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### Epidemiology of Non-Small Cell Lung Cancer (NSCLC) by Histology and Disease Stage in Western Europe: Population-Level Projections 2021–2026

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### Background

#### Lung cancer is the leading cause of cancer-related deaths in Europe<sup>1</sup>

- NSCLC accounts for ~85% of all lung cancer cases, and can be classified by histology as squamous (~30%) or non-squamous (~70%)<sup>2</sup>
- Approximately 70% of patients with NSCLC present with advanced or metastatic disease<sup>3</sup>
  - Five-year OS decreases with increasing disease stage to ~30% for stage III and 6% for stage IV NSCLC<sup>4,5</sup> (see Table)
  - While 5-year OS for advanced disease remains low, novel therapeutic developments are improving OS benefits
  - Population-level projections are critical to anticipate disease burden and address unmet needs

#### 5-year OS per disease stage (%)

Store	Staging edition					
Stage	AJCC7 <sup>5</sup>	AJCC8 <sup>5</sup>				
IA	58.1	58.1				
IB	49.1	52.6				
IIA	39.1	38.9				
IIB	33.1	39.3				
IIIA	23.2	26.5				
IIIB	15.3	16.9				
IIIC		13.2				
IV	5.5	5.5				

AJCC7/8, American Joint Committee on Cancer (7<sup>th</sup>/8<sup>th</sup> edition); NSCLC, non-small cell lung cancer; NSQ, non-squamous; OS, overall survival; SQ, squamous.

1. World Health Organization. 2020. https://gco.iarc.fr/today/data/factsheets/populations/908-europe-fact-sheets.pdf. Accessed 8 February 2021.; 2. Duma N, et al. *Mayo Clin Proc*. 2019;94:1623–1640; 3. Uprety D, et al. *Biologics: Targets and Therapy*. 2019:13 133–137; 4. Goldstraw P, et al. *J Thorac Oncol*. 2016;11:39–51; 5. Surveillance, Epidemiology, and End Results (SEER) Program. 2021. www.seer.cancer.gov. Accessed 21 October 2021.

### **Study aims**

To report population-level projections of newly diagnosed patients with NSCLC in Western Europe for 2021–2026 by:

- Country (France, Germany, Italy, Spain, UK)
- Histology (squamous or non-squamous)
- AJCC 8<sup>th</sup> edition staging system for lung cancer

### **Methods**

	<ul> <li>Historic, annual age- and sex-specific incidence rates of lung cancer were obtained from country-specific registries in Western Europe (see table below)</li> </ul>
Incidence	<ul> <li>Histology data from the IARC's Cancer Incidence in Five Continents (volume XI)<sup>1</sup> was used to estimate the total number of patients with NSCLC and by histology (non-squamous and squamous)</li> </ul>
	<ul> <li>Assuming that observed trends will continue, the most recent country-, age- and sex-specific incidence rates of NSCLC by histology were estimated and multiplied by the respective projected country populations to estimate the annual number of new cases (2021–2026)</li> </ul>

	Country	Available incidence data (registry source)
	0	Annual age-standardised incidence rates for lung cancer over 1990–2015, and age- and sex-specific incidence rates for lung cancer over 2013–2015 <sup>2</sup>
Data	-	Annual age- and sex-specific incidence rates for lung cancer over 1999–2017 <sup>3</sup>
sources		Annual age- and sex-specific incidence rates for lung cancer over 2003–2014 <sup>4</sup>
		Age- and sex-specific incidence rates for lung cancer across 2008–2012 <sup>1</sup>
		Annual age-standardised incidence rates for lung cancer over 1993–2017, and age- and sex-specific incidence rates for lung cancer over 2015–2017 <sup>5</sup>

IARC, International Agency for Research on Cancer; NSCLC, non-small cell lung cancer. 1. Bray F, et al. 2021: <a href="http://ci5.iarc.fr">http://ci5.iarc.fr</a>. Accessed February 2018. 2. Le Guyader-Peyrou S, et al. Santé publique France. 2019. 20p. <a href="http://www.santepubliquefrance.fr">www.santepubliquefrance.fr</a>. Accessed October 2021; 3. German Centre for Cancer Registry Data. 2021. <a href="http://www.krebsdaten.de/database">www.krebsdaten.de/database</a>. Accessed May 2021; 4. Buzzoni C, et al. *Tumori*. 2019;105:121–137; 5. CancerStats UK. 2021. <a href="http://info.cancerresearchuk.org/cancerstats/">http://info.cancerresearchuk.org/cancerstats/</a>. Accessed February 2021; 4. Buzzoni C, et al. *Tumori*. 2019;105:121–137; 5. CancerStats UK. 2021. <a href="http://info.cancerresearchuk.org/cancerstats/">http://info.cancerresearchuk.org/cancerstats/</a>. Accessed February 2021; 4. Buzzoni C, et al. *Tumori*. 2019;105:121–137; 5. CancerStats UK. 2021. <a href="http://info.cancerresearchuk.org/cancerstats/">http://info.cancerresearchuk.org/cancerstats/</a>. Accessed February 2021.

#### **Methods**

	Western Europe cancer registries have limited data on disease stage at diagnosis
Staging	<ul> <li>A secondary literature review was conducted to identify AJCC8 staging distribution for NSCLC across Western Europe</li> </ul>
	<ul> <li>Proportions from the US SEER program<sup>1</sup> (see Table below) were applied to projected incidence for Western Europe by squamous and non-squamous histology as indicated</li> </ul>

	Proportions of patients by stage and histology (%)								
NSCLC stage (SEER)	IA	IB	IIA	IIB	IIIA	IIIB	IIIC	IV	
Histology									
Squamous	20.5	7.6	2.7	8.6	15.6	10.8	2.5	31.6	
Non-squamous	23.6	6.3	1.7	5.5	8.1	4.6	1.1	49.1	

AJCC8, American Joint Committee on Cancer, 8<sup>th</sup> edition; NSCLC, non-small cell lung cancer; SEER, Surveillance, Epidemiology, and End Results. 1. Surveillance, Epidemiology, and End Results (SEER) Program. 2021, <u>www.seer.cancer.gov</u>. Accessed 21 October 2021.

## Projected new cases of non-squamous NSCLC in Western Europe, 2021–2026

Our data estimate that the number of newly diagnosed patients with non-squamous NSCLC will increase over time (total of +7.0% across 5 years)



## Projected new cases of squamous NSCLC in Western Europe, 2021–2026

Our data estimate that the number of newly diagnosed patients with squamous NSCLC will increase over time (total of +7.5% across 5 years)



## Projected new cases of non-squamous NSCLC by stage in Western Europe, 2021 and 2026

The number of newly diagnosed patients with non-squamous NSCLC, and the proportion of those with advanced/metastatic disease, is projected to increase between 2021 and 2026



## Projected new cases of squamous NSCLC by stage in Western Europe, 2021 and 2026

The number of newly diagnosed patients with squamous NSCLC, and the proportion of those with advanced/metastatic disease, is projected to increase between 2021 and 2026



■UK ■Germany ■France ■Italy ■Spain

### **Discussion**

- The total number of new NSCLC cases in Western Europe is projected to increase between 2021 and 2026
  - Non-squamous: From 162,789 to 174,177 cases (7.0% increase)
  - Squamous: From 45,560 to 48,968 cases (7.5% increase)
- The rates of increase for non-squamous and squamous NSCLC vary by country
  - The lowest increase over the 5-year period is for Germany (5.1% and 5.5%, respectively) and the highest increase is for Spain (9.4% and 10.6%, respectively)
  - The projected number of new NSCLC (particularly non-squamous NSCLC) cases is lower in Spain compared with other EU countries due to Spain having a smaller population
  - While several factors may contribute to the increase in the number of new NSCLC cases projected in the future, one important factor is the underlying aging of the population<sup>1</sup>
- Based on AJCC8 staging, a large proportion of the new NSCLC cases will have advanced and metastatic disease

### Strengths, limitations and conclusion

Study strengths	<ul> <li>Availability of comprehensive historical registry data for lung cancer incidence</li> <li>Historical rates reflect changes such as increased rates of smoking cessation during the years covered by the registry data</li> </ul>
Study limitations	<ul> <li>Estimates are based on historical trends in NSCLC incidence as a proxy for future projections</li> <li>Assumptions were made for histology and staging. It will be important for Western Europe registries to collect and publish these data for lung cancer in the future</li> <li>Unconsidered factors in this study may affect future incidence in Western Europe</li> </ul>
Conclusion	<ul> <li>Newly diagnosed cases are projected to rise by 7.0% and 7.5% for non-squamous and squamous NSCLC, respectively; most newly diagnosed cases will be advanced/metastatic NSCLC</li> <li>Low overall survival coupled with projected increased case numbers underscore the need for novel therapies and synergistic combinations, in addition to improvements in early detection of NSCLC</li> </ul>

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https://bit.ly/3q2Amyj

# Projected new cases of non-squamous and squamous NSCLC in France, 2021–2026

The number of newly diagnosed patients with NSCLC in <u>France</u> is projected to increase for both NSCLC histologies (non-squamous and squamous) between 2021 and 2026

Non-squamous	2021	2022	2023	2024	2025	2026
Stage I	9,809	9,949	10,079	10,209	10,340	10,451
Stage II	2,334	2,367	2,398	2,429	2,460	2,486
Stage IIIA	2,762	2,801	2,838	2,875	2,911	2,943
Stage IIIB/C	1,923	1,950	1,976	2,001	2,027	2,049
Stage IV	15,323	15,541	15,745	15,947	16,152	16,325
Squamous	2021	2022	2023	2024	2025	2026
Stage I	3,062	3,112	3,161	3,210	3,259	3,298
Stage II	1,230	1,250	1,269	1,289	1,309	1,324
Stage IIIA	1,798	1,828	1,856	1,885	1,914	1,937
Stage IIIB/C	1,536	1,561	1,585	1,610	1,634	1,654
Stage IV	3,439	3,495	3,550	3,605	3,660	3,704

# Projected new cases of non-squamous and squamous NSCLC in Germany, 2021–2026

The number of newly diagnosed patients with NSCLC in <u>Germany</u> is projected to increase for both NSCLC histologies (non-squamous and squamous) between 2021 and 2026

Non-squamous	2021	2022	2023	2024	2025	2026
Stage I	12,068	12,188	12,308	12,428	12,550	12,686
Stage II	2,871	2,900	2,928	2,957	2,986	3,018
Stage IIIA	3,398	3,432	3,466	3,499	3,534	3,572
Stage IIIB/C	2,366	2,389	2,413	2,436	2,460	2,487
Stage IV	18,852	19,039	19,226	19,414	19,604	19,818
Squamous	2021	2022	2023	2024	2025	2026
Stage I	3,014	3,040	3,069	3,103	3,142	3,179
Stage II	1,210	1,221	1,232	1,246	1,262	1,277
Stage IIIA	1,770	1,785	1,802	1,822	1,845	1,867
Stage IIIB/C	1,512	1,524	1,539	1,556	1,575	1,594
Stage IV	3,385	3,414	3,446	3,485	3,528	3,570

### Projected new cases of non-squamous and squamous NSCLC in Italy, 2021–2026

The number of newly diagnosed patients with NSCLC in <u>Italy</u> is projected to increase for both NSCLC histologies (non-squamous and squamous) between 2021 and 2026

Non-squamous	2021	2022	2023	2024	2025	2026
Stage I	10,358	10,494	10,632	10,774	10,922	11,065
Stage II	2,464	2,497	2,530	2,563	2,599	2,633
Stage IIIA	2,916	2,955	2,994	3,034	3,075	3,115
Stage IIIB/C	2,030	2,057	2,084	2,112	2,141	2,169
Stage IV	16,180	16,393	16,608	16,831	17,062	17,284
Squamous	2021	2022	2023	2024	2025	2026
Stage I	2,014	2,038	2,065	2,096	2,129	2,155
Stage II	809	818	829	842	855	865
Stage IIIA	1,183	1,197	1,213	1,231	1,250	1,266
Stage IIIB/C	1,010	1,022	1,036	1,051	1,067	1,081
Stage IV	2,262	2,289	2,319	2,354	2,391	2,420

### Projected new cases of non-squamous and squamous NSCLC in Spain, 2021–2026

The number of newly diagnosed patients with of NSCLC in <u>Spain</u> is projected to increase for both NSCLC histologies (non-squamous and squamous) between 2021 and 2026

Non-squamous	2021	2022	2023	2024	2025	2026
Stage I	5,886	5,992	6,103	6,217	6,329	6,442
Stage II	1,400	1,426	1,452	1,479	1,506	1,533
Stage IIIA	1,657	1,687	1,718	1,750	1,782	1,814
Stage IIIB/C	1,154	1,174	1,196	1,219	1,241	1,263
Stage IV	9,195	9,360	9,533	9,711	9,887	10,063
Squamous	2021	2022	2023	2024	2025	2026
Stage I	2,021	2,061	2,104	2,149	2,195	2,235
Stage II	812	827	845	863	882	897
Stage IIIA	1,187	1,210	1,236	1,262	1,289	1,313
Stage IIIB/C	1,013	1,033	1,055	1,077	1,101	1,121
Stage IV	2,270	2,314	2,363	2,413	2,465	2,510

### Projected new cases of non-squamous and squamous NSCLC in the UK, 2021–2026

The number of newly diagnosed patients with NSCLC in <u>the UK</u> is projected to increase for both NSCLC histologies (non-squamous and squamous) between 2021 and 2026

Non-squamous	2021	2022	2023	2024	2025	2026
Stage I	11,546	11,732	11,915	12,102	12,297	12,498
Stage II	2,747	2,791	2,835	2,879	2,926	2,973
Stage IIIA	3,251	3,303	3,355	3,408	3,463	3,519
Stage IIIB/C	2,263	2,300	2,336	2,372	2,410	2,450
Stage IV	18,036	18,327	18,613	18,905	19,210	19,523
Squamous	2021	2022	2023	2024	2025	2026
Stage I	2,497	2,533	2,571	2,610	2,652	2,685
Stage II	1,003	1,017	1,032	1,048	1,065	1,078
Stage IIIA	1,466	1,488	1,510	1,533	1,557	1,577
Stage IIIB/C	1,252	1,270	1,289	1,309	1,330	1,347
Stage IV	2,804	2,845	2,887	2,931	2,978	3,016