
Asthma

06

Key Points

- Ireland has among the highest rates of asthma in the world
- Asthma typically begins earlier in life than many other chronic diseases. Consequently it can impose a high lifetime burden on individuals, caregivers and the community
- Adults with asthma include those who have had asthma since childhood, those in whom it apparently resolved but subsequently recurs and those who develop asthma as adults

Background

Asthma is a heterogeneous group of conditions that results in recurrent episodes of reversible airway obstruction. It is a chronic inflammatory condition of the airways characterised by symptoms of wheezing, breathlessness, chest tightness and coughing, particularly at night or in the early morning.

Asthma afflicts up to 334 million people worldwide¹. It has been increasing in prevalence for the past three decades². It is the most common chronic disease in children³. Children with asthma may have abnormal lung growth and are at risk of developing lifelong respiratory symptoms⁴.

The causes of the increase in global asthma are not well understood. Genetic predisposition, exposure to environmental allergens, indoor and outdoor air pollution, lower respiratory tract infection early in life, airway microbiome make-up, dietary factors and abnormal immunological responses may promote the development of asthma. The timing and level of exposure to such allergens, infection or irritants may be important factors in the development of asthma. Early viral infections and passive tobacco smoke exposure have been associated with its development in young children. Airborne allergens and irritants in the workplace can lead to asthma among workers if the exposure persists. Triggers such as stress, exercise, cold air and inhaling substances such as smoke, pollution or pollen can cause airways to become inflamed and narrowed⁵.

Asthma affects people of all ages. Most commonly it arises in childhood and may persist into adulthood. In perhaps two-thirds of children with asthma, the disease remits in the early teenage years, only to relapse, in about a third of these cases, in adulthood. Less commonly, the disease begins for the first time in adulthood. It is estimated that 15% of all adult asthma is 'work related'¹. Therefore adult asthma may represent persistent or relapsed childhood disease or true incident 'new' adult disease⁶.

Childhood asthma results from an interaction between different environmental and genetic factors. Respiratory virus infections such as Respiratory Syncytial Virus (RSV) are major causes of acute bronchiolitis in infancy and of acute asthma attacks among older asthmatic children. From 2 years of age, rhinovirus infections are the most frequent precipitants of acute asthma. It is estimated that 85% of acute asthma attacks are precipitated by respiratory virus infections⁷. After two years of age, inhalant allergy - from both outdoor and indoor allergens - becomes increasingly important for the development of asthma.

In adults, exacerbations of asthma are often provoked by respiratory infections – usually viral in origin. In adults with allergic asthma, symptoms are provoked by exposure to the relevant allergen. Other common triggers include physical exertion (particularly in cold, dry air) and traffic pollution. Certain drugs such as β -adrenergic blockers and non-steroidal anti-inflammatory agents including aspirin can provoke asthma⁶.

Incidence

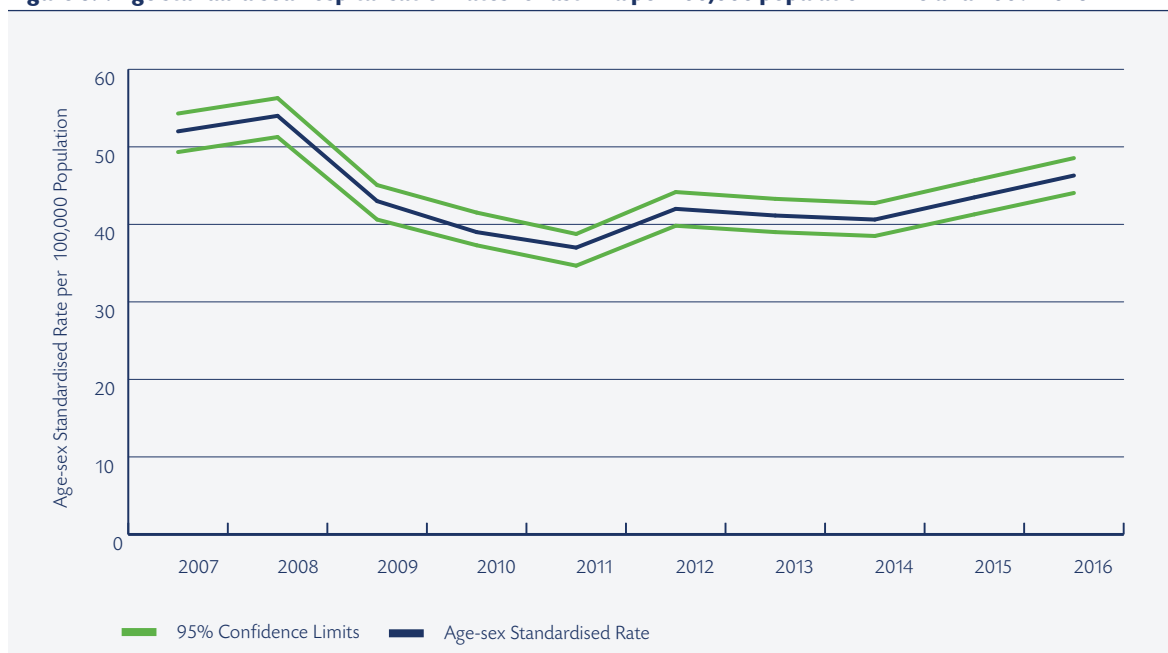
At a national level the incidence of asthma is unknown.

Prevalence

Current estimates suggest that the prevalence of doctor-diagnosed asthma in Ireland is 21.5% of children ("asthma ever") and 7-9.4% of adults⁸. As part of the Longitudinal Growing up in Ireland Study in 2011, 9.5% of 3 year olds reported asthma symptoms⁹. Among those aged 15 years and older in the Healthy Ireland Survey, 8% reported that they had asthma¹⁰.

In the absence of better population data, and as a proxy for prevalence for those with greater asthma needs, hospitalisation rates are of value. A number of people with asthma are admitted on a planned basis, either to facilitate the administration of medication or for diagnostic investigations¹¹.

The age-sex standardised inpatient hospitalisation rate for asthma fluctuated over the decade 2007-2016, from a high of 54 per 100,000 population in 2008 to a low of 37 per 100,000 population in 2011 (see figure 6.1 below). Over the three years (2014, 2015, 2016), the age-sex standardised rate of hospitalisation for asthma has increased year-on-year from 41 per 100,000 population in 2014 to 46 per 100,000 population in 2016¹¹.

Figure 6.1. Age standardised hospitalisation rates for asthma per 100,000 population in Ireland 2007-2016

Source: National Healthcare Quality Reporting System Annual Report 2017. Figure 22.¹¹

Table 6.1. Asthma RIP: 2007-2016 and 5 year Standardised Rates 2003-2016

Year	Total	/100,000 population	5yrs*	Standardised Mortality Rate
2007	61	1.39	2003-2007	2.54
2008	52	1.16	2004-2008	2.40
2009	53	1.17	2005-2009	2.25
2010	44	0.97	2006-2010	2.07
2011	56	1.22	2007-2011	2.06
2012	39	0.85	2008-2012	1.84
2013	48	1.04	2009-2013	1.81
2014	40	0.86	2010-2014	1.67
2015	74	1.58	2011-2015	1.86
**2016	72	1.52	2012-2016	1.92

Source: Public Health Information System (PHIS) *Change from ICD 9 to ICD 10 coding for deaths in 2007 ** Provisional data for 2016

Mortality

Table 6.1 above shows the number of deaths from asthma and the rate/100,000 population for each year of the decade 2007-2016. The five year standardised mortality rates (SMR) for the period 2003 - 2016 are also shown. At a population level the numbers are small, but at a human level these numbers are of concern as is the apparent reversion to a rising trend in recent years. For deaths in terms of years of potential lives lost (YPLL) see section on age.

Impact on health services

Data on asthma is not available at 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 for their asthma. Inpatient or day case data is only available from HIPE reporting acute publicly funded hospitals.

An analysis of 2013 Primary Care Reimbursement Scheme (PCRS) pharmacy claims data for inhalers for patients under the age of 40 years (on the assumption that the majority in this age group would have asthma rather than another respiratory diagnosis) reported that between the General Medical Services (GMS) and the Drugs Payment Scheme (DPS), pharmacy claims for inhalers amounted to an expenditure in excess of €16 million. Between these two schemes an average of 12,300 prescriptions for combination inhalers were estimated to be filled each month for patients with asthma¹². This analysis excluded those aged under 6 years or over 40 years. In 2013, 40%

of the total population were eligible for the GMS scheme. For those not eligible for GMS, the threshold for refund under the DPS was a monthly excess of €144 in 2013. The cost for supply of newer biologics high tech asthma therapy is estimated to be about €8m annually for approximately 550 patients¹³.

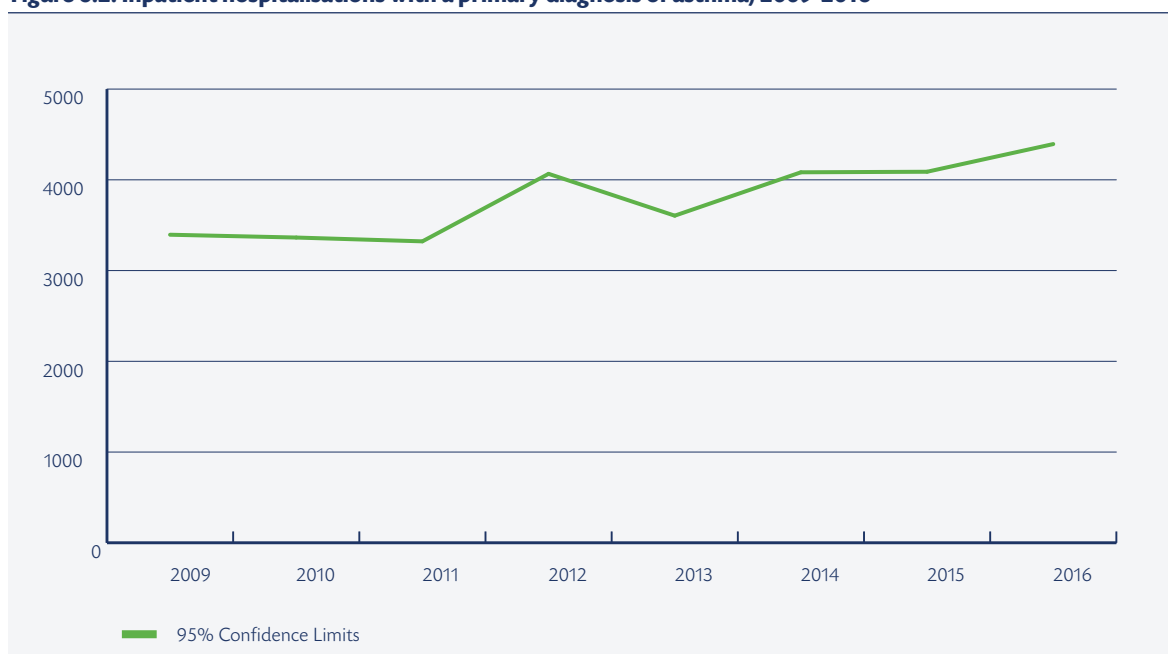
In terms of publicly funded acute hospitals, the numbers of day case hospitalisations for asthma has more than doubled in the years 2009 to 2016 from 1,336 in 2009 to 2,889 in 2016. In the section on prevalence, inpatient hospitalisations standardised for the population were shown in figure 6.1. In figure 6.2 below, the increasing burden on inpatient hospital services for the years 2009-2016 is shown.

In 2016, asthma accounted for 7,283 hospitalisations in acute publicly funded hospitals (day cases and inpatients). Of these, 4,394 (60%) were inpatients who occupied 11,630 inpatient bed days (0.3% of all inpatient bed-days, 2% of all respiratory inpatient bed days). Over 97% (4,252) of these inpatient hospitalisations were emergency admissions. Of the inpatients with asthma in 2016, 12.5% were classified as major complexity¹⁴.

Gender

Over the period, 2009-2016, of those aged under 15 years of age admitted as inpatients with asthma, 63.4% were males. Of those aged 65 years and over, 70.6% were females.

Figure 6.2. Inpatient hospitalisations with a primary diagnosis of asthma, 2009-2016



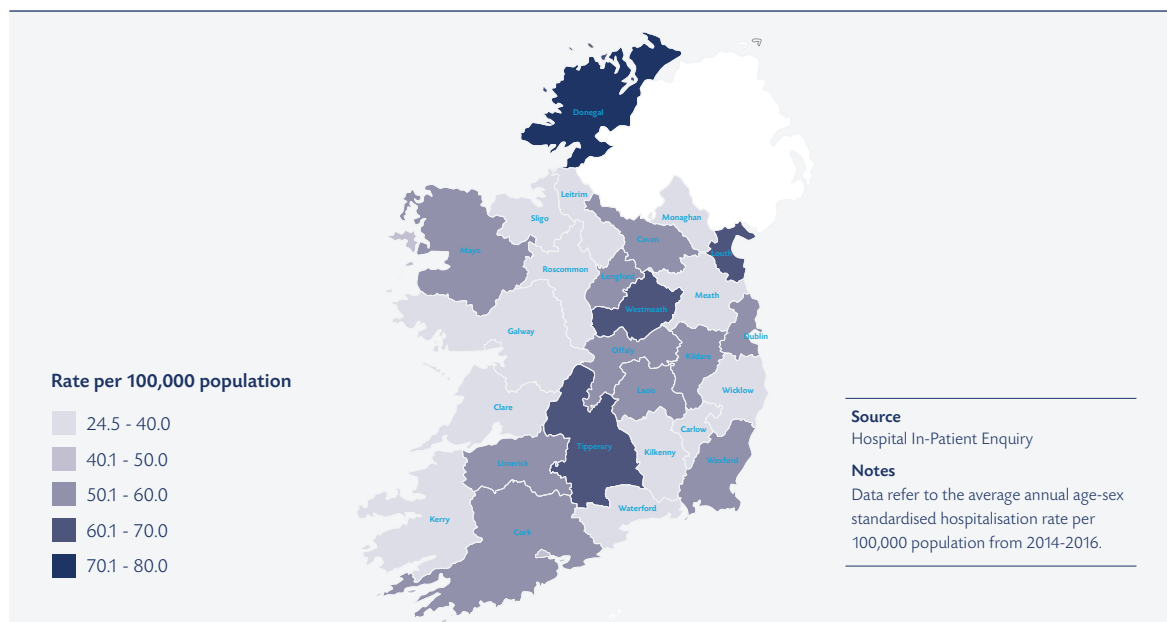
Source: HIPE 2009-2016. All hospitals reporting data to HIPE

Table 6.2. Deaths from Asthma and Years of Potential Life lost (YPLL): 2007-2016

Year	Standardised Mortality rate: all ages	Deaths: Total	Deaths aged <70yrs (% of total)	YPLL up to 70 yrs	YPLL/100,000 population
2007	2.52	61	16 (26.2%)	354	7.7
2008	1.94	52	21 (40.4%)	459	9.5
2009	2.13	53	12 (22.6%)	218	5.0
2010	1.64	44	14 (31.8%)	292	6.1
2011	2.06	56	20 (35.7%)	433	8.6
2012	1.44	39	10 (25.6%)	364	7.2
2013	1.85	48	12 (25.0%)	227	4.7
2014	1.38	40	12 (30.0%)	322	6.6
2015	2.48	74	21 (28.4%)	624	15.5
*2016	2.32	72	21 (29.2%)	582	11.3

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

Figure 6.3. Age-sex standardised hospitalisation rates for asthma per 100,000 population by county of residence, 2014-2016



Source: National Healthcare Quality Reporting System Annual Report 2017. Figure 24.¹¹

Age

Asthma is the most common chronic disease of childhood. However the majority of deaths from asthma occur in those aged 70 years and over (table 6.2). For those who die under the age of 70 years, there are significant years of potential life lost (YPLL) as shown in table 6. 2.

Of the inpatient hospitalisations for asthma in 2016, 1,885 (43%) were aged 0-15 years using 5.6% of respiratory inpatient bed days in that age group (1.2% of all inpatient bed days), 1,966 (44.7%) were aged 16-64 years using 3.9% of respiratory inpatient bed days (0.4% of all inpatient bed days) in that age group) and 543 (12.4%) were aged 65 years or over using 0.7% of respiratory inpatient bed days (0.1% of all inpatient bed) days in that age group.

Regional variation

During the three year period from 2014-2016, the age-sex standardised hospitalisation rate by county of residence for asthma ranged from 25 hospitalisations per 100,000 population in Leitrim to 73 hospitalisations per 100,000 population in Donegal (see figure 6.3 above). The low absolute number of hospitalisations in many counties makes the rate sensitive to small changes in these numbers¹¹.

International Comparisons

The prevalence of childhood asthma increased markedly in Europe in the second half of the 20th century⁷. In the UK, 8 % of the population have asthma⁵.

The International Study of Asthma and Allergies in Childhood (ISAAC) survey between 2000 and 2003 reported that about 14% of the world's children were likely to have had asthmatic symptoms in the previous year¹. In the 2002-2003 ISAAC study, for those aged 13-14 years, the prevalence of "asthma ever" in Ireland was 21.5%. The figure in the UK was 20.7% for the same age group⁷. These figures were among the highest in Europe.

Overall, 4.3% of respondents to the World Health Organisation's (WHO) World Health Survey of 18-45 year olds in 2002-2003 reported a doctor's diagnosis of asthma, 4.5% reported having either a doctor's diagnosis or that they were taking treatment for asthma, and 8.6% reported that they had experienced attacks of wheezing or symptoms (of asthma) in the preceding 12 months¹. Ireland, with a rate of 9.41%, was at the higher end of the range in WHO Europe (range <3% - >20%) but not as high as the UK (17.84%)⁶. In Australia in 2014-2015, 10.8% of the population had asthma¹⁵.

Data (2004-2010) from WHO for children aged 0-14 years shows that mortality is generally low in Europe⁷. Death from asthma in adults is uncommon in most European countries with the age standardised rate ranging from <1.0 to 9.86 (Ireland 1.45)⁶. In the UK, most asthma deaths are in those aged >65 years⁵. In 2015, the UK audit of asthma deaths reported that 90% of deaths in the UK had a preventable aspect¹⁶.

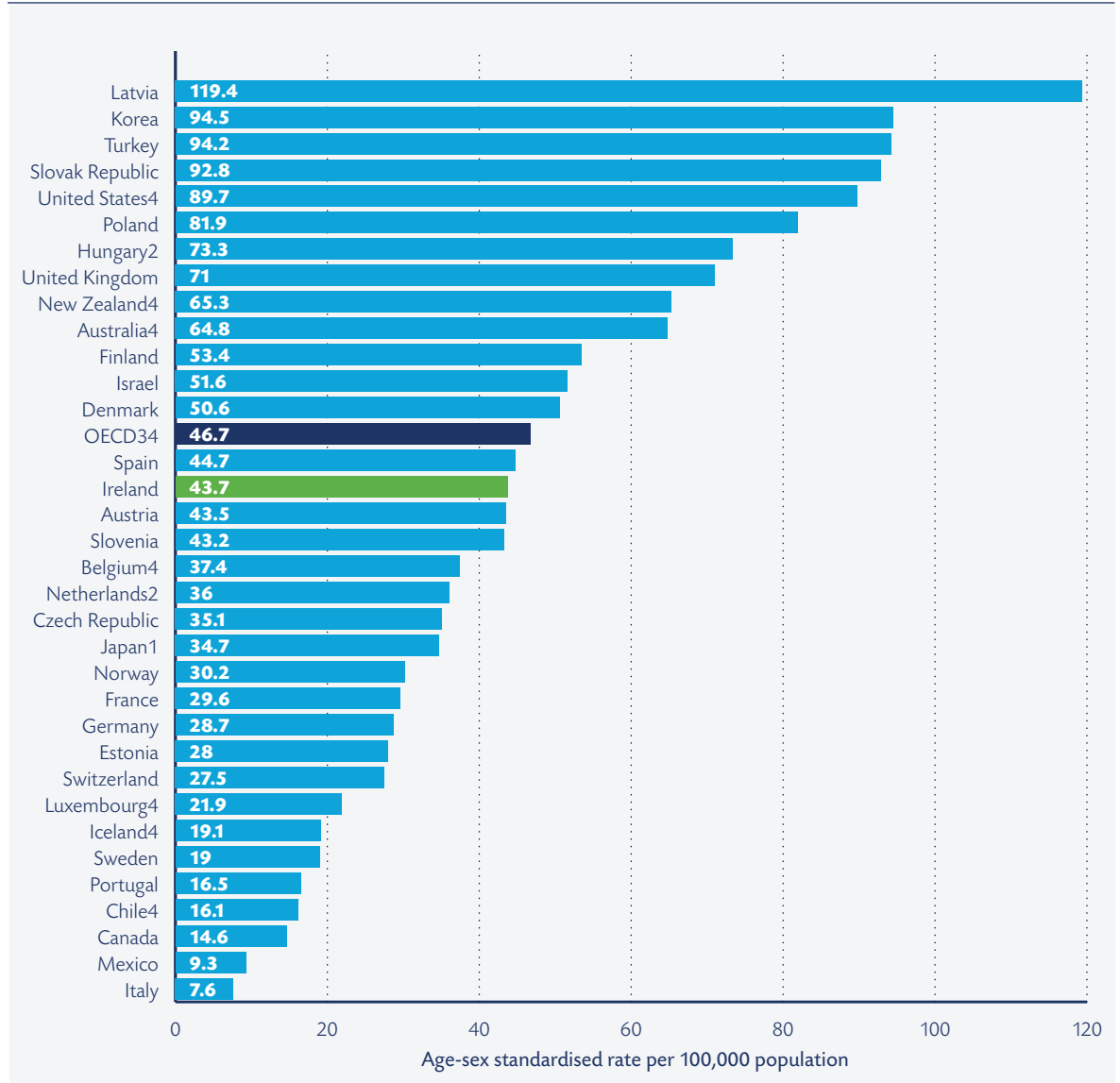
In 2013 (the latest year for which OECD data are currently available), the age-sex standardised hospitalisation rate for asthma in Ireland at 41 per 100,000 population (see figure 6.4 below) was below the OECD average of 44 hospitalisations per 100,000

population, but the difference was not statistically significant¹¹.

The 2015 Global Burden of Disease study reported that in terms of years of life lost, asthma ranked 37th¹⁷. The burden of asthma, measured by both disability and premature death, is greatest in children

approaching adolescence (ages 10-14) and the elderly (ages 75-79)¹. The Global Asthma report estimated that asthma was the 14th most important disorder in terms of global years lived with disability. However, for people in older age groups, premature death due to asthma contributes more to the burden of disease¹.

Figure 6.4. Age-sex standardised hospitalisation rates for asthma per 100,000 population for selected OECD countries, 2013 (or nearest year)



Source: National Healthcare Quality Reporting System Annual Report 2017, Figure 23.¹¹

Note on international comparability: Differences in coding practices among countries and the definition of admissions may affect the comparability of data. Differences in disease classification systems, for example between ICD-9-CM and ICD-10-AM/ACHI may also affect data comparability. 95% confidence intervals represented by I-I.

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