
Lung Cancer and Mesothelioma

03

Key Points

- Lung cancer (trachea, bronchus and lung) accounts for 20.6% of cancer deaths in Ireland
- At time of diagnosis of lung cancer, 29% of cases are aged under 65 years and 64% are aged under 75 years
- 26% of those presenting with lung cancer for the first time present to an emergency department
- Smoking is the most important cause of lung cancer
- Rates of lung cancer among women in Ireland, unlike men, are continuing to rise

Background

Lung cancer (trachea, bronchus and lung) accounts for 20.6% of cancer deaths in Ireland¹. Over 85% of cases of lung cancer occur in current or ex-smokers. Smoking accounts for 90% of cases in men and 80% in women². The risk increases with the quantity and duration of smoking. Exposure to environmental tobacco smoke is also associated with lung cancer risk. Although lifestyle changes have occurred in recent decades with reduced tobacco consumption, lung cancer will remain a major health problem for some years to come given the legacy effects of smoking.

Chronic obstructive pulmonary disease (COPD) is also a risk factor for lung cancer. Patients with airflow limitation are more likely to develop lung cancer than those with normal airway function, independent of smoking status. Exposure to radon, chromium, arsenic, beryllium, diesel exhaust, coal smoke, indoor emissions from other fuels and air pollution are also risk factors for lung cancer. Other factors that may predispose

to it include pulmonary fibrosis, history of cancer of the head, neck or oesophagus and smokers who have previously had lymphoma or breast cancer treated with thoracic radiotherapy. Genetic susceptibility also plays a role in the development of lung cancer².

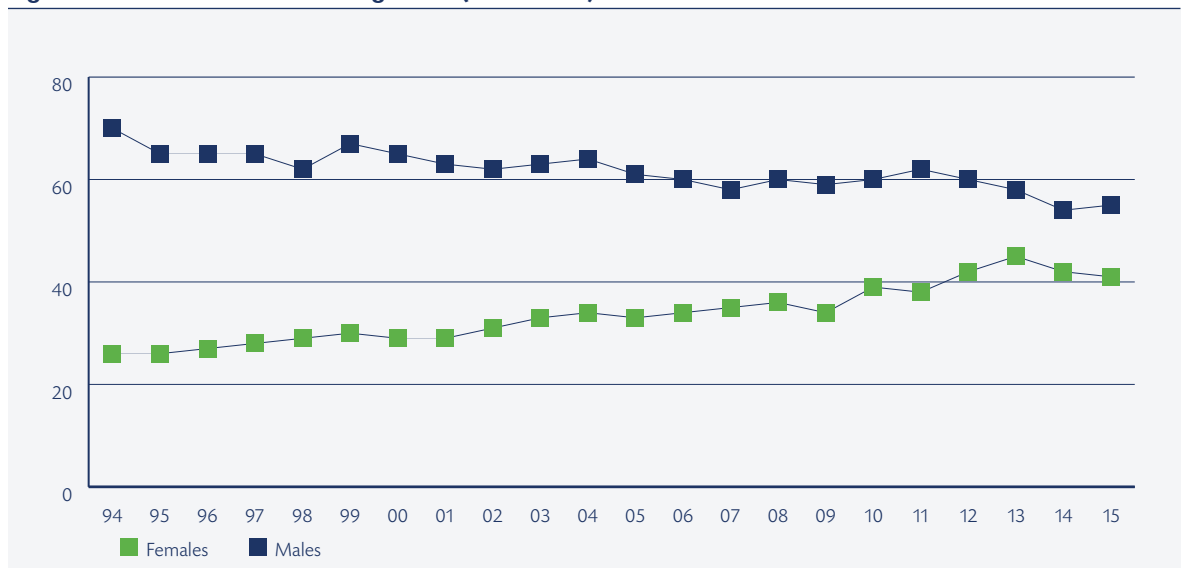
Lung cancer develops in up to 25% of those heavily exposed to asbestos. Asbestos exposure combined with cigarette smoking confers a greater than 40 times increased risk of lung cancer. Mesothelioma begins most commonly in the pleura, and is particularly associated with inhalation of asbestos dust. In Ireland, 94% of male cases and 75% of female cases are mesothelioma of the pleura³. In Ireland, asbestos was mostly used from the 1960s to the mid-1980s. It was banned on a phased basis from 1994 to 1998 with general prohibition on its use introduced under EU regulations in 2004³.

In the sections which follow unless otherwise specified lung cancer refers to cancer of trachea, bronchus and lung (ICD 10: C33, C34). Mesothelioma refers to mesothelioma of any site. Of those recorded on HIPE (2016), 70% were pleural.

Incidence and Prevalence

Lung cancer (ICD 10: C34), accounts for 11.3% of invasive cancers in Ireland⁴. In 2015, there were 2,431 new cases of which 1,104 (45.4%) were in females and 1,327 (54.6%) in males⁴. The incidence, as shown in figure 3.1, has been falling in males by 0.8% per year and increasing in women by 2.3% per year over the period 1994 to 2014⁵. In both 1995 and 2015 the number of cases of cancer of the trachea (C33) was 5 or less. The five-year age standardised survival for people with lung cancer (ICD 10: C33, C34) has increased over the period 1994-2015 from 9% to 17.9%⁵.

Figure 3.1. Trends in incidence of lung cancer (ICD 10: C34) 1994-2015



Source: National Cancer Registry Ireland⁴

Mesothelioma incidence in Ireland has increased from nine cases per year in 1994 to 48 cases per year in 2015⁵. This increase is largely seen in males. The incidence is predicted to continue to increase until 2020 in view of the long latency period between exposure to asbestos and the development of mesothelioma³.

The prevalence of a given cancer type is related to its incidence rate, median age at diagnosis and survival rates. On December 31st 2015, the most prevalent common cancers were: breast cancer (24% of all cancer survivors), prostate cancer (20%), colorectal cancer (13%) and skin melanoma (7%)⁵. Lung cancer, a common but high-fatality cancer, accounted for only 3% of all survivors⁵.

Mortality

Lung Cancer (ICD 10: C33, C34) causes the greatest number of cancer deaths in Ireland. It accounted for 20.6% of total cancer deaths in 2016¹. With 1,864 deaths in 2016, it was second only to ischaemic heart disease as a cause of death¹. Over the period 2007 – 2016, the number of deaths has increased from 1,668 to 1,864 although the 5 year standardised mortality ratio has decreased as shown in table 3.1.

In 2007, the move to ICD-10 coding for death certification in Ireland saw the introduction of a

specific code for pleural mesothelioma. In 2007-2010, of 125 mesothelioma deaths, only 20 deaths were registered as pleural mesothelioma³. However on review of the death certifications for people known to have died from pleural mesothelioma (2007-2010), only 51% were coded as mesothelioma of which only 5% were coded as pleural mesothelioma³. In 2012 – 2014, there was an average of 38 deaths per year in Ireland attributed to mesothelioma which was an increase from 2007 – 2009, when the average was 29 deaths per year⁹.

Impact on health services

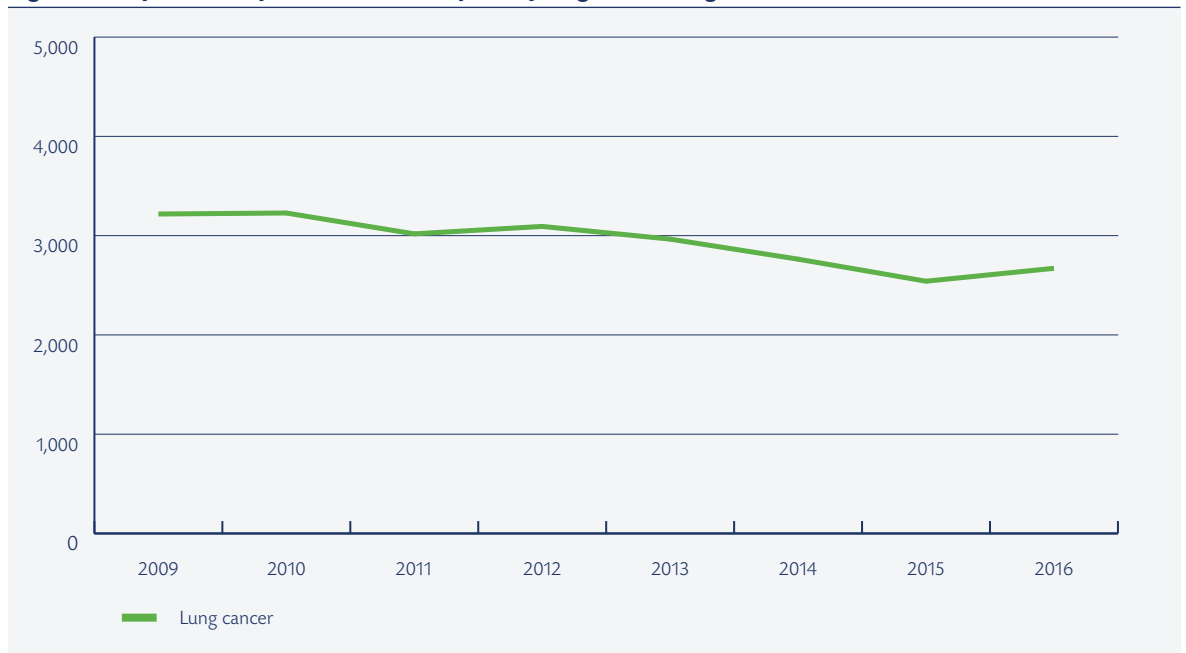
Data on those with lung cancer or mesothelioma is not available at national level in terms of attendance at GPs, out of hours services, Emergency Department attendances or hospital Outpatient Department attendances. In the period 2010-2014, 26% of people presenting with lung cancer for the first time for which method of presentation was recorded, presented as an emergency⁵. The majority at presentation were either at stage III (25.2%) or stage IV (37.2%)⁴.

The trends in terms of inpatient hospitalisations for lung cancer in publicly funded hospitals for the period 2009-2016, is shown in figure 3.2 overleaf.

Table 3.1. Deaths: Cancer of Lung (ICD 10 C33,C34) 2007-2016

Year	Total	/100,000 population	*5yrs	Standardised Mortality Rate
2007	1668	38.12	2003-07	63.65
2008	1681	37.48	2004-08	62.94
2009	1728	38.08	2005-09	63.04
2010	1695	37.20	2006-10	62.34
2011	1850	40.32	2007-11	62.35
2012	1801	39.21	2008-12	61.77
2013	1831	39.68	2009-13	61.06
2014	1934	41.63	2010-14	61.38
2015	1828	38.99	2011-15	60.74
**2016	1864	39.33	2012-16	59.11

Source: PHIS (Public Health Information System)*ICD 10 coding for deaths introduced 2007. **Provisional data for 2016.

Figure 3.2. Inpatient hospitalisations with a primary diagnosis of lung cancer, 2009-2016

Source: HIPE 2009-2016. All hospitals reporting data to HIPE.

In 2016, lung cancer accounted for 2,671 inpatient hospitalisations (2.9% of respiratory inpatient hospitalisations, 0.4% of all inpatient hospitalisations) and 30,583 inpatient bed days (5.3% of respiratory inpatient bed days, 0.3% of all inpatient bed days). In addition there were 3,550 day cases. Of these inpatients, 56% presented as emergencies.

In 2016, there were 116 hospitalisations for mesothelioma, of whom 107 had the site specified. Of these 70% (75) had pleural mesothelioma. Of the 116, there were 61 inpatient hospitalisations (856 bed days) and 55 day case admissions. Of the inpatients, 72% presented as emergencies.

In 2016, 46.0% of inpatient hospitalisations with respiratory neoplasms were classified as major complexity and had a mean and median length of stay of 13.4 and 9 days respectively. For those inpatient hospitalisations with minor complexity, their mean and median length of stay was 6.7 and 4 days respectively¹⁰. Of the elective inpatient hospitalisations, the Activity in Acute Public Hospitals in Ireland report for 2016 listed lung cancer 12th of the top twenty principal diagnoses¹⁰.

Gender

Among males, at 11.7%, lung cancer is the 3rd commonest cause of invasive cancer, while among females, at 10.9% it is the second commonest⁴. The cumulative lifetime risk of developing it (up to age 74 years) is 1 in 24 in males and females⁴.

In the period 2012-2014, lung cancer was the leading cause of cancer death in both sexes, accounting for 18.4% of cancer deaths in women and 23.5% of

cancer deaths in men⁵. The cumulative lifetime risk of death from lung cancer (up to age 74 years) in males was 1 in 29, while among females it was 1 in 48⁶. The 5 years age standardised survival for those with lung cancer for the period 2010-2014 was 17.9% (21.0% for females, 15.5% for males)⁴.

In the five year period, 2012-2016, 57% of deaths from lung cancer were in males and 43% in females. In the same period the standardised death rate for males was 74.8 while for females it was 47.1⁸. In 2016, 54.5% of deaths from lung cancer were in males, with 45.5% in females. The standardised mortality rate (all ages) for males was 67.36 while that for females was 47.5⁸.

In the decade 2006-2015, of 387 cases of mesothelioma, 333 (86.0%) were in males⁴. Of the 38 deaths in the 3 year period 2012-2014, 35 (92%) were in males⁵. In Ireland, for those where occupational history was recorded, 49% of males had worked in construction and related trades such as electrical, metal and woodworking compared with 20% of all male cancer patients. Secondary exposure to asbestos is more likely in women who are less likely to have direct work-related exposure. 90% of females with mesothelioma were or had been married compared with 81% of females with lung cancer (where secondary exposure to tobacco is an important risk factor) and 77% of all female cancer patients³.

Table 3. 2. Deaths 2007-2016: Lung Cancer (ICD 10: C33,C34): Years of Potential Life lost (YPLL)

Year	Standardised Mortality Rate: all ages	Total	Deaths aged <70yrs (%)	YPLL < 70 yrs	YPLL/100,000 population
2007	63.18	1,668	717 (43.0%)	6,840	176.1
2008	62.16	1,681	710 (42.2%)	7,078	175.4
2009	62.31	1,728	724 (41.9%)	6,877	167.3
2010	59.88	1,695	702 (41.4%)	6,685	160.0
2011	63.62	1,850	748 (40.4%)	7,007	164.9
2012	60.61	1,801	745 (41.4%)	6,422	151.8
2013	60.11	1,831	750 (41.0%)	6,437	150.2
2014	61.65	1,934	799 (41.3%)	6,974	161.0
2015	56.65	1,828	733 (40.1%)	6,393	144.9
*2016	56.20	1,864	720 (38.6%)	6,121	134.9

Source: Public Health Information System (PHIS)⁸ *provisional data for 2016

Age

For the years 2011-2015, the median age group at time of diagnosis of lung cancer was 70-74 years⁴. When looked at in greater detail, 3.3% of patients were aged under 50 years of age, 25.6% aged 50-64 years, 34.9% aged 65-74 years with the remaining 36.2% aged 75 years or over⁴.

The median age group for deaths from lung cancer was also 70-74 years. Over the period 2007 – 2016 the age standardised rate of deaths from lung cancer has reduced from 63.2 to 56.2 per 100,000 population as shown in table 3.2 above. Due to the increasing size of the population, the actual number of deaths has increased in that same period. The Years of Potential Life Lost (YPLL)/100,000 reduced from 176.1 to 134.9. In 2016, lung cancer accounted for 7.3% of deaths in people aged 0-64 years and 5.5% of deaths in people aged 65 years or over¹.

Approximately one third of patients are in their 60s when diagnosed with mesothelioma with another one third in their 70s³. Of the inpatient hospitalisations for those with mesothelioma in 2016, 29.5% were aged 16-64 years.

Regional variation

Given the relatively small numbers, distribution of incidence by county is not shown. However, age standardised incidence by county is available from the National Cancer Registry⁴. For the years 1994-2015, the highest incidence for males was in Dublin (all, north, south), followed by Carlow and Louth. For females the highest incidence was also in Dublin (all, north, south) followed by Kildare and then Louth⁴. For both sexes, the lowest incidence was in Clare and Mayo⁴. Incidence is also available in absolute numbers on the NCRI Cancer Factsheet Lung⁶. The same is true for mesothelioma³. Compared with rural dwellers those in urban areas have a 49% higher incidence of mesothelioma, which may reflect higher proportions of manual workers in construction and related fields³.

Socio-economic analysis

Lung cancer incidence is usually higher in more deprived communities. This is in part due to higher rates of smoking. It is also likely to reflect greater occupational exposure to harmful dust, fibres and fumes. In the period 2010-2014, patients with lung cancer resident in the most deprived areas were more likely to present as an emergency⁵. In 2008-2011 the age-standardised incidence rate for males in the most deprived group was almost 80 per 100,000, more than double the rate (35 per 100,000) in the least deprived group. For females, the rate in the most deprived group at almost 50 per 100,000 was more than double that in the least deprived group at 22 per 100,000¹⁷. For 2010-2014 the absolute risk difference between the most and least deprived 20% of the population presenting as an emergency for lung cancer was +9% which was second only to pancreatic cancer (14%)⁵.

International comparisons

Lung cancer has been the most common cancer in the world for several decades accounting for 12.9% of all cancers¹². Lung cancer is the most common cause of death from cancer worldwide. In 2015, it accounted for 1.7 million deaths¹³. In terms of years of life lost in 2015, lung cancer ranked 13th (compared with 14th in 2005)¹³. Because of its high fatality (the overall ratio of mortality to incidence is 0.87) and the relative lack of variability in survival in different world regions, the geographical patterns in mortality closely follow those in incidence¹². In some Western countries where the tobacco epidemic reached its peak by the middle of the 20th century (e.g. the UK, Finland, and the USA), lung cancer rates have been decreasing slowly in men and plateauing in women². In the 2015 Global Burden of Disease report, the age standardised mortality rate for lung cancer was 26.6 (CI: 25.9-27.4) which was a reduction of 8.1% (10.7-5.2) on the 2005 rate¹³. However, due to the increase in the global population,

the total number of deaths from lung cancer in the same time period increased by 20.1%.

Globally, lung cancer is the most common cancer in men (16.7% of cancers) with the highest estimated age-standardised incidence rates in Central and Eastern Europe (53.5 per 100,000) and Eastern Asia (50.4 per 100,000)¹². In women, the incidence rates are generally lower with a different geographical pattern mainly reflecting different historical exposure to tobacco smoking. Thus the highest estimated rates are in North America (33.8) and Northern Europe (23.7)¹². Worldwide, lung cancer is the fourth most common cancer in women (8.8% of all cancers) and the second most common cause of death from cancer (13.8% of total cancer deaths)¹².

In the UK, 50% of those admitted with lung cancer are as emergencies. 38% of lung cancer diagnoses in the UK are made after an emergency hospital admission¹⁴. The Irish figures, as mentioned earlier, were 56% (lung cancer hospitalisations which were as emergencies in 2016) and 26% (lung cancer diagnoses as a result of an emergency admission in 2010-2014). The incidence of lung cancer in the UK is 80% higher in more socially deprived groups¹⁴. Lung cancer accounts for 5.9% of deaths in people aged 65 years and over in the UK and 8.4% of deaths in people aged 15-64 years¹⁴. The Irish figures are in line with international trends. Australia has the highest mesothelioma incidence in the world at 2-3 cases per 100,000 population¹⁵. In the UK, 80% of cases of pleural mesothelioma occur in men¹⁴. Most are diagnosed in those aged over 70 years of age but 20% are diagnosed in those aged 51-60 years¹⁴. In Ireland, 85.5% of cases of mesothelioma occur in males (14.5% in females) with one third diagnosed in their 60s and one third in their 70s.

Lung cancer will continue as a health challenge for many years to come based both on the legacy effect of tobacco smoking, its continued use and the emergence of newer carcinogens.

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