%
<b>2011</b>	43,140%	19,991%	15,709%
<b>2012</b>	44,952%	21,523%	16,916%
<b>2013</b>	45,234%	20,914%	15,845%
<b>2014</b>	45,210%	21,938%	16,969%
<b>2015</b>	46,352%	22,611%	18,009%
<b>2016</b>	47,225%	24,383%	19,639%
<b>2017</b>	46,793%	24,725%	19,962%
<b>2018</b>	47,023%	24,837%	18,261%
<b>2019</b>	49,549%	27,679%	19,213%
<b>2020</b>	48,704%	25,885%	20,481%
<b>2021</b>	49,706%	25,578%	20,384%



Table 5. Survival rates in Poland for stage localized + regionalized (all ages, men+women), by year

	1-year survival	3-year survival	5-year survival
2000	50,250%	24,397%	20,598%
2001	51,817%	24,503%	19,351%
2002	50,655%	24,859%	19,182%
2003	51,010%	24,253%	19,309%
2004	50,860%	24,155%	18,955%
2005	53,562%	26,811%	21,330%
2006	53,213%	26,747%	21,136%
2007	54,871%	27,988%	22,513%
2008	55,388%	28,000%	22,545%
2009	54,125%	26,697%	21,292%
2010	56,023%	26,982%	21,548%
2011	57,655%	29,509%	23,801%
2012	59,583%	32,171%	26,027%
2013	61,085%	32,978%	25,823%
2014	60,777%	33,700%	26,616%
2015	61,300%	33,281%	26,193%
2016	62,227%	36,648%	29,895%
2017	63,718%	38,019%	31,378%
2018	64,801%	37,844%	27,671%
2019	67,706%	42,945%	29,583%
2020	67,713%	40,386%	32,106%
2021	67,443%	40,840%	33,171%

Table 6. Survival rates in Poland for stage distant (all ages, men+women), by year

	<b>1-year survival</b>	<b>3-year survival</b>	<b>5-year survival</b>
<b>2000</b>	24,676%	6,670%	5,014%
<b>2001</b>	25,119%	6,254%	4,334%
<b>2002</b>	24,321%	6,172%	4,784%
<b>2003</b>	22,621%	5,238%	3,741%
<b>2004</b>	23,504%	5,096%	3,513%
<b>2005</b>	25,069%	7,039%	5,301%
<b>2006</b>	25,356%	7,548%	5,769%
<b>2007</b>	25,079%	6,604%	4,876%
<b>2008</b>	25,495%	6,705%	4,937%
<b>2009</b>	24,111%	5,884%	3,526%
<b>2010</b>	25,037%	6,032%	3,873%
<b>2011</b>	25,271%	5,611%	3,040%
<b>2012</b>	26,330%	6,360%	3,643%
<b>2013</b>	27,632%	6,328%	3,282%
<b>2014</b>	27,429%	6,544%	3,720%
<b>2015</b>	27,110%	6,119%	3,932%
<b>2016</b>	27,157%	6,065%	3,518%
<b>2017</b>	26,140%	6,737%	4,087%
<b>2018</b>	25,908%	7,835%	3,788%
<b>2019</b>	27,999%	8,215%	3,888%
<b>2020</b>	29,505%	8,321%	5,372%
<b>2021</b>	31,299%	8,567%	5,278%

Table 7. Survival rates in Poland for stage unknown (all ages, men+women), by year

	1-year survival	3-year survival	5-year survival
2000	39,306%	19,300%	16,702%
2001	40,002%	19,152%	16,376%
2002	38,801%	18,807%	16,063%
2003	38,959%	20,047%	16,604%
2004	37,715%	17,864%	15,080%
2005	42,245%	23,761%	20,628%
2006	42,027%	23,798%	20,731%
2007	43,535%	25,799%	23,192%
2008	47,110%	27,104%	23,687%
2009	44,447%	25,433%	21,124%
2010	43,309%	24,244%	20,699%
2011	44,818%	26,469%	22,275%
2012	50,166%	29,266%	24,596%
2013	46,833%	25,030%	20,541%
2014	45,526%	25,856%	21,474%
2015	49,245%	29,349%	25,739%
2016	49,986%	31,152%	27,097%
2017	51,478%	33,180%	28,360%
2018	49,753%	31,826%	27,219%
2019	50,269%	31,888%	27,052%
2020	45,219%	27,839%	23,512%
2021	45,782%	25,305%	21,297%

Table 8. Survival rates in Poland for all stages with small cell lung cancer (all ages, men+women), by year

	1-year survival	3-year survival	5-year survival
2000	35,637%	10,640%	7,943%
2001	37,566%	8,213%	5,630%
2002	35,824%	8,636%	6,408%
2003	34,962%	8,353%	6,560%
2004	35,220%	8,242%	6,052%
2005	35,939%	11,299%	8,868%
2006	36,359%	10,489%	7,627%
2007	35,785%	10,480%	7,592%
2008	35,197%	10,142%	7,202%
2009	34,883%	8,178%	5,476%
2010	37,814%	9,538%	6,589%
2011	36,716%	9,547%	6,369%
2012	36,840%	10,921%	8,750%
2013	37,179%	9,688%	7,104%
2014	36,861%	9,903%	6,650%
2015	38,096%	9,992%	7,722%
2016	35,963%	9,853%	6,446%
2017	33,052%	10,513%	7,300%
2018	35,599%	10,750%	5,575%
2019	37,520%	10,713%	7,220%
2020	37,987%	12,608%	9,040%
2021	38,005%	9,938%	6,601%

Table 9. Survival rates in Poland for stage localized + regionalized with small cell lung cancer (all ages, men+women), by year

	1-year survival	3-year survival	5-year survival
2000	44,123%	15,022%	10,087%
2001	48,692%	11,911%	8,120%
2002	47,902%	15,159%	11,752%
2003	44,642%	11,906%	9,788%
2004	47,777%	14,066%	10,269%
2005	46,050%	15,195%	10,975%
2006	47,675%	14,757%	9,756%
2007	48,484%	15,907%	12,001%
2008	44,106%	14,535%	10,927%
2009	48,511%	13,530%	9,429%
2010	49,833%	14,944%	10,077%
2011	47,535%	14,685%	10,164%
2012	49,501%	18,068%	15,242%
2013	51,193%	15,401%	12,320%
2014	47,061%	14,788%	10,929%
2015	53,840%	17,832%	13,586%
2016	51,048%	18,724%	12,512%
2017	45,098%	18,500%	13,431%
2018	53,561%	20,049%	11,998%
2019	55,018%	20,514%	14,006%
2020	53,736%	21,557%	15,769%
2021	52,376%	19,475%	11,650%

Table 10. Survival rates in Poland for stage distant with small cell lung cancer (all ages, men+women), by year

	1-year survival	3-year survival	5-year survival
2000	25,723%	6,084%	5,272%
2001	28,064%	3,807%	2,356%
2002	24,992%	2,593%	1,515%
2003	25,357%	4,691%	3,274%
2004	23,643%	3,065%	2,417%
2005	24,854%	5,892%	5,081%
2006	26,258%	6,595%	5,317%
2007	23,998%	5,173%	3,756%
2008	26,241%	6,160%	4,273%
2009	24,156%	3,444%	2,196%
2010	28,100%	5,616%	4,174%
2011	26,080%	4,340%	2,291%
2012	26,552%	4,610%	2,602%
2013	26,472%	4,746%	2,794%
2014	30,161%	5,216%	2,889%
2015	27,895%	2,535%	1,483%
2016	24,959%	2,806%	1,132%
2017	24,257%	3,980%	1,830%
2018	21,701%	3,461%	1,263%
2019	25,292%	4,088%	1,736%
2020	26,709%	6,168%	1,522%
2021	29,722%	3,716%	1,975%

Table 11. Survival rates in Poland for stage unknown with small cell lung cancer (all ages, men+women), by year

	1-year survival	3-year survival	5-year survival
2000	34,017%	9,277%	6,881%
2001	32,860%	8,233%	5,759%
2002	32,424%	7,446%	5,334%
2003	31,853%	7,743%	5,938%
2004	31,199%	6,824%	5,130%
2005	37,652%	14,123%	12,111%
2006	33,717%	10,022%	8,525%
2007	37,102%	11,917%	7,932%
2008	38,255%	9,547%	4,673%
2009	30,725%	8,452%	4,981%
2010	35,741%	7,261%	5,055%
2011	39,362%	11,213%	8,192%
2012	39,839%	14,433%	13,558%
2013	37,543%	12,156%	8,587%
2014	35,289%	12,882%	8,406%
2015	34,048%	13,143%	11,805%
2016	31,945%	10,562%	8,727%
2017	34,189%	15,238%	12,563%
2018	32,399%	9,024%	10,826%
2019	36,891%	8,085%	10,265%
2020	39,784%	5,312%	4,754%
2021	32,751%	6,073%	3,815%

Table 12. Survival rates in Poland for all stages with non-small cell lung cancer (all ages, men+women), by year

	1-year survival	3-year survival	5-year survival
2000	40,720%	19,110%	16,165%
2001	41,577%	19,403%	15,662%
2002	40,646%	19,551%	15,690%
2003	40,464%	19,145%	15,294%
2004	39,986%	18,184%	14,459%
2005	42,524%	21,279%	17,377%
2006	42,465%	21,483%	17,569%
2007	43,554%	21,937%	18,187%
2008	44,360%	21,929%	18,020%
2009	42,414%	20,694%	16,329%
2010	43,038%	20,398%	16,374%
2011	44,060%	21,685%	17,242%
2012	46,006%	23,211%	18,293%
2013	46,353%	22,669%	17,273%
2014	46,465%	23,925%	18,686%
2015	47,588%	24,596%	19,646%
2016	48,659%	26,387%	21,428%
2017	48,610%	26,773%	21,752%
2018	48,587%	26,995%	19,757%
2019	51,117%	30,097%	21,102%
2020	50,218%	28,038%	22,280%
2021	51,411%	28,043%	22,481%



Table 13. Survival rates in Poland for stage localized + regionalized with non-small cell lung cancer (all ages, men+women), by year

	1-year survival	3-year survival	5-year survival
2000	50,837%	25,657%	21,863%
2001	52,223%	26,214%	20,938%
2002	51,017%	26,526%	20,518%
2003	51,924%	26,171%	20,852%
2004	51,278%	25,507%	20,168%
2005	54,504%	28,585%	22,944%
2006	53,885%	28,368%	22,632%
2007	55,717%	29,592%	23,953%
2008	56,782%	30,024%	24,387%
2009	54,820%	28,685%	23,093%
2010	56,916%	28,797%	23,319%
2011	58,796%	31,497%	25,668%
2012	60,615%	34,046%	27,509%
2013	62,207%	35,268%	27,665%
2014	62,300%	36,252%	28,810%
2015	62,138%	35,298%	27,894%
2016	63,389%	38,625%	31,714%
2017	65,736%	40,304%	33,451%
2018	66,141%	40,134%	29,229%
2019	69,037%	45,567%	31,613%
2020	69,304%	42,815%	34,213%
2021	69,181%	43,657%	35,575%

Table 14. Survival rates in Poland for stage distant with non-small cell lung cancer (all ages, men+women), by year

	1-year survival	3-year survival	5-year survival
2000	24,408%	6,891%	5,088%
2001	24,336%	6,698%	4,584%
2002	23,841%	6,840%	5,412%
2003	22,063%	5,376%	3,877%
2004	23,043%	5,445%	3,671%
2005	25,018%	7,396%	5,465%
2006	24,838%	7,661%	5,888%
2007	25,173%	6,898%	5,055%
2008	25,354%	6,835%	5,062%
2009	24,005%	6,468%	3,877%
2010	24,368%	6,250%	3,929%
2011	25,005%	5,866%	3,189%
2012	26,099%	6,617%	3,813%
2013	27,803%	6,702%	3,463%
2014	27,045%	6,930%	3,946%
2015	27,004%	6,801%	4,376%
2016	27,308%	6,611%	3,918%
2017	26,439%	7,331%	4,515%
2018	26,463%	8,721%	4,017%
2019	28,330%	8,991%	4,390%
2020	29,947%	9,094%	5,980%
2021	31,474%	9,701%	6,056%

Table 15. Survival rates in Poland for stage unknown with non-small cell lung cancer (all ages, men+women), by year

	1-year survival	3-year survival	5-year survival
2000	39,566%	20,066%	17,507%
2001	40,915%	20,834%	18,027%
2002	39,253%	20,373%	17,574%
2003	39,958%	21,739%	18,172%
2004	38,505%	19,305%	16,438%
2005	42,827%	25,210%	21,970%
2006	43,056%	25,623%	22,321%
2007	44,482%	27,784%	25,324%
2008	48,078%	29,246%	25,777%
2009	45,908%	27,805%	23,443%
2010	44,129%	26,107%	22,548%
2011	45,783%	28,752%	24,364%
2012	51,168%	31,172%	26,143%
2013	47,845%	26,580%	21,963%
2014	46,719%	27,440%	23,064%
2015	51,276%	31,639%	27,743%
2016	51,954%	33,557%	29,257%
2017	53,145%	35,034%	29,990%
2018	51,427%	34,178%	29,055%
2019	51,488%	34,088%	28,563%
2020	45,788%	29,739%	25,032%
2021	47,279%	27,247%	23,087%

## 4. Bibliography

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