Faculty of Public Health Medicine

Position Paper

Chronic Obstructive Pulmonary Disease (COPD)
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Chronic obstructive pulmonary disease

1. Introduction

Chronic Obstructive Pulmonary Disease (COPD) is defined as “a common preventable and treatable disease, which is characterised by persistent airflow limitation that is usually progressive and associated with an enhanced chronic inflammatory response in the airways and the lung to noxious particles or gases. Exacerbations and co-morbidities contribute to the overall severity in individual patients” (1).

Currently there is no cure. Globally it is a major cause of morbidity and mortality. By 2020 it will be the 3rd leading cause of death globally (2). There is both widespread under-recognition and under-diagnosis of COPD (3,4). Within both WHO Europe and the EU, Ireland has one of the highest standardised death rates for COPD (5). Ireland also has one of the highest rates in the OECD of hospital admissions for exacerbations of COPD (6). It is a heterogeneous disease, with multiple etiological factors, clinical phenotypes and co-morbidities (7). It is caused by many factors that trigger and maintain inflammation. While COPD can affect those who have never smoked, smoking is the trigger in the majority of cases. It disproportionately affects people from lower socio-economic groups and is associated with significant morbidity, mortality and costs.

2. COPD prevalence

COPD is the most prevalent adult respiratory disease in Ireland. The global, population-based Burden Of Lung Disease (BOLD) studies report a prevalence of moderate to severe COPD in Europe of 10% (i.e. excludes mild disease) with all studies showing an increase with age. In those aged over 70 years, the prevalence can be 20% in men and 15% in women (8). However, prevalence varies considerably between European countries (5) with studies from some European countries recording prevalence as high as 26% in those aged 40 years and above (9). COPD prevalence in Ireland has never been measured at a national level, but given the mortality and relatively high rate of hospitalisations for COPD in Ireland, Irish prevalence figures may well be as high as this 26%. Many with

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* See here for a list of the WHO European region countries
http://www.who.int/about/regions/euro/en/
COPD are undiagnosed, especially those with mild disease. Diagnosed at a late stage, COPD health interventions are both less effective and more costly.

The population aged 35 years and above in Ireland could increase by a factor of 51%-94% by 2036 (11). Without concerted sustained action, this ageing Irish population together with current and historical smoking prevalence and impact of other risk factors means that the health burden of COPD in Ireland will continue to increase and be a significant burden to people, health services and society for the foreseeable future.

3. COPD Burden of Disease

COPD has considerable impact on the quality of life of the patient, involving long term medical care, frequent hospital admissions for many and often resulting in premature death. As with many chronic conditions, COPD not only affects the patient, but also has significant impact on the carer and family as well as the health services and wider society. In the Global Burden of Disease (GBD) Study 2010 COPD ranked 3rd among leading causes of death, 5th for years lived with disability (YLD) and 9th for disability-adjusted life years (DALYs) (10). In the same study, COPD was the 4th highest cause of DALYs in Ireland.

Morbidity burden

The majority of those with COPD are managed in primary care. Data on the number of COPD consultations in primary care is not available. However, 14.5% of all GP consultations are for respiratory disease (11). In Ireland in 2012, for those people availing of any of the drug schemes (GMS, LTI, DPS) over 400,000 people aged 35 years and over were prescribed drugs consistent with a diagnosis of COPD.

Data for admissions to acute public hospitals are proxy measures of disease burden especially for those at the more severe end of the COPD spectrum. Compared with the WHO European region where the average annual age-standardised acute hospital admission rate for COPD was 200/100,000, Ireland’s rate was 263.5 (5). For 2011, the OECD rate of hospitalisations for exacerbations of COPD was 198/100,000 but Ireland had the highest rate at 364/100,000 (6).

In 2012, there were 14,896 inpatient hospitalisations with a primary diagnosis of COPD accounting for 3.1% of all inpatient discharges. In the same year, there were 32,482

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b General Medical Scheme, Long Term Illness Scheme, Drugs Payment Scheme
inpatient hospitalisations where COPD was recorded as a primary or secondary diagnosis implying that COPD was a factor in 6.8% of all inpatient discharges. In a recent Irish study 41% of people hospitalised with COPD were re-admitted to the same acute hospital within 90 days of discharge (12).

Mortality burden

The Global Burden of Disease (GBD) Study reported COPD as the 3rd leading cause of death globally in 2010 (10). The age standardised (European Standard Population) death rate for COPD, as reported in 2011, was 27.87 per 100,000 for Ireland compared with 18 per 100,000 for the WHO European region. Only three countries (Denmark, Moldova, and Hungary) had rates higher than Ireland (5).

Respiratory disease inclusive of cancer of the lung accounted for 18.5% of deaths in Ireland in 2012 (13) and respiratory disease, with or without lung cancer, is the 3rd commonest cause of death in Ireland. In 2012 there were 3,473 deaths registered as respiratory disease (excludes lung cancer). Chronic lower respiratory deaths (n=1,496) and deaths due to pneumonia (n=1,115) accounted for 75% of these. Deaths registered as chronic lower respiratory disease are under-estimates, as people with COPD often succumb to COPD’s co-morbidities especially pneumonia or cardio-vascular morbidities. While the size of this under-estimation is unknown in Ireland, the literature suggests that for over 60% of people with COPD, when they die, a co-morbidity rather than COPD may be listed as the primary cause of death (14,15). Under-recognition, under-diagnosis and under registration of COPD affects the accuracy of mortality data.

In Ireland almost 70% of excess winter mortality from respiratory disease arises in the poorest three socio-economic groups (16). In an Irish study of inequalities in mortality (1989-1998), the difference between the lowest occupational class and the highest occupational class in terms of death from respiratory disease was greater than 200% (17). For the period 2007-2012, the age standardised mortality from COPD is much higher, of the order of 303%, in the lower social classes compared to the upper classes for males aged 15 years and over. For the younger age group, 15-64 years, the difference is even greater at 366% (18).
Burden on health services plus wider economic and social burden

The impact of COPD on healthcare facilities is profound, but it also has wider social and economic effects. For the individual patient, COPD is associated with a significant economic burden in terms of both direct medical costs and indirect costs including care provided by family members.

In Ireland in 2012, for those prescribed medication consistent with a diagnosis of COPD, the drug cost to the State under the drug schemes was almost €650 million. These costs did not include additional drugs such as antibiotics, nor long term oxygen therapy (LTOT), supply of nebulisers or vaccines, nor did it include GP costs or costs of care in the community.

In 2011, for inpatient admissions with a primary diagnosis of COPD, 110,242 bed days were used (BDU). In addition there were 3,629 day cases. For in-patients with both a primary and secondary diagnosis of COPD 29,072 bed days were used. Of the Irish Health sector budget in 2011 €3.023 billion was spent on admissions in the acute hospital sector. Admissions with a primary diagnosis of COPD accounted for 3% of this budget (€91,186,895 or 4.26% of inpatient, 0.87% of day case budget). Admissions with a primary or secondary diagnosis of COPD accounted for 8.2% of the budget (€248,175,318 or 12.12% of inpatient, 1.51% of day case budget)(19).

In addition to hospitalisation is the cost of those attending hospital outpatient departments. In 2013 this was approximately €9,575,670 for adults with respiratory problems. There is also the number and cost of those who attend but are not admitted from the emergency department at €268 per attendance (20).

The estimated annual economic burden of COPD in the EU in 2011 was €141.4 billion (direct healthcare costs €23.3 billion, indirect costs €25.1 billion, monetarised value of DALYs lost €93.0 billion) (5). As this excluded the undiagnosed, those with mild disease and those with COPD co-morbidities, it is an under-estimate of the true cost. The figures for Ireland are likely to be at least in line with this or higher, given our probable high prevalence and relatively high hospitalisation rates compared with European counterparts.

In summary, COPD places a huge burden on individuals, families and society in terms of disability and premature mortality, in direct health service costs and the indirect costs related to disability, premature death and lost production.
4. COPD Contributing Factors

Risk factor identification is important both for prevention and treatment of COPD. All risks for COPD result from host-environment interaction (Table 1). Many factors contribute to COPD susceptibility, progression and exacerbations. Exacerbations of COPD are triggered by factors including infection (bacterial and/or viral) and environmental pollutants.

Patients with COPD often have other disease co-morbidities which can have a major impact on quality of life and survival (21). These co-morbidities may be common pathway co-morbidities, complicating co-morbidities, co-incidental co-morbidities or inter-current co-morbidities. They may be due to common risk factors (e.g., tobacco smoking), ageing, genetic susceptibility and as yet undetermined factors. They may represent extra-pulmonary manifestations or complications of COPD, such as muscle dysfunction due to inactivity. Co-morbidities occur with mild, moderate or severe COPD.

Tobacco smoking is the most important risk factor for COPD. Other factors as shown in Table 1 include age - COPD prevalence, morbidity and mortality increase with age as does the role of co-morbidities - environmental pollution, occupational dust exposure, early childhood lung infections and genetic factors (22).

Table 1 Risk Factors for COPD (1,23,24,25)

<table>
<thead>
<tr>
<th>Host Factors</th>
<th>Environmental Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Genes (C)</td>
<td>Inhalational particles</td>
</tr>
<tr>
<td>Gender (A)</td>
<td>Outdoor air pollution (C if heavy)</td>
</tr>
<tr>
<td>Age (A)</td>
<td>Indoor air pollution (C if heavy)</td>
</tr>
<tr>
<td>Growth and development of the lung (A)</td>
<td>Occupational exposures (C if heavy)</td>
</tr>
<tr>
<td>Oxidative stress</td>
<td>Tobacco smoke (C)</td>
</tr>
<tr>
<td>Respiratory airway hypersensitivity (A)</td>
<td>Social and economic level (A)</td>
</tr>
<tr>
<td>Co-morbidities (A)</td>
<td>Respiratory Infections (A)</td>
</tr>
</tbody>
</table>

(A) additive, (C) causal. Adapted from (23)

Social and economic factors are proxies for nutritional status, crowding, exposure to pollutants including work exposures and smoking exposure, access to health care and early respiratory infections)
Smoking

Smoking is a factor in 85% of those with COPD. The prevalence of COPD is directly related to the prevalence of cigarette smoking but not all people with the same smoking history will develop COPD. Although up to 50% of lifelong smokers develop COPD (26,27,28), genetic and other factors modify an individual’s risk from smoking (29). The proportion of the risk of COPD attributable to smoking is estimated at 40-60%, depending on how many risk factors are taken into account. Although never-smokers are less likely to have COPD, never-smokers comprise about one-quarter of those classified with moderate-severe COPD (5). Individuals highly exposed to passive smoking (more than 40 hours per week for over 5 years) are 48% more likely to present with COPD than are unexposed individuals (30,31).

The figures from the Irish National Tobacco Control Office in December 2012 reported a smoking rate of 21.7% (22.6% of men, 20.9% of women) (31). Smoking rates were highest among young adults (18-34 years), reaching 29.4% in the 25-34 year old age group. The highest cigarette smoking prevalence rates were in the lower income groups - 25.5% of those in C2 and 26% of those in D and E categories. The rate amongst those in C1 was 18.7%. The lowest smoking rates (16.1% and 14%) were among farmers (F) and higher socio-economic groups (AB). Given that the adverse effects of cigarettes in terms of COPD can have a lag period of 15-20 years, these rates have significant health implications for the medium and long term.

Social and economic factors

COPD is inversely associated with socio-economic status. The association between COPD and socio-economic factors relates not just to an individual’s lifestyle and genetic determinants but also to socio-economic public policies such as housing standards, air pollution, nutrition and service provision. The effects are reflected in risk factors for COPD - the smoking rate in Ireland among those in more deprived social groups as

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C: skilled manual workers and those manual workers with responsibility for other people) D Semi skilled and unskilled manual workers, E Those entirely dependent on the state long-term plus those unemployed for period exceeding 6 months)
reported above is high compared with the national rate. Among homeless men in Dublin the smoking prevalence was 78% (33). These social and economic gradients are reflected not just in the prevalence of smoking but also in the prevalence of COPD and the outcome for those with COPD in terms of morbidity and mortality.

Other contributing factors

A serious, but often unrecognised, risk factor for COPD is lack of awareness among health professionals and the public. Lack of awareness is a risk factor in terms of delayed diagnosis and delayed effective intervention to slow disease progress. This is in keeping with the very high rate of admissions for acute exacerbations.

Polymorphisms of many genes or combinations of genes may increase the risk of an individual developing COPD. The best documented genetic risk factor for COPD is α1-antitrypsin deficiency (AAT). The incidence of severe (ZZ homozygotes) AAT deficiency in the Irish population is estimated to be 1/2,100 (34).

Early life environmental factors such as mothers who smoke, frequent respiratory infections and asthma in childhood, and bronchial hyper-reactivity are increasingly recognised as important risk factors for COPD. The proportion of the risk of COPD attributable to these early childhood events may be as great as that attributable to smoking. There is an overlap of up to 30% between people with a diagnosis of COPD and asthma (35,36).

The World Health Organisation (WHO) estimates that urban air pollution causes 1% of COPD cases in high-income countries such as Ireland (2). It also plays a role in exacerbations of COPD. In Dublin, in the year following the banning of bituminous coal there were approximately 116 fewer respiratory deaths (37). The relevance of short-term, high peak exposures compared with long-term, low-level exposures is not yet known.

Occupational dust, chemicals and vapours can both cause and increase the risk of COPD independently of cigarette smoking but also increase the risk of the disease in the presence of those exposed to smoke (5). Among adults aged 30-75 years the fraction of COPD attributable to work is estimated at 19.2% overall. In never-smokers, the fraction of COPD attributable to occupational exposure is estimated to be 30% (38).

In summary while current understanding of risk factors for COPD is incomplete, it is sufficient for action.
5. Clinical Management

The clinical effects of COPD show considerable inter-individual variation, depending on which respiratory symptoms predominate, the frequency of exacerbations, the level and rate of lung function decline as well as co-morbidities.

Co-morbidities contribute to the overall severity and manifestations of the disease. They increase the risks of hospitalisation and mortality of COPD independently of the COPD itself. The most common co-morbidities in COPD are pneumonia, cardiovascular disease, anxiety, depression, osteoporosis, skeletal muscle dysfunction, lung cancer and diabetes.

The Irish National COPD Guideline is based on the GOLD guidelines (1,39). These are based on symptoms, lung function impairment and frequency of exacerbations. Exacerbations, which are a sudden, acute onset of COPD symptoms above the patient’s usual condition, accelerate the decline in lung function resulting in reduced physical activity, poorer quality of life, and an increased risk of death. They are also responsible for a large proportion of the healthcare costs attributable to COPD.

The aim is to prevent COPD in the first instance. The goals of management for those with the disease, are accurate diagnosis based on spirometry, relief of symptoms, prevention or slowing of disease progression, increased exercise tolerance, improvement in health status, prevention and treatment of complications and exacerbations, reduction of mortality and preventing or minimising side-effects from treatment.

The impact of COPD on health, health services and society can be reduced by the implementation of best practice guidelines. Effective management of people with COPD using an integrated approach will slow disease progression, optimise quality and quantity of life and provide care in the most appropriate setting.

6. The Way Forward

The World Health Organisation’s (WHO) recommended approach to chronic diseases such as COPD is an integrated strategy which promotes population level health promotion and risk reduction tailored with targeted disease management programmes specific to the needs of people with the disease (40, 41). In terms of COPD this means disease prevention and risk reduction, patient education and appropriate supported self-
management, early accurate diagnosis, effective multi-disciplinary interventions - pharmaceutical and non pharmaceutical - focused on the primary care setting and supported by specialist respiratory expertise to maintain patients at the appropriate level of care. At a national policy level it includes the factors which impact on respiratory health such as deprivation, housing, air quality and access to health services.

To prevent COPD, slow its progression in those affected, and at a population level tilt the burden to the milder end of the disease spectrum, health promotion and prevention must range from policy level to the individual level and from primary prevention, through secondary prevention to tertiary prevention. The association between COPD and socio-economic factors relates not just to an individual’s lifestyle such as smoking but also to socio-economic policies including housing, air quality, and access to health services at all stages of life.

Smoking cessation is the single most effective intervention in COPD. Coherent implemented smoking cessation interventions, appropriate to the heterogeneous nature of smokers, are vital for the primary prevention of COPD, the secondary prevention of slowing COPD progression and tertiary prevention to maximise quality of life.

To help address the burden of COPD in Ireland there needs to be greater awareness of the disease - among the public, media, high risk groups, health care professionals - of its impact, its signs and symptoms and the potential to improve quality of life for those affected. Diagnosis of COPD requires in the first instance awareness of the disease amongst the public, those at higher risk and health care professionals. Secondly it requires accessible quality diagnostic services based on spirometry.

Currently, for many patients with COPD in Ireland, care can be fragmented across setting and disciplines. The National Clinical COPD programme is working towards the implementation of an improved national model of care focused on evidence-based care.

In the absence of a national integrated structured approach to COPD the adverse impact of COPD will continue in Ireland. In the coming decades, it is likely that COPD will increase due to the delayed impact of smoking, in particular among the more disadvantaged groups, the ongoing uptake of cigarette smoking, increasing population, changing age distribution, increasing life expectancy together with other factors such the delayed health impact on the foetus and child exposed to smoke (42-45). With awareness, early diagnosis and appropriate interventions the population curve can be tilted from the severe end of the disease spectrum to the mild/moderate.
Compared with the other major killers in Ireland COPD is not currently prioritised to the equivalent extent yet it exerts a large negative impact on people’s lives, on health services and on society.

7. RCPI Faculty of Public Health Medicine opinion

The vision must be to reduce the burden of COPD in Ireland. COPD is preventable. Its progress can be slowed. The quality and quantity of life can be improved for those affected. Key to the planning of services is knowledge of the actual burden of disease in the population. Another key factor is awareness of this burden among the public, policy makers and the wider health care community. Other key factors are implementation of effective interventions, from population to individual level, on smoking, on socio-economic factors which adversely affect health, on environmental pollution, together with timely accessible comprehensive integrated multi-disciplinary health services in appropriate settings which empower patients and carers to actively participate in the management of their condition and enable health care workers to deliver an evidence based service. All of the above can be achieved with leadership from the Public Health Medical community in addition to the respiratory community and other relevant groups.

We, the Faculty of Public Health Medicine (FPHMI) support a national approach to COPD which takes action on risk factors both at a societal and individual level and which delivers quality integrated health care services for those with COPD. A cohesive comprehensive approach contributed to a significant improvement in both cardio-vascular and cancer quality of care including mortality and morbidity outcomes. The same can be achieved for those with COPD.

To reduce the burden of COPD the RCPI Faculty of Public Health Medicine recommends actions in the six areas outlined below.

**Recommended Actions**

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<th>Action</th>
<th>Who</th>
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<tr>
<td><strong>1. Expand knowledge base on COPD</strong></td>
<td>Department of Health</td>
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<td>• National health statistics should reflect Respiratory disease - including COPD - as the 3(^{rd}) major cause of mortality in Ireland and also its morbidity burden</td>
<td>RCPI including FPHMI</td>
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<tr>
<td>• Accurate data on COPD prevalence, risk factors, morbidity,</td>
<td>HSE</td>
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mortality and cost at national and regional levels should be collated and published at regular intervals. This should include identifying where and why Ireland differs from European/International counter-parts.

2. **Prioritise COPD at National level:**
   - Government departments, public representatives, media and the general public need greater awareness of the burden of COPD in Ireland, its primary prevention, signs and symptoms, value of early diagnosis and effectiveness of interventions to slow its progression.
   - COPD should be acknowledged and championed as a health priority with specific targets for reducing its prevalence, morbidity, mortality and cost at National level.
   - COPD – prevalence and burden - should be included as a national health marker of socio-economic inequality and should be addressed in a targeted manner
   - The impact of Public Policies - with respect to deprivation, housing, air quality, tobacco, employment regulations, timely access to affordable health services - should be monitored in terms of their effect on respiratory health, in particular COPD.
   - Respiratory health as exemplified by COPD should be a policy driver in promoting healthy respiratory environments in areas such as housing, heating standards, air quality including vehicle emissions and environmental tobacco smoke (ETS).
   - Vulnerable sub-groups of the population - including homeless, hostel dwellers, travellers, those with poor literacy/ language/ digital skills - need targeted information and programmes specific for their needs.

3. **Strengthen advocacy for COPD and empowerment of patients and carers:**
   - Patient support groups and the COPD patient community should be supported and enabled to act as advocates of their needs.

| Department of Health (DoH) & relevant Govt Depts |
| RCPI including FPHMI |
| Health Service Executive (HSE) |
| Other relevant Health Care Institutions/ groups |
| Professional Colleges/Institutions /representative bodies |
| HSE |
4. **Address smoking as a key risk factor for COPD**
   - At a national level, public health policies should protect people from the effects of tobacco smoke through the workplace ban, advertising bans, health warnings, taxation on tobacco products, smoke-free cars, plain packaging for cigarettes and other evidence based initiatives as per RCPI’s policy statement in March 2014 (46).
   - Smoking should be acknowledged and treated as an addictive chronic relapsing disorder.
   - There should be ongoing monitoring of both the implementation and impact of evidence based smoking interventions which prevent people from starting to smoke, which help them quit, which protect children from exposures, and interventions which specifically address vulnerable/disadvantaged people who smoke.
   - All patients with COPD with a history of smoking, should be encouraged to stop, stay stopped and offered help to do so, at every health care encounter.
   - Smoking cessation services including pharma support where appropriate should be provided to smokers on admission to hospital - as would be the case in treating other disease risk factors such as hypertension.
   - Additional interventions to support smoking cessation among marginalised groups should be provided.

5. **Improve secondary and tertiary prevention of COPD**
   - Early diagnosis, patient education, inhaler technique, symptom relief, appropriate vaccinations, pulmonary rehabilitation access - should be accessible for the individual patient with COPD.

6. **Deliver Evidence-Based Quality COPD care:**
   - Comprehensive integrated programmes and services based on

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<th>Patient Support Groups</th>
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<tr>
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<td>DoH and Other relevant Govt Depts</td>
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<td></td>
<td>Other relevant Health Care Institutions/ groups</td>
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<tr>
<td></td>
<td>Statutory/regulatory bodies, employers</td>
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<td>HSE</td>
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<th>patient Support Groups</th>
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best evidence should be implemented in appropriate settings to ensure a quality approach for all people with COPD in line with the National COPD Clinical Programme

- All health care staff who care for people with COPD should be enabled and able to provide best practice
- Information systems which support the evaluation of COPD care are required. Quality assurance, audit and where relevant, accreditation systems should be an integral part of care
- National performance indicators for COPD services and outcome targets for people with COPD should be specified and incorporated in relevant HSE service plans.

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