



Lung Disease in Ireland - Prevalence and Trends: Implications for work force planning

General overview

Workforce planning by its nature cannot be an exact process and the information provided in this document is an estimate as of November 2013.

Respiratory medicine is concerned with the management of 30 respiratory and related conditions. At present lung disease causes one in five deaths in Ireland and is the third most common reason for emergency hospital admission. Ireland's high prevalence, mortality and hospital admission rates for respiratory disease coupled with the fact that Ireland has the lowest number of adult respiratory physicians in Europe after Macedonia at 1.3 per 100,000 while the mean for Europe is 4.4 per 100,000³ means that an increase in manpower for the specialty is vital.

Irish Population and Population Growth

Based on the last census in 2011 the population of Ireland is now 4.58 million - an increase of 8.1% since the 2006 census, or 2% per annum. This is the highest rate of increase since records began and has taken place in spite of economic recession. The average age of the population is increasing with the population aged 65 and over growing by 14.4%, while the number of pre-school children also increased by 17.9%.¹

The population of Ireland is projected to increase to between 5 million and 6.7 million by 2046.² The older population (those aged over 65 years) is projected to increase significantly from the current 2011 level of 532,000 to between just under 1.4 million and 1.45 million by 2046. Those aged 80 years of age and over is set to rise even more dramatically, increasing from 128,000 in 2011 to between 484,000 and 470,000 in 2046.

Mortality rates are also expected to decrease which will result in increased life expectancy at birth from: 77.9 years in 2010 to 85.1 years in 2046 for males and from 82.7 years in 2010 to 88.5 years in 2046 for females.² As respiratory disease is more common in an ageing population these data indicate that respiratory disease burden will increase over 2 fold in the next 30 years.

Another significant issue for Ireland is population distribution. In general trainee and consultant posts cluster in metropolitan areas which have resulted in potential inequality of medical care provision across the country. The proposed figures for trainees and consultants must be taken in the context of distributing consultant posts according to population need.

International Trends

By 2030, the WHO estimates that the four major potentially fatal respiratory diseases (pneumonia, tuberculosis, lung cancer and COPD) will account for about one in five deaths worldwide, compared to one-sixth of all deaths globally in 2008. There are also upward trends in the prevalence of asthma, interstitial lung disease and sleep disorders. Respiratory diseases are therefore likely to remain a major burden on European societies for decades to come.³ Both the prevention and treatment of lung diseases will need to be improved if their impact on longevity and quality of life of individuals, and their economic burden on society, are to be reduced in Europe and worldwide.

Ireland and the EU

In Ireland there were 3,438, deaths from diseases of the respiratory system in 2011 of which 1,625 were males and 1,813 were females. Diseases of the respiratory system accounted for 12.1% of all deaths (0.75 per 1,000 of population), affecting, in particular the older age-groups, with 79.3% of these occurring in persons aged 75 and over. These were largely made up of 1,504 deaths from chronic lower respiratory diseases and 1,062 deaths due to pneumonia (which often accompanies COPD), which combined accounted for 75% of respiratory deaths.⁴ Although age standardised death rates have decreased over the last decade, death rates are still high by comparison with other European countries. Deaths due to chronic lower respiratory disease are likely to be underrepresented due to the fact that patients with COPD often die from cardiac rather than respiratory failure. It is also important to note that respiratory deaths nationally and internationally exclude lung cancer.

The recently published European Respiratory Society White Book provides data on respiratory health and disease in Europe and allows us to compare prevalence and manpower in Ireland with our European neighbours. The White Book indicates the following data for lung disease in Ireland:⁵

- The mortality rate for respiratory disease in Ireland is 113.6 / 100,000 – EU 28 average is 85.2.
- Hospital admission rates in Ireland are high at 928 per 100,000 (EU 28 average is 965)
- Asthma prevalence in adults between 18 and 44 years of age is 9.41% (Top ten in Europe)
- Mortality rate for COPD – 27.87 / 100,000 (only Hungary and Denmark are higher)
- Hospital admission rates for COPD are 264 /100,000 – European average is 200.
- Ireland has the highest cystic fibrosis mortality rate at 26/100,000 (next Belgium at 11)
- Incidence of lung cancer is 46 per 100,000
- Ireland has the highest hospital admission rate for acute lower respiratory infections at 227/ 100,000, after Malta at 140 per 100,000 and the UK at 108 per 100,000

- Ireland has the second highest death rate for pneumonia deaths in Western Europe (33/100,000)
- Mortality rate for ILD is highest in Europe at 5.49 / 100,000 – EU 28 average is 1.7 /100,000

Specific Respiratory Diseases and Workload:

Chronic Obstructive Pulmonary Disease (COPD)

The National Respiratory (COPD) Framework (2008)⁶ estimates (based on international studies) that at least 440,000 people in Ireland have COPD, of whom over 180,000 have moderate or severe disease with only half likely to be diagnosed. It is estimated that 10% of people over 50 years of age have COPD rising to 50% of those over 70. The Institute of Public Health (IPH) projects that by 2020 there is likely to be a 23% increase in the number of adults with clinically diagnosed chronic airflow obstruction with one third of this increase due to an increase in the size of the population and two thirds due to population ageing (including the increases in risk factor levels associated with ageing) ⁷.

A ten year study of trends in COPD mortality and in-patient admissions found that there has been a convergence in COPD deaths and COPD hospital in-patient discharges for men and women that mirrors the trend in the convergence of male and female smoking rates. This study highlights the substantial burden of COPD on acute hospital services in Ireland with lengthy hospital stays and repeat admissions being common. It concludes that given our ageing population and the greater number of older women than men in Ireland, we need to prepare for the growing burden of COPD on our health services by ensuring that adequate resources and best evidence based practice is used to care for patients.⁸

COPD care spans both chronic disease management with pulmonary rehabilitation to acute care with newly developed COPD outreach programme. The latter programmes have reduced length of hospital stay but require close involvement by the respiratory consultant during acute exacerbations managed at home. This increased workload taken with the increasing prevalence of COPD will place increasing demands on respiratory physicians over the next ten years.

Asthma

Ireland has the fourth highest prevalence of asthma in the world. Estimates of disease prevalence vary from 7-15% of the population. Respiratory physicians are closely involved in the management of severe disease (15% of asthmatics or 70-100,000 cases). More than one person dies per week from asthma and 14 percent of asthmatics attend emergency services each year resulting with 4753 admissions. International studies demonstrate that asthma and associated allergic disease is increasing (over 100% increase in a decade).⁹



As these trends are likely to continue asthma represents a major challenge for respiratory physicians into the future.

In a meta-analysis of seven prospective studies that included 333,000 subjects, obesity increased the risk of developing asthma in both men and women by 50%.¹⁰

Lung cancer and Interventional Respiratory Medicine

Lung cancer is the most common cause of cancer death in both sexes and accounted for 20% of all deaths (n=1693) in 2010. Lung cancer incidence and mortality in Irish women is amongst the highest in Europe. Incidence rates are 55% higher than the EU average - 4th highest in Europe while Irish female mortality rates were 6th highest overall, 34% higher than the EU average.

Trends in lung cancer show very different patterns between males and females. Although incidence and mortality rates in males have been higher than in females throughout 1994 to 2010, this difference has declined over time. While both incidence and mortality rates in males have declined significantly since 1994, lung cancer incidence in females has increased substantially, with a statistically significant APC of 2.2% (compared to 0.7% in males). Female lung cancer mortality rates have also increased significantly by 0.5% annually. In contrast, male mortality rates have fallen significantly by 1.9% per year. Lung cancer is now the main cause of cancer deaths in women (as in men) outnumbering breast cancer deaths by 6%.¹¹

Management of lung cancer is complex and requires a multidisciplinary approach. The national cancer care programme with rapid access to lung cancer specialists has driven improved diagnostic pathways and outcomes. This programme has resulted in a significant increase in OPD referrals, and the development of interventional care pathways.

With expanding interventional services respiratory medicine consultants have taken a large volume of work from other specialities. These include sampling of mediastinal lymph nodes, formally performed by cardiothoracic surgeons, and pleural ultrasound guided procedures, previously performed by radiologist. While these services have improved the efficiency of diagnosis, they represent a major increase in interventional work

Sleep

Obstructive Sleep Apnea (OSA) is estimated to affect approximately one in five adults (approximately 100,000 adults in Ireland). One in 15 adults has moderate or severe obstructive sleep apnoea. The prevalence in children is 3%. Prevalence figures have been increasing over the past decade in adults and children, at least partly due to the growing prevalence of obesity. OSA results in long-term healthcare costs in addition to adverse consequences for employment and productivity.

OSA is a major independent contributor to cardiovascular and metabolic co-morbidities, and is also recognised to greatly increase the risk of motor vehicle accidents and injury, both of which have substantial implications for the health services.

Only 25% of OSA cases have been identified but as 75% are symptomatic and disease awareness has increased, it is expected that rates of OSA diagnosis will increase by 2-3 fold. UK estimates suggest that a population of 500,000 will generate 500 referrals and 200 new prescriptions for CPAP per year. This implies that Ireland should have 8 dedicated respiratory sleep specialists or 16 specialists with a specialist interest in sleep. At present there are 2 dedicated sleep specialists (one public and one private), and 5 with a particular interest in sleep medicine.¹² There is no dedicated specialist in Paediatric Sleep Medicine.

Interstitial Lung Disease (ILD)

Ireland has the second highest prevalence of sarcoidosis in the world and recent data suggest idiopathic pulmonary fibrosis (IPF) occurs at a higher frequency in those of British and Irish heritage. The diagnosis and management of these conditions requires specialist investigation and a multi-disciplinary approach. The only treatments for IPF are pirfenidone, a drug that requires close monitoring for toxicity, and lung transplantation. Mortality rates for IPF in Ireland are higher than the EU average.

Pulmonary Hypertension

Pulmonary hypertension is an orphan lung disease that is generally managed by specialist respiratory consultants. International guidelines recommend that the disease is managed in expert centres given the complexity of disease management. In England there are six designated centres each with a minimum of two full time consultants and Scotland with a population similar to Ireland has two full time consultants. A hub and spoke approach to facilitating ease of access for patients who are remote is frequently advocated.

Tuberculosis

Tuberculosis remains a major infection in Ireland. While numbers have decreased over the last decade, the rates remain at 10-12 per 100,000 per year. The complexity of care has increased due to the increasing prevalence of drug resistant organisms, including multidrug resistance. Over 40% of cases occur in non-Irish born persons, creating a challenge in communication and follow up.¹³ These data have necessitated a development of regional TB clinics. Management in specialised clinics improves compliance and outcome but also generates a significant workload.

Acute Respiratory Care

Respiratory disease accounts for 21 per cent of all hospital admissions in Ireland. Respiratory medicine is considered a core specialty in acute and internal medicine. Respiratory consultants provide care to acute respiratory disease through inpatient care and consultative services. Respiratory is also the most frequently consulted service in acute hospitals.

Specialised intervention includes the provision of non-invasive ventilation (which has been shown to improve outcome, reduce mortality, and decrease length of stay) as well as a pleural ultrasound service.

As above, respiratory physicians also provide a COPD outreach service to assist early discharge for patients with COPD. In addition many respiratory physicians spend up to 50% or more of their time dealing with non-respiratory patients especially in the smaller hospitals and are making an increasing contribution to oncall/acute take in most hospitals. Therefore the acute workload for respiratory consultants is significant and likely to increase in future years, given disease and population trends.

The Acute Medicine Programme has been recognised as improved the quality of care in patients presenting with acute medical conditions as well as reduce length of stay. Further expansion of these programmes is envisioned. Respiratory medicine is a core acute medical specialty relating to acute medical care pathways and based on AMP proposals suggesting the need for additional consultants in this area (50-100), it is expected that many of these posts will be dual appointments between the acute medical units and respiratory medicine.

Many respiratory physicians also play a large role in ICU especially dealing with patients on ventilators with pneumonia and ARDs.

Domiciliary non-invasive ventilation

Domiciliary non-invasive ventilation has evolved as a major respiratory service over the last decade. In recent study in Galway-Roscommon demonstrated that 270 patients were started on this treatment over the last decade with 170 still alive on treatment. About 35 patients are initiated on this therapy per year in Galway-Roscommon. Extrapolating these data nationally we can estimate over 2250 patients on this treatment with 500 started each year. This home-base care requires regular follow up and specialist input.

Cystic Fibrosis

Ireland has the highest prevalence of CF in the world with 50 new cases diagnosed each year. The introduction of the newborn screening programme ensures earlier diagnosis. Around 55% of the CF patient population in Ireland is aged 18 or older.

The predicted median age of survival for a person with CF is in the early and mid-30's in Ireland. CF is and will continue to be a major respiratory illness in future years.¹⁴

Risk Factors

Smoking

The 2007 SLÁN Report showed that 29% (31% men, 27% women) of Irish adults reported being current smokers i.e. daily and occasional smokers. 24% of adults reported smoking on a daily basis and 48% reported having smoked at some point in their lives.¹⁵ Although this shows a slight reduction from SLÁN 1998 when 33% reported being current smokers smoking levels are still high and the health impacts of previously high rates are now being seen in the health system.

Obesity

The 2007 SLÁN Report also found that 36% of respondents reported themselves as being overweight and 14% reported being obese, according to the body mass index (BMI). Men were more likely to report being overweight (43%) or obese (16%) than women (28% overweight and 13% obese). The Growing Up in Ireland Survey found that one quarter of Irish nine year olds are either overweight or obese.¹⁶ This has direct implications for respiratory health, in particular increased asthma and OSA rates.

Lack of Awareness and Underdiagnosis

Research carried out by the Irish Lung Health Alliance in 2012 found that one in seven Irish people has a previously undiagnosed lung condition. The study concluded that undiagnosed respiratory disease is common, particularly airflow obstruction, and demographic and socioeconomic factors influence lung health in Ireland. This high level of undiagnosed respiratory disease also points to another risk factor – low awareness levels amongst the general population of the causes and symptoms of lung disease.

Present Workforce 2013

Ireland has the lowest number of respiratory consultants in Europe after Macedonia at 1.3 per 100,000 population while the mean for Europe is 4.4. Ireland also has the lowest number of respiratory consultants as a percentage of total physicians in Europe (0.41).¹⁷ Although international recommendations suggest a ratio of 1 respiratory consultant to 35,000 persons, in Ireland there is 1 consultant to every 80,000 people. At present there are 54 public appointed respiratory consultants and approximately 6 respiratory WTE in private practice. The age distribution of consultants shows that 35 percent are 50 years or older and 35 percent are aged under 45 years of age.



Workforce Projections

While all workforce planning is an estimate and inherently cannot be fully accurate, we have arrived at the figures based on the review of available data from Ireland, and where not available extrapolated from European data.

1. Ireland has 60 respiratory consultant WTEs involved in Private and Public practice, representing 1 physician per 80,000 persons. International guidelines suggest a figure of 1 physician per 35,000 persons. This latter ratio reflects disease prevalence in 2013 and before. It is clear that respiratory disease will increase significantly (approximately 20%) in future due to population growth and aging.
2. Thus the ratio of consultant to population may decrease in future years. **At present we should have at least 130 respiratory consultants in Ireland or 70 additional consultant posts. Based on population growth alone Ireland should have 200 respiratory consultants by 2046. This may reach 230 based on disease prevalence and evolving specialist respiratory care.**
3. As respiratory medicine is a core acute medical specialty relating to acute medical care pathways and based on AMP proposals suggest the need for additional consultants in this area (50-100) it is expected that **1-2 post per year** will dual trained in acute internal medicine and respiratory medicine.
4. The present age profile of respiratory consultants suggests that 10 posts will be vacated every 10 years. **Thus a minimum of 10 replacement posts are needed every decade.**
5. Trainee retention is difficult to predict with recent career tracking studies suggesting a high proportion of trainees will opt to work outside Ireland. We estimate that 25% of respiratory trainees will not return to Ireland. **Therefore we would expect to train 12.5 trainees in order to ensure 10 trainees in the Irish workforce. This equates to 1 – 2 additional trainees per year.**

Projection: 80-90 consultant posts in ten years which will require training of 100-110 trainees or 11 per year.

References

1. Central Statistics Office, Census 2011. www.cso.ie/en/census2011
2. Central Statistics Office, Population and Labour Force Projections 2016 - 2046, April 2013. www.cso.ie/en/releasesandpublications/
3. <http://www.erswhitebook.org/chapters/the-burden-of-lung-disease/>
4. Central Statistics Office, Report on Vital Statistics 2011 www.cso.ie
5. <http://www.erswhitebook.org/chapters/#pagesPARTCMajorRespiratoryDiseases>
6. www.irishthoracicsociety.com/images/uploads/file/Draft_RespFramework_Oct_000.pdf
7. Institute of Public Health, Chronic Disease Briefings, 2010 & 2011 www.chronicconditionshub.info
8. O'Farrell A, De La Harpe D, Johnson H, Bennett K. Trends in COPD mortality and in-patient admissions in men and women: evidence of convergence. Ir Med J 2011 Sep; 104 (8): 245-8.
9. <http://www.asthma.ie/get-help/resources/facts-figures-asthma>
10. Beuther DA, Sutherland ER. Department of Medicine, National Jewish Medical and Research Center, 1400 Jackson Street, J220, Denver, CO 80206, USA. *Am J Respir Crit Care Med.* 2007 Apr 1;175(7):661-6. Epub 2007 Jan 18. <http://www.ncbi.nlm.nih.gov/pubmed/17234901>
11. Cancer in Ireland 2013: Annual report of the National Cancer Registry. National Cancer RegistryIreland. www.ncri.ie/pubs/pubfiles/AnnualReport2011.
12. Sleep Apnoea Programme Proposal – August 2013
13. Health Protection Surveillance Centre - www.hpsc.ie
14. www.cfireland.ie
15. Surveys of Lifestyle, Attitudes and Nutrition in Ireland (SLÁN). Department of Health and Children, 2007.
16. Growing Up in Ireland National Longitudinal Study 2011 – www.growingup.ie
17. <http://www.erswhitebook.org/chapters/medical-respiratory-specialists/>