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# Pneumonia and Acute Lower Respiratory Infection (Unspecified)

05

## Key Points

- Pneumonia is the 5<sup>th</sup> most frequent cause of death in Ireland
- People with pneumonia and acute lower respiratory infection (unspecified) are largely treated in the community setting
- People with pneumonia and acute lower respiratory infection (unspecified) in 2016 accounted for 31.7% of respiratory inpatient hospitalisations and 40.3 % of respiratory inpatient bed days

## Background

Acute lower respiratory infections are a leading cause of morbidity and mortality in children and adults. Pneumonia is the 5<sup>th</sup> most frequent cause of death in Ireland<sup>1</sup>.

As acute lower respiratory infections are not uniformly defined, this can hamper an appreciation of their epidemiological importance<sup>2</sup>. In epidemiological data recording, acute lower respiratory infections can include acute bronchitis (ICD 10: J20), acute bronchiolitis (ICD 10: J21), acute lower respiratory infection (unspecified) (ICD 10: J22), influenza (ICD 10: J10, J11) and pneumonia (ICD 10: J12-18). This chapter, unless otherwise specified, will focus on pneumonia (ICD 10: J12-18) and acute lower respiratory infection (unspecified) (ICD 10: J22). Bronchiolitis is discussed in the Paediatric chapter and influenza in the Infectious disease chapter.

Pneumonia is a severe, acute, respiratory infection that affects the lungs<sup>3</sup>. Bacteria, viruses and occasionally fungi can cause pneumonia<sup>2</sup>. Respiratory infection due to *Legionella* (including *Legionella pneumoniae*), is included in the Respiratory Infectious disease chapter. Acute bronchitis occurs in people without chronic lung disease.

## Incidence

Incidence data at a national level is not available. As these are acute events, incidence data rather than prevalence data is the data of interest.

## Mortality

Pneumonia (ICD 10: J12-18) is the 5<sup>th</sup> commonest cause of death in Ireland<sup>1</sup>. Over 1,000 people die each year in Ireland from pneumonia. It is the 3<sup>rd</sup> commonest cause of death from respiratory disease after lung cancer and COPD<sup>1</sup>.

The 5 year standardised mortality rate (SMR) for pneumonia (J12-18) is shown in the table below. The rate of decline over the past few years has slowed.

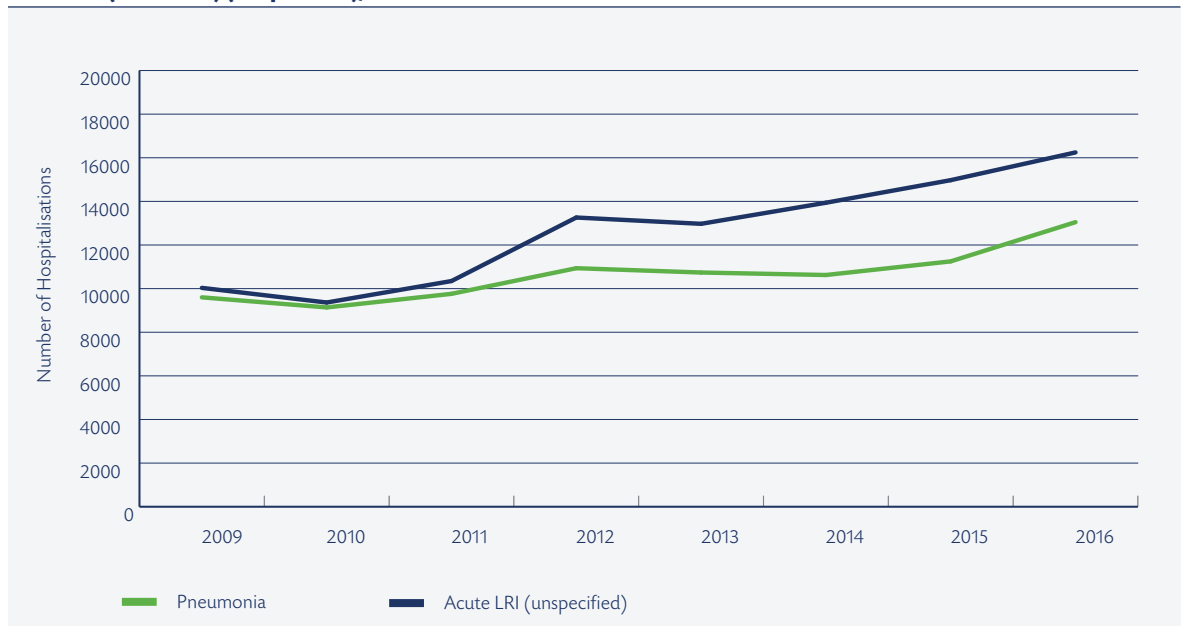
For years of potential life lost (YPLL) due to deaths from pneumonia (ICD 10: J12-18), see section on age below. In 2007, 191 deaths were recorded for acute lower respiratory infection (unspecified) (ICD 10: J22); in 2015, this number was 144<sup>4</sup>.

**Table 5.1. Deaths from Pneumonia (ICD 10: J12-18): 2007-2016**

Year	Total	/100,000 population	5yrs	Standardised Mortality Rate
2007	1125	25.71	2003-07	92.77
2008	1356	30.23	2004-08	81.52
2009	1320	29.09	2005-09	74.54
2010	1141	25.04	2006-10	65.06
2011	1057	23.04	2007-11	54.88
2012	1086	23.64	2008-12	52.65
2013	983	21.30	2009-13	47.68
2014	1003	21.59	2010-14	43.96
2015	1165	24.85	2011-15	43.45
**2016	1049	22.13	2012-16	41.87

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

**Figure 5.1. Inpatient hospitalisations with a primary diagnosis of pneumonia or acute lower respiratory infection (Acute LRI) (unspecified), 2009-2016**



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

### Impact on health services

Data on pneumonia (ICD 10: J12-18) or acute lower respiratory infection (unspecified) (ICD 10: J22) is not available at a national level for people with full medical cards, those with GP only cards or those who are private patients. This is also true for those who attend GP out of hours services, those who attend Emergency Departments and those who attend hospital Outpatient Departments. Inpatient or day case data is only available from HIPE reporting publicly funded hospitals.

Both pneumonia (ICD 10: J12-18) and acute lower respiratory infection (unspecified) (ICD 10: J22) are largely treated in the community, hospitalisations are only the tip of the iceberg in terms of burden both on patients and on health services. The number of inpatient hospitalisations for acute bronchitis is relatively low. In 2016, there were 236 such inpatient hospitalisations using a total of 539 bed days.

In terms of publicly funded acute hospitals, figure 5.1 above, reflects the increasing burden on inpatient hospital services for both pneumonia (ICD 10: J12-18) and acute lower respiratory infection (unspecified) (ICD 10: J22) for the years 2009-2016.

For the years 2007-2016, the crude in-hospital mortality for pneumonia (ICD 10: J12-18) changed from 13.8 deaths per 100 admissions in 2007 to 11.1 deaths per 100 admissions in 2016 among the 32 included hospitals<sup>5</sup>. The standardised mortality rate (SMR) in 2016 (99.8% control limits), as opposed to crude mortality, ranged from 162 (39-170) to 28 (25-188)<sup>5</sup>.

In 2016, pneumonia (ICD 10: J12-J18) accounted for 13,048 inpatient hospitalisations (14.1% of respiratory inpatient hospitalisations) while acute lower respiratory infection (unspecified) (ICD 10: J22) accounted for 16,245 (17.6%) i.e. a combined total of 29,293, which is 31.7% of all inpatient respiratory hospitalisations and 4.5% of all inpatient hospitalisations. In terms of inpatient bed days, the two conditions accounted for 40.3% of respiratory inpatient bed days or 6.3% of all inpatient bed days.

In 2016, 97.7% (15,879) of the inpatient hospitalisations for acute lower respiratory infection (unspecified) (ICD 10: J22) were admitted as emergencies. The figure for those with pneumonia (ICD 10: J12-18) was 98.3% (12,821). When combined, they accounted for 6.9% of all emergency inpatient hospitalisations and 36.7% of respiratory emergency hospitalisations.

The Activity in Acute Public Hospitals in Ireland Report for 2016 listed three respiratory conditions among its top 10 Principal Diagnoses for inpatient hospitalisations<sup>6</sup>. Following spontaneous delivery, pain in throat and chest and delivery by caesarean section, in 4<sup>th</sup> place was acute lower respiratory infection (unspecified) and in 8<sup>th</sup> place, pneumonia organism unspecified (ICD 10: J18)<sup>6</sup>. Among the top Principal Diagnoses for emergency hospitalisations, after pain in throat and chest, in 2<sup>nd</sup> place was acute lower respiratory infection (unspecified) while in joint 4<sup>th</sup> place was pneumonia organism unspecified (ICD 10: J18)<sup>6</sup>.

**Table 5.2. Deaths from Pneumonia (ICD 10: J12-18): Years of Potential Life lost (YPLL): 2007-2016**

Year	Standardised Mortality Rate: all ages	Total deaths	Deaths aged <70yrs (%)	YPLL up to 70 yrs	YPLL/100,000 population
2007	55.45	1125	92 (8.2%)	1021	24.9
2008	63.87	1356	110 (8.1%)	1421	34.0
2009	59.75	1320	108 (8.2%)	1529	35.2
2010	50.34	1141	110 (9.6%)	1719	39.4
2011	45.38	1057	77 (7.3%)	844	18.9
2012	45.80	1086	75 (6.9%)	777	20.2
2013	40.47	983	55 (5.6%)	861	20.5
2014	39.39	1003	79 (7.9%)	905	22.2
2015	44.32	1165	81 (6.9%)	1287	29.3
*2016	38.40	1049	95 (9.1%)	1237	28.7

Source: Public Health Information System (PHIS) \* Provisional data for 2016

## Gender

More women than men die from pneumonia (ICD 10: J12-18). In 2016, of those who died from pneumonia, 43.6% were male and 56.4% were female. When age-standardised, the rate is higher in men. That for males was 45.35 and for females was 34.17 in 2016. Over the 5 year period 2012-2016, the age-standardised rate for males was 49.99 while that for females was 37.41.

For deaths due to acute lower respiratory infection (unspecified), of the 144 who died in 2015, 62% (91) were females. In 2007, the figure was 56% (107)<sup>4</sup>.

## Age

The majority (>90%) of deaths from pneumonia (ICD 10: J12-18) occur in those aged 70 years and over (table 5.2).

Of 144 deaths from acute lower respiratory infection (unspecified) in 2015, 73% (105) were aged 85 years or over, 18.1% (26) were aged 75 -84 years and 4.9% (7) were aged 65-74 years<sup>4</sup>.

Of the inpatient hospitalisations for pneumonia in 2016, 1,508 (11.6%) were aged 0-15 years using 8.9% of respiratory inpatient bed days (1.9% of all inpatient bed days) in that age group, 3,455 (26.5%) were aged 16-64 years using 17.4% of respiratory inpatient bed days (1.8% of all inpatient bed days) in that age group and 8,085 (62.0%) were aged 65 years or over using 26.4% of respiratory inpatient bed days (5.0% of all inpatient bed days) in that age group.

Another way of looking at these figures for 2016 is, of those aged 0-15 years hospitalised with a respiratory illness, 6.4% (1,508) had pneumonia, the figure for those aged 16-64 years was 11.6%, while for those aged 65 years or over it was 20.7%.

Of inpatient hospitalisations for acute lower respiratory infection (unspecified) in 2016, 2,325 (14.3%) were aged 0-15 years using 10.5% of

respiratory inpatient bed days (6.1% of all inpatient bed days) in that age group, 4,910 (30.2%) were aged 16-64 years using 13.6% of respiratory inpatient bed days (1.4% of all inpatient bed days) in that age group and 9,010 (55.5%) were aged 65 years or over using 20.7% of respiratory inpatient bed days (4.4% of all inpatient bed days) in that age group.

As with pneumonia another way of looking at these figures is to say in 2016, of those aged 0-15 years, hospitalised with a respiratory illness, 10.2% (2,325) had acute lower respiratory infection (unspecified) (ICD 10: J22), the figure for those aged 16-64 years was 17.2% (4,910) while for those aged 65 years or over it was 23.2% (9,010).

## Regional variation

The 5 year standardised death rates for pneumonia by county of residence for the past number of 5 years periods show a wide variation in range with Longford usually at the top of the scale and Cavan at the bottom. For the period 2012-2016, the range was 25.09 (Cavan) to 98.38 (Longford). Data for acute lower respiratory infection (unspecified) on a regional basis is not available.

## Socio-economic analysis

National data is not available.

## International Comparisons

The incidence of Community-acquired pneumonia (CAP) in general practice in Europe is reported to range from 1.7–11.6 cases per 1,000 people per year in adults<sup>2</sup>. Although most patients are treated in the community, most available data are from hospitalised patients. Based on WHO (Europe) Morbidity data base (2011) and Eurostat (2012), the variation in age-standardised hospitalisation rates per 100,000 population for those aged ≥15 years between

European countries, ranged from 50.6 to 515.95, with Ireland at 216.61<sup>2</sup>.

Globally, pneumonia causes 13% of childhood deaths<sup>3</sup>. In the Global Burden of Disease report (2015), 12.1% of deaths in children under the age of 5 years were due to lower respiratory infections<sup>7</sup>. This age group accounted for 26% of all deaths from lower respiratory infections<sup>7</sup>.

The age-standardised mortality rate per 100,000 for pneumonia in adults (aged 15 years of age and over) in WHO Europe ranged from 4.50 to 38.28 as reported in 2011. Ireland was among the highest with a rate of 32.96<sup>2</sup>. In 2015, the Global Burden of Disease reported that the age-standardised mortality rate for lower respiratory infections was 41.6 (CI: 38.0-43.5), which was a reduction since 2005 of 19% (CI: 22.3-16.9). The figure in 2005 was 51.7 (CI: 47.9-54.1)<sup>7</sup>. The risk of death from pneumonia increases with age. A UK study reported case-fatality rates of 5.6% in those aged less than 65 years and 47.2% for those aged more than 85 years<sup>2</sup>.

The age standardised hospitalisation rate for acute lower respiratory infections (but excluding pneumonia) in adults as reported by WHO Europe in 2011 ranged from 4.89 to 227.61. This latter figure was the Irish figure<sup>2</sup>. Malta and the UK were the 2<sup>nd</sup> and 3<sup>rd</sup> highest at 140.61 and 108.14 respectively.

## References

1. Health in Ireland, Key Trends, 2017, Department of Health; Dec 2017 <https://health.gov.ie/blog/publications/health-in-ireland-key-trends-2017/>
2. Gibson GJ, Loddenkemper R, Lundbäck B, Sibille Y. The European Lung white book; Respiratory Health and Disease in Europe. ERS Journals 2013. Chapter 18, Acute Lower Respiratory Infections <https://www.erswhitebook.org/chapters/acute-lower-respiratory-infections/>
3. Research Investments in Global Health Study (ResIn). Sizing Up Pneumonia Research: Assessing Global Investments in Pneumonia Research 2000-2015. Southampton, UK:ResIn, 2018
4. Central Statistics Office, Vital Statistics 2016
5. National Office of Clinical Audit, (2017). National Audit of Hospital Mortality Annual Report 2016. Dublin: National Office of Clinical Audit. <https://www.noca.ie>
6. Activity in Acute Public Hospitals In Ireland, 2016: Annual Report; Healthcare Pricing Office Health Service Executive; Sep 2017 [http://www.hpo.ie/latest\\_hipe\\_nprs\\_reports/HIPE\\_2016/HIPE\\_Report\\_2016.pdf](http://www.hpo.ie/latest_hipe_nprs_reports/HIPE_2016/HIPE_Report_2016.pdf)
7. Global, regional, and national life expectancy, all-cause mortality, and cause-specific mortality for 249 causes of death, 1980–2015: a systematic analysis for the Global Burden of Disease Study 2015 GBD 2015 Mortality and Causes of Death Collaborators. *Lancet* 2016; 388: 1459–544 Corrected [http://dx.doi.org/10.1016/s2213-2600\(17\)30293-X](http://dx.doi.org/10.1016/s2213-2600(17)30293-X)