**COPD Exacerbations – A Comparison of Irish Data with European Data from the ERS COPD Audit**

**Abstract:**

The European Respiratory Society (ERS) Chronic Obstructive Pulmonary Disease Audit was established in 2010 in a cross-sectional, multicentre study collecting data about the way hospitals across Europe provide care for COPD patients, as well as clinical data and outcomes for those admitted to hospital with an exacerbation. The audit was performed in collaboration with national respiratory societies of 13 participating countries, and the aim was to develop a core data set that can be used for future audits of COPD admissions with a view to raising the standard of care across Europe. The purpose of this study is to describe the data recorded in Ireland, to compare it to the wider dataset from across Europe, and to determine factors in the Irish patients that predicted length of stay, readmission and death within the 90 day follow-up period.

**Methods**

Demographic and clinical data were recorded for patients with a diagnosis of COPD exacerbation admitted to 11 Irish hospitals between 1st January and 28th February 2011. Informed, written consent was obtained from all patients prior to inclusion. On admission, age, gender, smoking status and history (pack/years), body mass index (BMI), baseline FEV1 and FVC, use of high-flow oxygen before admission, arterial blood gas values and chest radiographic abnormalities were recorded, alongside patient-specific criteria (e.g., time of admission, including symptoms, treatment before admission, arterial blood gas values and chest radiographic abnormalities). After discharge, treatment administered during the hospital stay and oxygen and ventilatory requirements during admission were documented. Details were gathered on the length of stay and whether the patient was discharged or died during the admission. At the 90-day follow up time point, readmissions (COPD related or not), and death were recorded. Data were entered into an online database, and each participating clinician had an individual, secure login. An individual participant number was assigned to each patient to ensure anonymity.

The authors analysed the Irish dataset to describe the outcomes in the Irish patients compared with those reported in the European group. Pearson and Spearman correlations were performed on the Irish dataset to determine if demographic and admission-specific criteria predicted length of stay, readmission, or death. Statistical analysis was performed using GraphPad Instat version 3.05 (GraphPad Software, San Diego, Ca).

**Results**

During the recruitment period, 237 Irish patients with exacerbations of COPD were admitted to 11 Irish hospitals (Table 1). There were 171 (72%) males and 66 (28%) females. The median age was 71 years. 34% were current smokers and 66% ex-smokers. Median FEV1 was 41% at the time of admission. 35% of patients had been treated with high-flow oxygen before admission. 30.3% of patients had a higher likelihood of readmission or death within 90 days than the European average.

Comparison with the European data (Table 1) shows that Ireland had the second highest proportion of females, the UK having the highest. Irish patients were slightly younger and had a slightly lower BMI, although current smoking status and FTV, on admission were similar. Ireland had the second highest proportion of patients that were treated with high-flow oxygen before admission, and the second lowest proportion of patients that received the majority of their care in a respiratory ward. Ireland had the third highest percentage of patients with consolidation on CXR (the European percentage was 18.5%) and the highest percentage of patients treated with antibiotics for exacerbations across all European countries. The median length of stay was lower in Irish patients than the European average, however, a higher percentage of Irish patients were readmitted within 90 days and died within 90 days of admission. A higher proportion of patients were treated with non-invasive ventilation and a lower proportion of patients were treated with invasive ventilation in Ireland than the European average.

**Abstract:**

The European Respiratory Society COPD audit was a cross-sectional, multicentre study that analysed outcomes for COPD patients admitted to hospital with an exacerbation across Europe. We present the data on patients admitted to 11 Irish hospitals that participated in the audit. Among 237 patients (171 males, 66 females), the median age was 71 years. 34% were current smokers and 66% ex-smokers. 35% were treated with high-flow oxygen before admission and 30.3% were cared for in a dedicated respiratory ward. 54 (23%) patients required ventilatory support. Median length of stay was 7 days, 98 (41%) patients were alive and 211 (89%) patients were alive at the 90 day follow up point. Irish patients were more likely to receive high-flow oxygen before admission, less likely to be managed in a dedicated respiratory ward and had a higher likelihood of readmission or death within 90 days than the European average.

**Introduction**

Chronic Obstructive Pulmonary Disease (COPD) is characterised by progressive airflow obstruction, worsening exercise performance and health deterioration. It is associated with significant morbidity, mortality and costs, and is the third biggest cause of disability adjusted life years lost. It is associated with significant morbidity, mortality and costs, and is the third biggest cause of disability adjusted life years lost. It is also the third biggest cause of respiratory death in Ireland, accounting for 24% of all deaths from respiratory disease. COPD exacerbations cause significant morbidity, mortality and costs, and are the third biggest cause of disability adjusted life years lost. It is also the third biggest cause of respiratory death in Ireland, accounting for 24% of all deaths from respiratory disease.

In the Irish patient group, female sex, higher arterial bicarbonate and pCO2 and the need for ventilatory support were weakly but significantly correlated with longer length of hospital stay (Table 2), but age, current smoking, pack year history, FEV1, BMI, use of high-flow oxygen before admission, arterial pH and pO2 and the presence of consolidation on chest radiograph did not. Lower arterial pH, higher pCO2 and the need for ventilatory support were weakly but significantly correlated with readmission within 90 days (Table 2), but age, sex, current smoking, pack year history, FEV1, BMI, use of high-flow oxygen before admission, arterial pH and pO2 did not. A higher pCO2 on the admission arterial blood gas and the need for ventilatory support (either invasive or non-invasive) were positive predictors of all three measured indices length of stay, readmission within 90 days and death within 90 days.
Discussion

Studies of the prevalence of international COPD suggest that up to 10% of the global adult population have GOLD stage II or higher, with prevalence increasing with age. The impact of this disease on healthcare facilities is profound, with social and economic effects. In 2012, Dibonaventura et al published data showing that adjusting for confounders, employed adults with COPD reported significantly lower quality of life and work productivity, and increased health care resource utilisation. In Ireland, respiratory conditions account for one fifth of all deaths, with COPD being the third biggest cause of respiratory death. COPD admissions nationally account for more than 15% of all non-surgical admissions. GOLD stage II or higher disease, with prevalence increasing with age.

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The National COPD programme was initiated in 2010 to implement these proposed changes. At the same time, the ERS COPD audit was launched to record outcomes of patients with COPD exacerbations across Europe. Compared with European averages, patients admitted to hospital with COPD exacerbations in Ireland were of similar age, BMI, smoking status and FEV1. However, the proportion of female patients was significantly higher among Irish patients. Interestingly, Ireland had the lowest prevalence of GOLD stage II or higher disease, with prevalence increasing with age.

In 2007, the National COPD Group was created with representatives from the Health Service Executive, Irish Thoracic Society and Irish College of General Practitioners. In 2008, they released a COPD strategy document in which they outlined that pulmonary outreach, hospital in the home and assisted discharge schemes should be used as an alternative way of managing patients with an exacerbation of COPD to both prevent hospital admission and shorten length of stay. The National COPD programme was initiated in 2010 to implement these proposed changes. At the same time, the ERS COPD audit was launched to record outcomes of patients with COPD exacerbations across Europe. Compared with European averages, patients admitted to hospital with COPD exacerbations in Ireland were of similar age, BMI, smoking status and FEV1. However, the proportion of female patients was significantly higher among Irish patients. Interestingly, Ireland had the lowest prevalence of GOLD stage II or higher disease, with prevalence increasing with age.

The authors were struck by the lack of a relationship between older age, current smoking, FEV1, BMI and adverse outcomes (higher length of stay, readmission and death at 90 days). There were consistent albeit weak correlations, however, between these adverse outcomes and raised pCO2 and the requirement for ventilatory support. These data suggest that these patients should perhaps be channelled to dedicated respiratory wards / NIV units as these continue to evolve in Irish hospitals. It is anticipated that the ERS COPD audit will be repeated in future years. The dataset from the first audit will serve as a useful baseline to measure the impact of further developments in community and hospital-based programmes, which may further ease the burden on inpatient beds.

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