

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 Poland¹. Life tables were downloaded from the website 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.

¹ https://stat.gov.pl/en/

3. Results

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

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

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

	1-year survival	3-year survival	5-year survival
2000	41,350%	17,978%	14,911%
2001	42,388%	18,247%	14,472%
2002	41,308%	18,198%	14,418%
2003	41,109%	18,123%	14,378%
2004	40,338%	17,400%	13,700%
2005	42,726%	19,715%	15,834%
2006	42,446%	19,992%	16,072%
2007	43,113%	20,381%	16,596%
2008	43,456%	19,867%	15,849%
2009	42,133%	19,000%	14,677%
2010	43,175%	19,076%	14,983%
2011	43,679%	19,992%	15,499%
2012	44,832%	20,935%	16,202%
2013	45,219%	20,499%	15,468%
2014	44,915%	21,043%	16,040%
2015	46,309%	22,249%	17,569%
2016	47,230%	23,620%	18,674%
2017	46,516%	24,027%	19,054%
2018	47,039%	24,114%	16,910%
2019	48,979%	26,703%	18,650%
2020	48,357%	24,760%	19,280%
2021	48,910%	24,580%	19,180%

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

	1-year survival	3-year survival	5-year survival
2000	52,072%	24,600%	20,439%
2001	53,788%	25,619%	20,294%
2002	53,022%	25,859%	20,140%
2003	53,302%	25,687%	20,442%
2004	52,320%	25,284%	19,815%
2005	55,355%	27,345%	21,615%
2006	54,738%	27,334%	21,484%
2007	56,468%	28,545%	22,842%
2008	56,275%	28,022%	22,153%
2009	55,538%	27,590%	21,603%
2010	57,290%	27,905%	22,188%
2011	58,877%	29,995%	23,763%
2012	59,575%	31,489%	25,112%
2013	61,228%	32,452%	25,265%
2014	61,325%	33,394%	26,048%
2015	61,935%	33,857%	26,740%
2016	62,710%	35,931%	28,847%
2017	64,108%	37,614%	30,526%
2018	64,666%	37,013%	26,790%
2019	67,779%	42,079%	28,990%
2020	66,605%	38,880%	30,620%
2021	66,846%	39,290%	31,350%

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	25,915%	6,570%	4,851%
2001	26,450%	6,316%	4,273%
2002	24,682%	5,734%	4,231%
2003	23,968%	5,459%	3,880%
2004	24,593%	5,495%	3,741%
2005	25,976%	7,059%	5,239%
2006	25,597%	7,389%	5,717%
2007	25,075%	6,808%	5,010%
2008	25,799%	6,694%	4,727%
2009	24,375%	5,678%	3,501%
2010	25,667%	5,941%	3,684%
2011	25,696%	5,617%	3,115%
2012	26,567%	6,210%	3,479%
2013	27,534%	6,155%	3,313%
2014	27,172%	6,256%	3,551%
2015	26,810%	5,797%	3,560%
2016	26,961%	5,697%	3,225%
2017	25,872%	6,212%	3,631%
2018	26,070%	7,369%	2,890%
2019	27,363%	7,889%	3,800%
2020	29,097%	7,510%	4,550%
2021	30,223%	7,800%	4,660%

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

	1-year survival	3-year survival	5-year survival
2000	39,098%	18,595%	16,001%
2001	39,955%	18,608%	15,682%
2002	38,926%	18,412%	15,559%
2003	38,466%	19,203%	15,707%
2004	37,208%	17,309%	14,556%
2005	42,057%	22,557%	19,275%
2006	41,533%	22,853%	19,613%
2007	42,645%	24,531%	21,863%
2008	45,681%	25,232%	21,906%
2009	43,832%	24,316%	19,911%
2010	43,154%	23,461%	19,729%
2011	44,227%	25,697%	21,284%
2012	48,142%	26,972%	21,949%
2013	45,847%	23,313%	18,593%
2014	44,075%	23,417%	19,028%
2015	48,296%	27,753%	23,986%
2016	49,163%	29,442%	25,008%
2017	48,864%	30,767%	25,754%
2018	47,532%	29,095%	23,950%
2019	47,790%	28,654%	24,040%
2020	44,571%	25,920%	21,380%
2021	43,085%	23,870%	19,470%

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	40,000%	10,344%	7,742%
2001	40,707%	9,847%	6,805%
2002	40,027%	8,916%	6,565%
2003	37,836%	9,577%	7,251%
2004	38,780%	10,340%	7,689%
2005	39,002%	10,868%	8,174%
2006	39,482%	11,586%	8,585%
2007	38,353%	11,159%	8,391%
2008	38,164%	9,945%	7,215%
2009	38,296%	8,774%	5,924%
2010	39,758%	10,191%	7,104%
2011	39,366%	9,994%	6,928%
2012	38,884%	11,373%	8,678%
2013	39,286%	10,554%	7,554%
2014	36,924%	9,729%	6,489%
2015	37,683%	9,807%	7,500%
2016	38,291%	10,247%	7,124%
2017	34,631%	10,404%	7,373%
2018	37,360%	10,850%	6,480%
2019	38,760%	10,761%	7,820%
2020	39,046%	10,790%	7,990%
2021	38,353%	10,320%	7,310%

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	49,654%	14,643%	11,373%
2001	51,750%	15,282%	10,366%
2002	51,483%	13,294%	10,302%
2003	49,020%	13,512%	10,619%
2004	51,116%	16,801%	12,305%
2005	51,269%	15,528%	10,845%
2006	51,717%	15,993%	10,754%
2007	51,884%	16,744%	12,691%
2008	49,133%	14,982%	11,202%
2009	51,455%	13,744%	9,489%
2010	52,089%	16,152%	11,256%
2011	53,323%	17,129%	11,967%
2012	52,679%	18,704%	15,070%
2013	53,443%	16,897%	13,069%
2014	49,962%	15,850%	11,342%
2015	54,371%	18,133%	13,980%
2016	53,012%	18,596%	13,777%
2017	47,715%	18,628%	13,995%
2018	53,345%	19,564%	12,550%
2019	55,711%	20,095%	14,650%
2020	54,387%	19,660%	14,850%
2021	53,175%	19,130%	14,410%

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	28,438%	4,851%	3,501%
2001	30,963%	4,378%	3,328%
2002	29,004%	3,737%	2,221%
2003	27,065%	4,910%	3,321%
2004	28,952%	4,592%	3,658%
2005	26,977%	5,391%	4,594%
2006	28,562%	7,039%	5,648%
2007	25,871%	5,845%	4,466%
2008	27,953%	5,976%	4,065%
2009	27,049%	3,814%	2,322%
2010	29,061%	5,454%	3,913%
2011	27,648%	4,027%	2,552%
2012	27,547%	5,359%	3,202%
2013	28,206%	4,947%	2,791%
2014	28,497%	4,936%	2,891%
2015	26,205%	3,009%	1,890%
2016	27,901%	3,872%	1,920%
2017	24,980%	3,542%	1,755%
2018	24,638%	4,054%	1,810%
2019	27,645%	4,720%	1,870%
2020	29,079%	4,750%	2,830%
2021	30,235%	4,330%	2,530%

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	38,233%	10,281%	6,887%
2001	36,077%	8,674%	5,873%
2002	37,397%	9,477%	6,928%
2003	33,889%	9,920%	7,430%
2004	34,070%	8,992%	6,596%
2005	39,397%	12,853%	10,202%
2006	36,226%	11,550%	9,863%
2007	37,902%	11,436%	8,158%
2008	39,090%	7,743%	5,521%
2009	36,403%	10,453%	7,294%
2010	38,647%	8,141%	5,310%
2011	39,098%	9,790%	7,322%
2012	42,151%	13,084%	10,993%
2013	40,054%	13,162%	9,439%
2014	35,157%	11,720%	7,398%
2015	34,604%	11,500%	9,776%
2016	33,623%	9,481%	7,008%
2017	34,000%	13,661%	10,430%
2018	35,773%	9,066%	7,630%
2019	35,729%	8,703%	11,740%
2020	36,200%	6,860%	5,860%
2021	28,358%	7,730%	4,760%

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	41,514%	18,972%	15,844%
2001	42,672%	19,696%	15,795%
2002	41,526%	19,814%	15,785%
2003	41,689%	19,636%	15,640%
2004	40,588%	18,532%	14,665%
2005	43,320%	21,128%	17,058%
2006	42,907%	21,298%	17,236%
2007	43,853%	21,815%	17,872%
2008	44,327%	21,501%	17,270%
2009	42,786%	20,742%	16,168%
2010	43,730%	20,521%	16,264%
2011	44,377%	21,611%	16,888%
2012	45,797%	22,483%	17,420%
2013	46,151%	22,061%	16,711%
2014	46,212%	22,880%	17,591%
2015	47,727%	24,294%	19,224%
2016	48,560%	25,610%	20,394%
2017	48,303%	26,075%	20,811%
2018	48,578%	26,222%	18,510%
2019	50,554%	29,160%	20,330%
2020	49,800%	27,010%	21,090%
2021	50,614%	26,870%	21,090%

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	52,391%	25,913%	21,635%
2001	54,098%	27,190%	21,803%
2002	53,254%	27,756%	21,626%
2003	53,983%	27,621%	22,002%
2004	52,482%	26,426%	20,826%
2005	55,934%	29,020%	23,142%
2006	55,151%	28,883%	22,950%
2007	57,080%	30,120%	24,198%
2008	57,312%	29,916%	23,743%
2009	56,138%	29,624%	23,383%
2010	58,043%	29,607%	23,772%
2011	59,663%	31,817%	25,433%
2012	60,492%	33,188%	26,446%
2013	62,292%	34,577%	26,932%
2014	62,771%	35,626%	27,919%
2015	62,914%	35,892%	28,391%
2016	63,863%	37,993%	30,639%
2017	66,152%	39,981%	32,588%
2018	66,200%	39,378%	28,570%
2019	69,222%	44,707%	30,810%
2020	68,083%	41,410%	32,690%
2021	68,555%	41,900%	33,550%

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	25,477%	6,869%	5,086%
2001	25,443%	6,749%	4,485%
2002	23,667%	6,204%	4,704%
2003	23,251%	5,587%	4,011%
2004	23,639%	5,693%	3,760%
2005	25,762%	7,416%	5,378%
2006	25,010%	7,459%	5,731%
2007	24,909%	7,010%	5,125%
2008	25,325%	6,852%	4,874%
2009	23,785%	6,090%	3,761%
2010	24,944%	6,046%	3,636%
2011	25,293%	5,945%	3,232%
2012	26,357%	6,393%	3,540%
2013	27,396%	6,403%	3,420%
2014	26,878%	6,550%	3,699%
2015	26,945%	6,415%	3,931%
2016	26,769%	6,070%	3,493%
2017	26,050%	6,745%	4,006%
2018	26,371%	8,067%	3,100%
2019	27,301%	8,593%	4,210%
2020	29,101%	8,130%	4,930%
2021	30,221%	8,530%	5,100%

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	39,170%	19,289%	16,762%
2001	40,552%	20,138%	17,192%
2002	39,158%	19,767%	16,869%
2003	39,137%	20,565%	16,922%
2004	37,651%	18,482%	15,680%
2005	42,394%	23,786%	20,425%
2006	42,261%	24,403%	20,950%
2007	43,219%	26,117%	23,523%
2008	46,414%	27,179%	23,731%
2009	44,821%	26,162%	21,591%
2010	43,660%	25,179%	21,346%
2011	44,865%	27,674%	23,020%
2012	48,893%	28,715%	23,324%
2013	46,490%	24,440%	19,610%
2014	45,217%	24,916%	20,519%
2015	50,224%	30,043%	25,987%
2016	50,962%	31,753%	27,093%
2017	50,439%	32,580%	27,378%
2018	48,628%	30,961%	25,720%
2019	48,993%	30,644%	25,260%
2020	45,376%	27,910%	22,990%
2021	44,714%	25,690%	21,180%

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

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Table 15. Survival rates in Poland for stage unknown with non-small cell lung cancer (all ages,	
men+women), by year1	8



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