

Chronic Obstructive Pulmonary Disease in the North East of England

Introduction

Chronic Obstructive Pulmonary Disease (COPD) is a term used to describe a range of progressive, irreversible lung conditions, including emphysema and bronchitis, which affect up to 1.5 million adults in England¹. Symptoms can range from mild to severe respiratory disability and may result in repeated hospital admissions.

In 2009 COPD was responsible for over 21,000 deaths in England², 4.7% of the total. Figures for the North East show that COPD caused 1,540 deaths in 2009, 5.9% of all deaths. In addition to the impact of COPD on patients and their families, care for COPD has a substantial impact on NHS resources. COPD is the second most common cause of emergency admission to hospital and the fifth largest cause of readmission³, costing the NHS an estimated £491 million per year⁴. It has however been suggested, that re-designing the care pathways for people with COPD could reduce hospital admissions by 46% by 2014, saving the NHS £208million³. Smoking is the main cause of COPD. Tobacco control policies and smoking cessation services can help to prevent the occurrence and reduce the burden of COPD⁴.

This paper informs commissioners and providers about the current impact of COPD on the local population and the implications for NHS resources. The estimated and recorded prevalence of

COPD are reviewed, along with primary and secondary care treatment. The death rate from COPD and the place of death are also assessed. Recommendations from this

paper are aimed at clinicians and service commissioners, to support both early diagnosis and suitable treatment for the large number of COPD sufferers in the North East.

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Summary

- COPD is linked to smoking, occupational dust and pollution, and is particularly prevalent in the North East of England.
- It is estimated that a substantial number of patients have undiagnosed COPD (over 32,000 in the North East), particularly within localities with high smoking rates.
- Primary care treatment for patients with diagnosed COPD in the North East is good, which can help reduce unplanned hospital admissions.
- There are however, high rates of emergency admissions for COPD in some parts of the North East, which may reflect the degree of under-diagnosis.
- COPD mortality rates in the North East are higher than in England, and the inequality gap appears to be increasing.
- COPD patients are less likely to engage in end of life care planning and are less likely to receive palliative care, than people with cancer or cardiovascular diseases.

Background

There is no single diagnostic test for COPD. A diagnosis is based on patient symptoms (breathlessness, cough, wheeze, weight loss, fatigue), age and the results of two tests for airway obstruction, following the use of a bronchodilator. An airway obstruction is diagnosed if the ratio of Forced Expiratory Volume in 1 second (FEV1) to the Forced Vital Capacity (FVC) is less than 70%, and the FEV1 is less than 80% of the predicted volume (based on the patients age, sex and body composition)⁴. An FEV of greater than 80% expected can be consistent with a diagnosis of COPD where there is an appropriate history of cough production and shortness of breath.

COPD is strongly linked with smoking, but can be also caused by occupational exposure to dust or pollution⁵. Stopping smoking reduces the risk of developing COPD, and for those who already have a diagnosis of COPD, it can halt progression of the disease and reduce the risk of mortality.

Estimated prevalence and under-diagnosis

The North East has the highest prevalence of COPD in England^{1,6}. In March 2010, 1.6% of all general practice patients in England had a recorded diagnosis of COPD⁷, up from 1.4% in 2004/05⁸. The figure for the North East was considerably higher (2.4%). This information, extracted from clinical databases in primary care as part of the Quality and Outcomes Framework (QOF) programme, is likely to underestimate the true prevalence of COPD as:

- Some patients will not seek support from their GP. This is particularly likely for patients with mild COPD, who may not yet realise that their cough or slight breathlessness is a sign of something more serious. It may also be more common among smokers, accepting their “smokers cough” as just a natural, and perhaps not too severe, consequence of their smoking habit.
- Some patients may attend their general practice but not receive a COPD diagnosis, due to the testing and clinical interpretation required. Again, this is particularly likely in patients with mild COPD.
- Recording differences occur between practices (although the financial incentives in QOF are likely to minimise these variations).

For the Health Survey for England (HSE) in 2001⁹, trained nurses carried out lung function tests on a random sample of the population aged over 15. The Association of Public Health Observatories (APHO) modelled this survey data to estimate the prevalence of COPD for populations at Local Authority and Primary Care Trust level over time^{1,10}. The model is based on age, sex, ethnicity, rurality, smoking prevalence and deprivation levels in a population. It could not include the details of industries which impact upon on COPD⁵, because of the lack of available data. Therefore the model could underestimate COPD prevalence in parts of the North East, where coal mining and ship building were still commonplace until as recent as the 1980s. The APHO model estimates that in 2010 the COPD prevalence for individuals aged 15 or older in England would be 3.6%, with an estimated prevalence of 4.6% for the North East.

Figure 1. Recorded COPD prevalence(QOF⁷) compared with estimated prevalence(HSE¹) for 16+ populations in Local Authorities in the North East

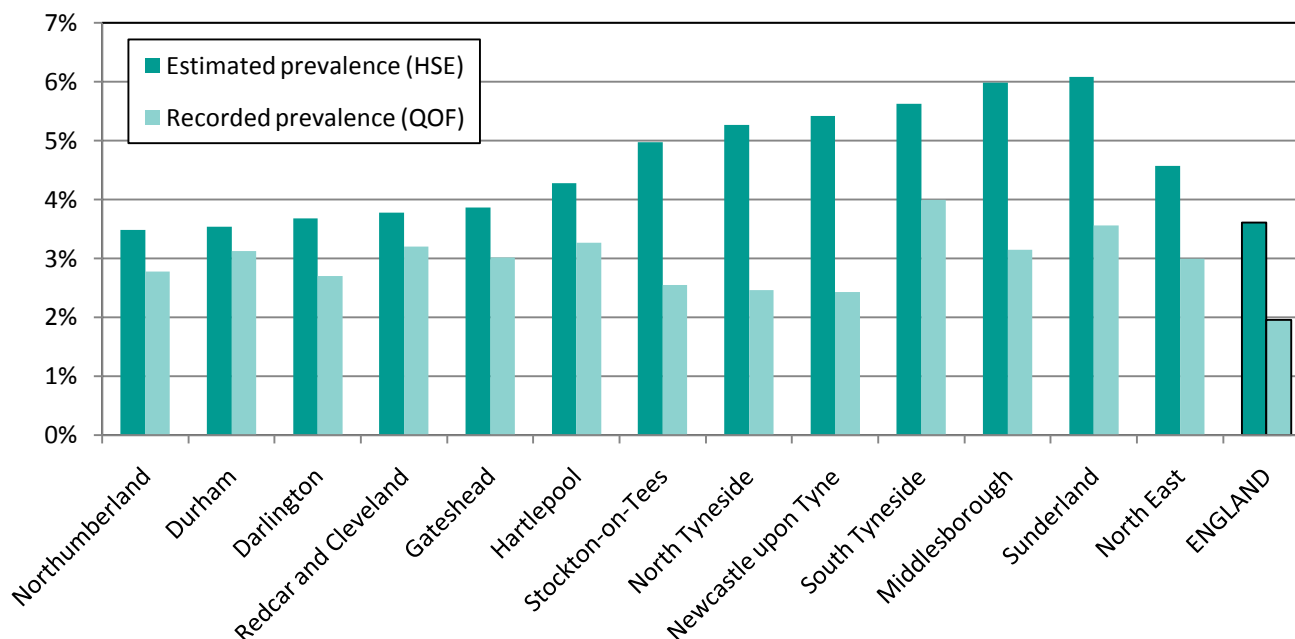


Figure 1 shows the discrepancy between estimated COPD prevalence in 2010 (based on the APHO model using Health Survey for England data from 2001) and recorded COPD prevalence (QOF data from 2009/10) for populations aged over 15. In the North East, the areas of highest estimated prevalence (linked with high estimated smoking prevalence¹⁰) are the urban areas of Wearside, Tyneside and Teesside. The recorded prevalence in QOF does not correlate well with the estimated prevalence at Local Authority level ($p=0.23$, $R=0.34$), indicating substantial under recording of COPD in the areas of greatest need. For general practices in the North East, the estimated prevalence of undiagnosed COPD is as high as 4.8% of their practice population. The British Lung Foundation estimates that the cost to the NHS in England of not reaching, diagnosing and treating those with undiagnosed COPD could be around £3.22 billion¹¹. The National Institute for Health and Clinical Excellence determined that opportunistic case finding using spirometry in primary care is a cost effective strategy to address this under-diagnosis⁴.

The prevalence of COPD increases with age. The APHO model predicts that, with an aging population, by 2020 COPD prevalence will increase to 3.8% in England, and to 4.9% in the North East¹.

Treatment in primary care

NICE guidance⁴ recommends that:

- COPD patients should be encouraged to stop smoking;
- short-acting bronchodilators should be prescribed where necessary for the relief of breathlessness;
- inhaled therapies should be prescribed for people with stable COPD;
- some patients with advanced COPD may require maintenance low dose oral corticosteroids;
- long-term oxygen therapy is indicated for some COPD patients;
- pulmonary rehabilitation, a multidisciplinary programme of care tailored to each patient, is also recommended.
- In some cases, lung surgery may be advised.

When treatment is provided in primary care, the risk of chronic exacerbations resulting in hospitalisation is reduced. QOF data from 2009/10 reviews some quality indicators for the care of COPD patients in primary care, including: patients with a smoking status recorded in the last 15 months; smoking cessation advice offered; flu immunisation over the previous winter; and inhaler technique checked in the

previous 27 months for those who use inhalers. For each area in the North East, this data showed that during 2009/10:

- over 90% of COPD patients were immunised against flu during the winter;
- between 87% and 91% of COPD patients had their FEV1 measured in the previous 27 months;
- between 87% and 93% of COPD patients during the year had their diagnosis confirmed with post-bronchodilator spirometry;
- between 88% and 92% of COPD patients underwent a review by a healthcare professional in the previous 15 months.

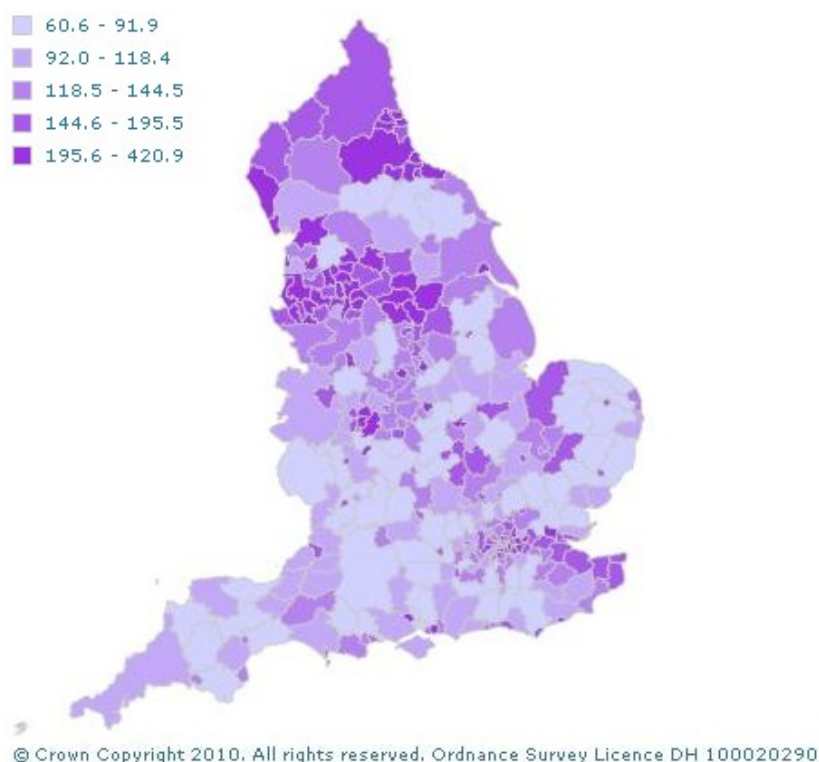
There is however variation at individual general practice level e.g. two practices scored 0% for all of these COPD indicators. However, the majority of practices in the North East (86%) recorded that 80% of their COPD patients received these tests and interventions.

Many of the drugs prescribed for COPD are also used for the treatment of other respiratory conditions such as asthma. Therefore no attempt is made to estimate prescribing costs/utilisation for COPD patients in this paper.

Hospital admissions

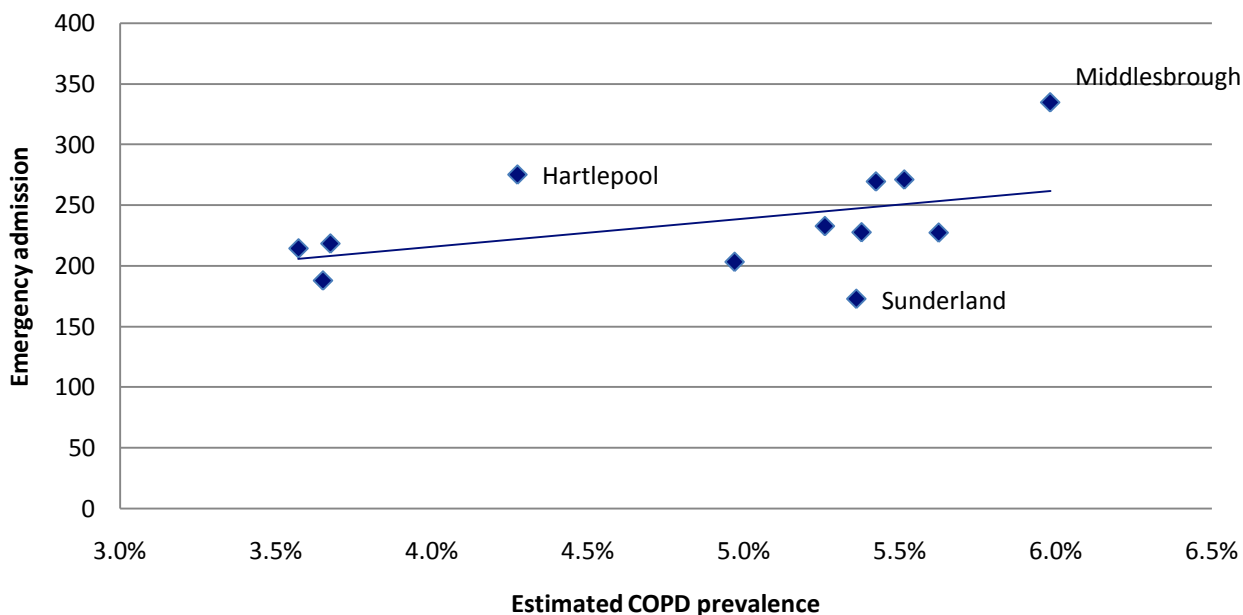
In 2008/09, the directly standardised rate of emergency admissions to hospital for COPD per 100,000 population ranged from 60.6 in Rutland to 420.9 in Tower Hamlets¹². Figure 2 shows that high emergency admission rates for COPD are concentrated in areas of deprivation and high smoking prevalence, predominantly in the north of England, consistent with national studies^{6,13}.

Figure 2. Directly standardised emergency admissions to hospital for COPD per 100,000 population¹²



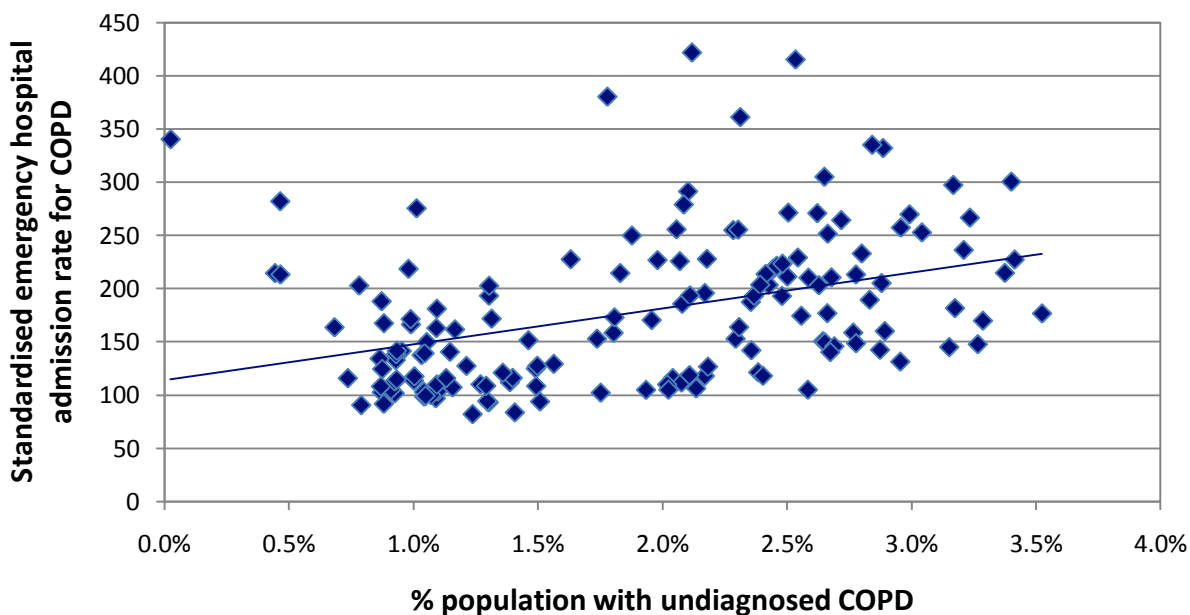
Emergency hospital admission rates across England were compared with both estimated and recorded COPD prevalence figures. There was a strong association between admission rates and estimated prevalence ($p < 0.01$, $R = 0.96$), and a weaker association between admissions and recorded COPD prevalence ($p < 0.01$, $R = 0.93$). Figure 3 compares the estimated prevalence with the emergency admission rate for each Local Authority in the North East. It shows high emergency admission rates for the estimated prevalence of COPD in areas like Middlesbrough and Hartlepool. Sunderland appears to have a particularly low admission rate, given its estimated prevalence.

Figure 3. Emergency admissions to hospital for COPD compared with the estimated COPD prevalence for Local Authorities in the North East



Diagnosis and appropriate treatment in primary care can help to reduce unplanned hospital admissions for COPD¹³. It is therefore conceivable that higher emergency admission rates would be seen in areas with relatively high rates of undiagnosed COPD. Assuming that modelled estimates of COPD are a reflection of the true prevalence, and the difference between estimated and recorded COPD prevalence figures provide an accurate reflection of undiagnosed COPD, Figure 4 shows how this estimated prevalence of undiagnosed COPD compares with emergency hospital admission rates. It shows a weak but statistically significant relationship ($p < 0.01$, $R = 0.39$) between the admission rates and undiagnosed COPD.

Figure 4. Emergency admissions to hospital by Local Authority in England for COPD compared with the estimated percentage of the population with undiagnosed COPD



Mortality from COPD

Patients with COPD frequently have co-morbidities and often die from other causes. A study in the 1970s suggested that less than a quarter of people with severe COPD, had COPD recorded as a cause of death¹⁴, which could either reflect the prevalence of co-morbidities or indicate a possible under-recording of COPD deaths. It can be difficult to determine the order for placing causes of death on the death certificate, resulting in variations in when COPD is recorded¹⁵.

In the North East of England, mortality rates from cancers and circulatory diseases (heart disease and stroke) have been decreasing for many years. Death rates from circulatory diseases have more than halved since 1993 (by 2009 the rate had decreased by 56%) compared to a 28% fall for COPD death rates (Figure 5). Furthermore, COPD mortality rates in the North East are much higher than those for England, and the inequality gap has increased over time: in 1993, the rate in the North East was 32% higher than the England average, and by 2009 it was 37% higher (see Figure 6).

Figure 5. Directly standardised death rates for cancers, circulatory diseases and COPD since 1993 in the North East

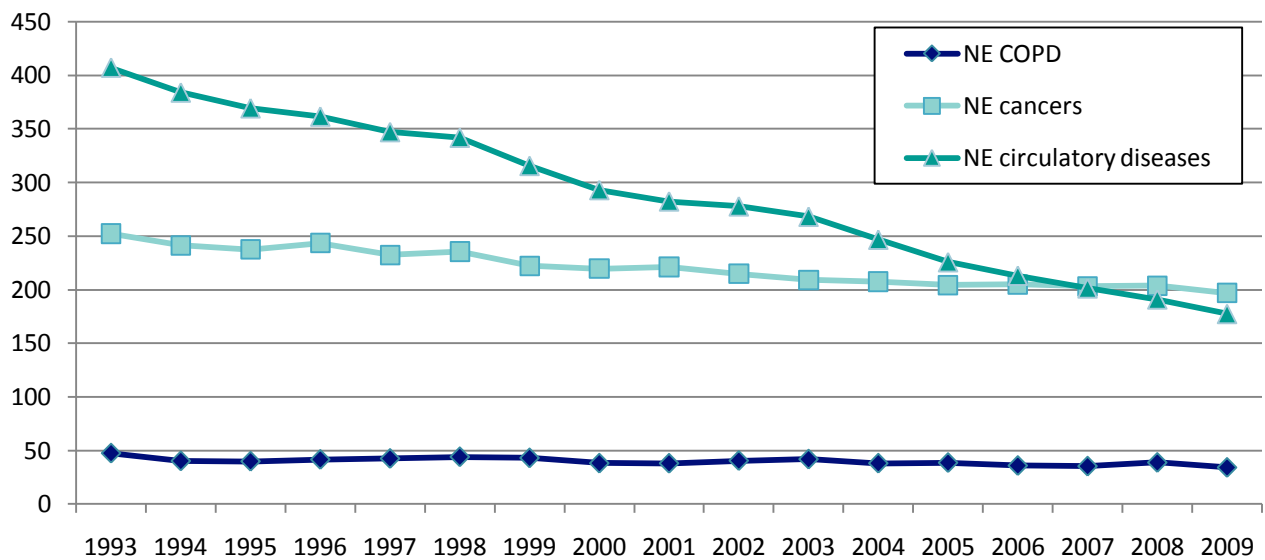
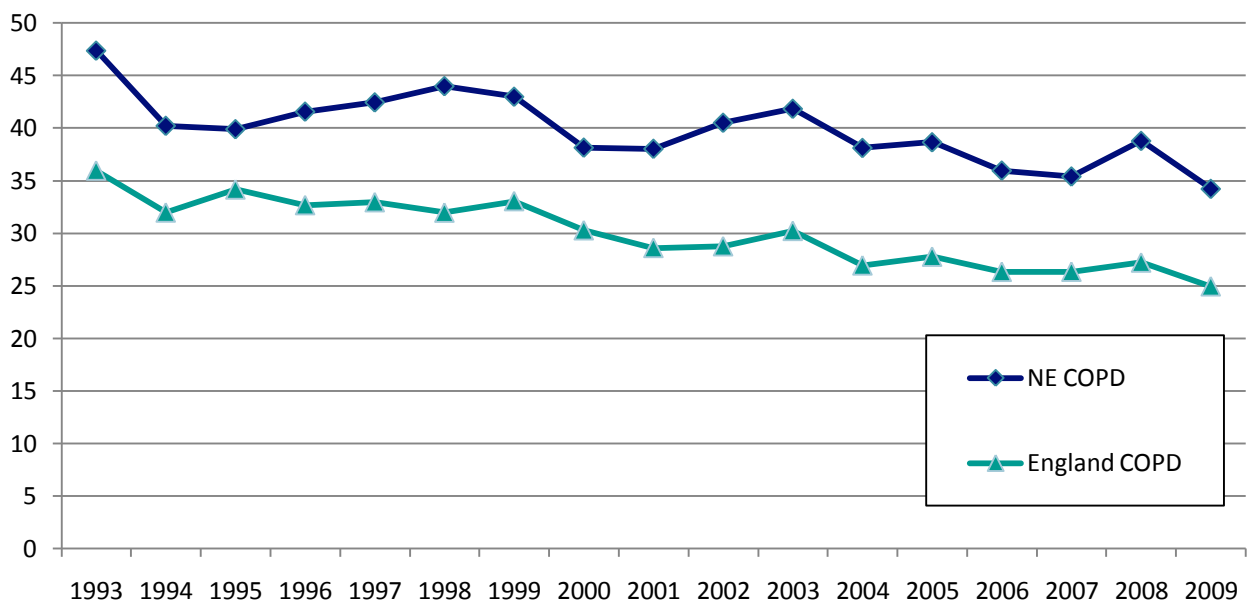
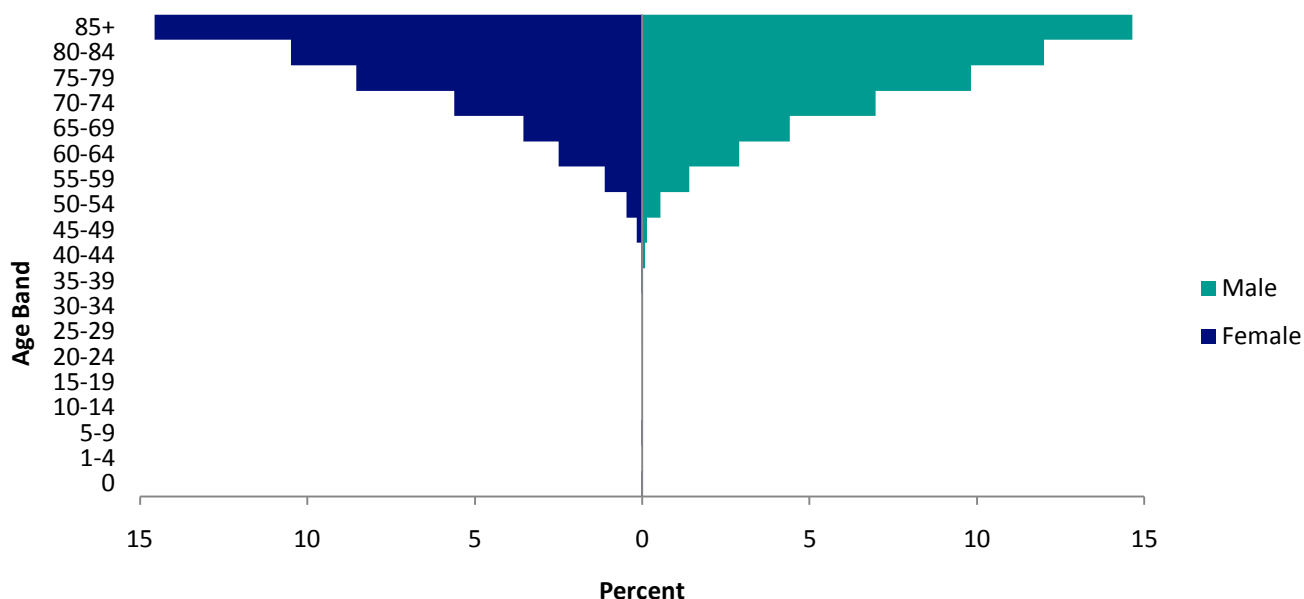


Figure 6. Directly standardised death rates for COPD in the North East and England since 1993



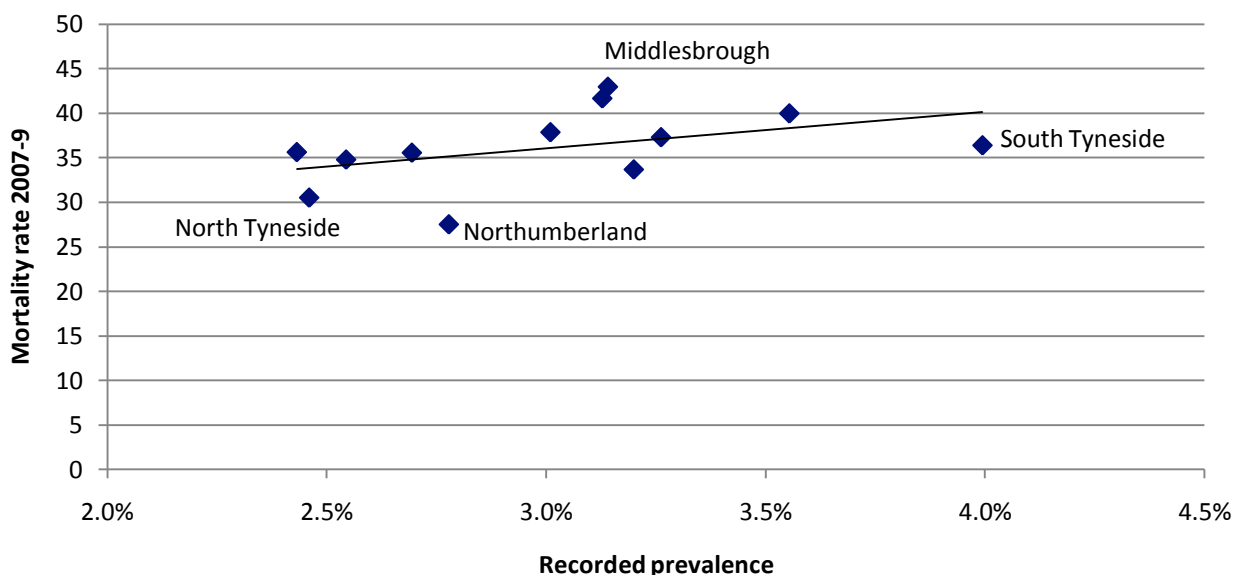
COPD is an age-related condition and deaths from COPD are more common in the elderly, as shown in Figure 7. For this reason, the remainder of this section will examine COPD deaths at all ages, and will not focus on premature deaths.

Figure 7. Age structure of deaths from COPD in England 2009



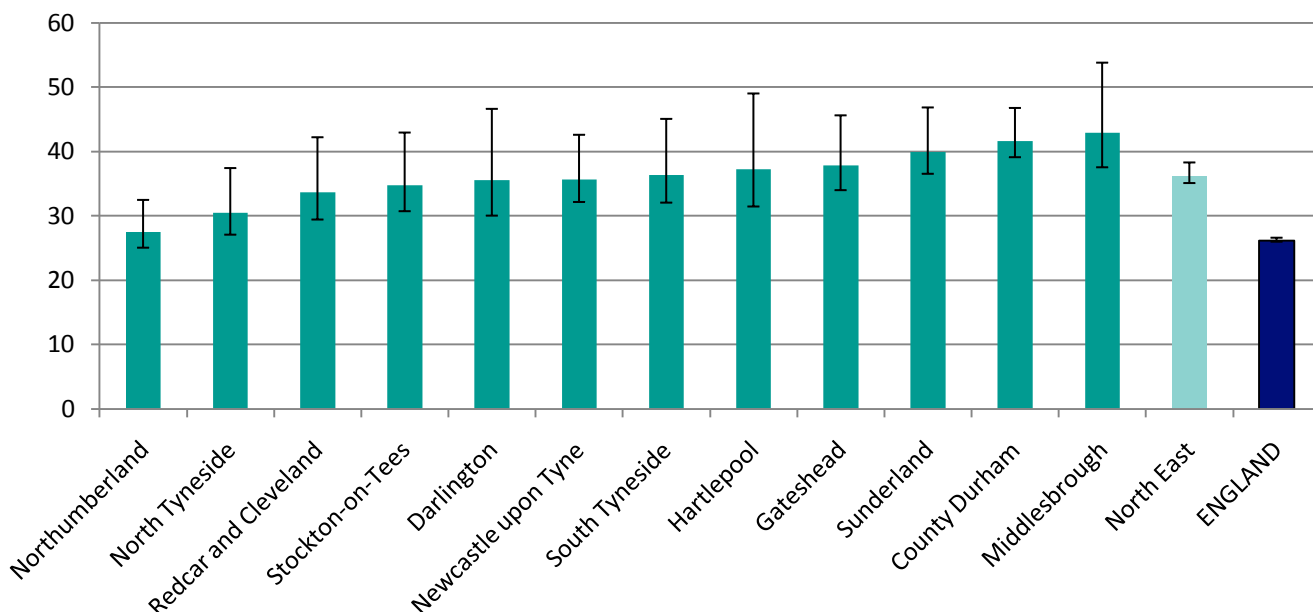
There is no significant relationship between COPD mortality rates for Local Authorities in the North East and estimated prevalence rates, but the correlation between recorded prevalence rates and death rates is significant at the 5% level ($p=0.02$, $R=0.61$).

Figure 8. Directly standardised COPD mortality rates for Local Authorities in the North East in 2007-9 compared with recorded prevalence rates.



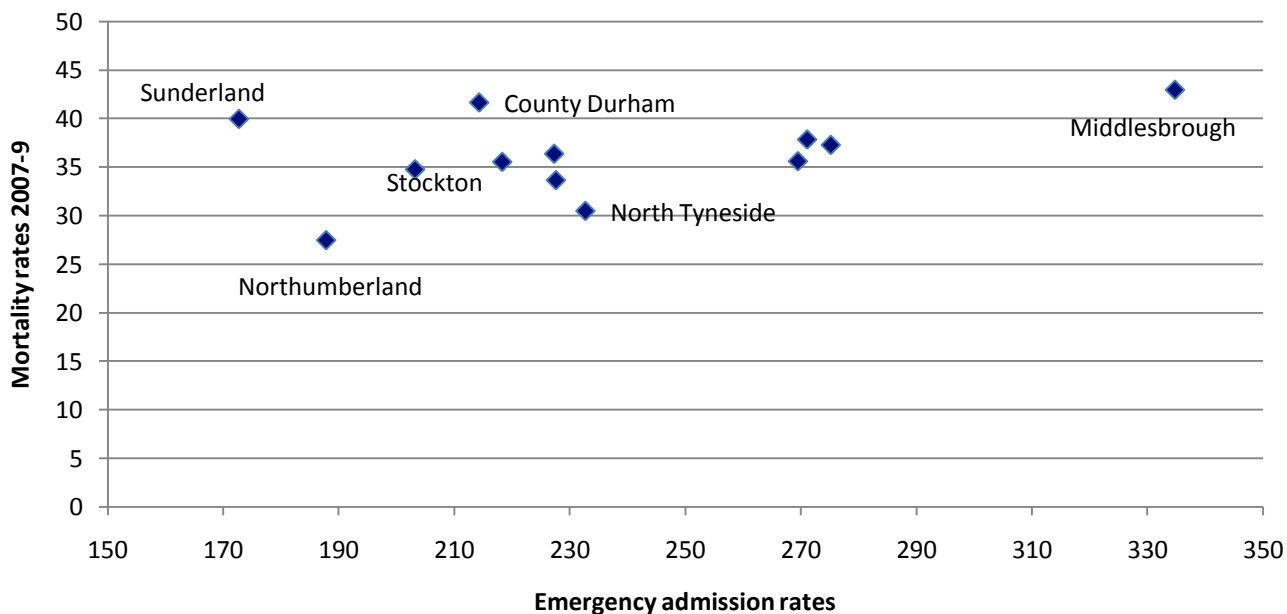
Within the North East, mortality rates for Local Authorities vary between 27.5 per 100,000 in Northumberland and 42.9 per 100,000 in Middlesbrough, as illustrated in Figure 9. Mortality rates are generally higher for males than females: across the North East between 2007 and 2009, the male mortality rate was 42.6/100,000 and the female rate was 32.3/100,000.

Figure 9. Directly standardised COPD mortality rates for Local Authorities in the North East, 2007-2009



There is no significant association between COPD mortality rates and emergency admissions at Local Authority level in the North East ($p=0.20$, $R=0.42$). Figure 10 shows that in Sunderland there are relatively few emergency admissions to hospital for COPD but a fairly high mortality rate. Northumberland has a lower mortality rate but a higher emergency admission rate than Sunderland.

Figure 10. Emergency admissions to hospital for COPD compared with COPD mortality rates in Local Authorities in the North East



Palliative care for patients with COPD

Everyone has the right to a good death¹⁶, but research indicates that patients with COPD are less likely to engage in end of life care planning, and are also less likely to receive palliative care, than cancer patients¹⁷. Most people would prefer to die either at home or in a hospice⁹ but recent work by the End of Life Care Intelligence Network¹⁸ (shown in Figure 11) found that people dying from respiratory diseases were much less likely to die in these places than those dying from cancers or circulatory diseases. People dying of respiratory diseases were much more likely to die in hospital.

Figure 11. Proportions of deaths by place of death for underlying cause, England, 2006–08

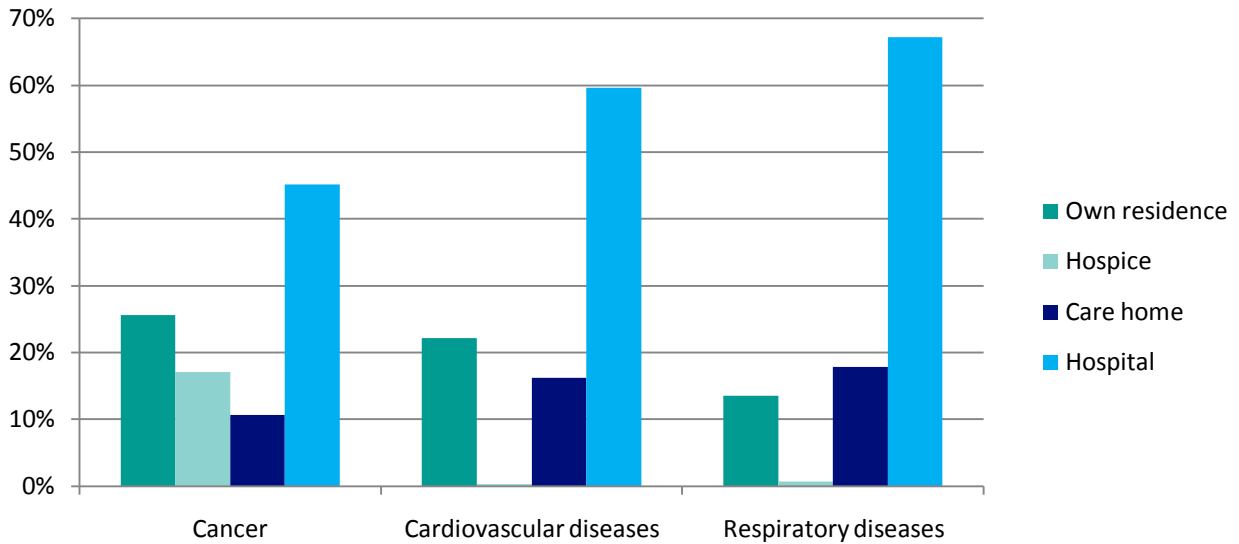
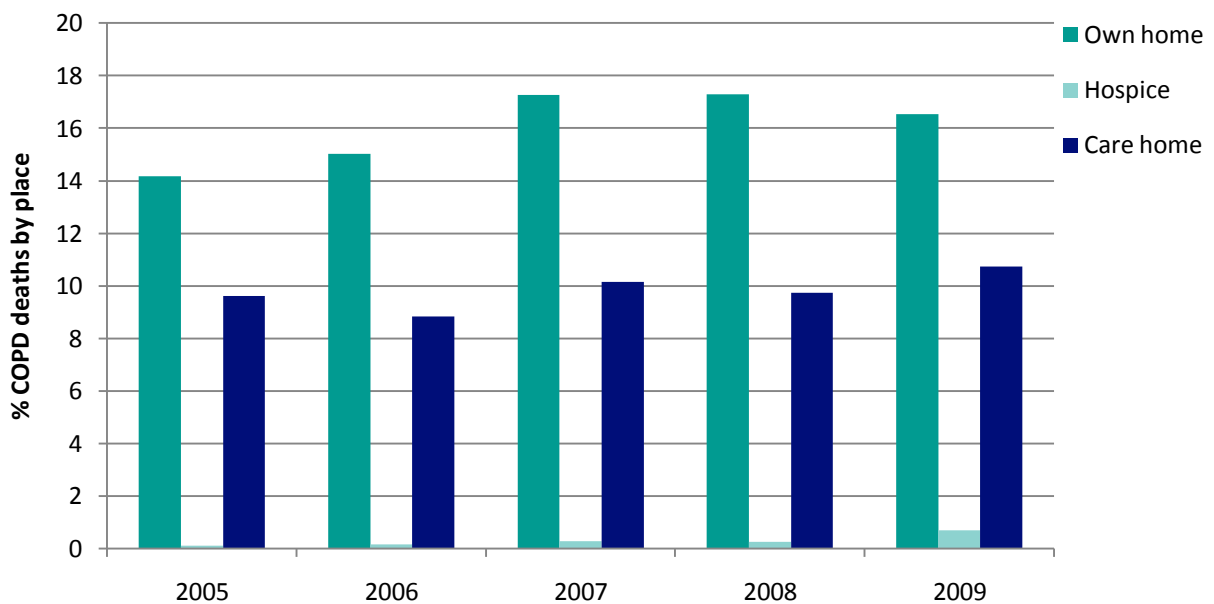


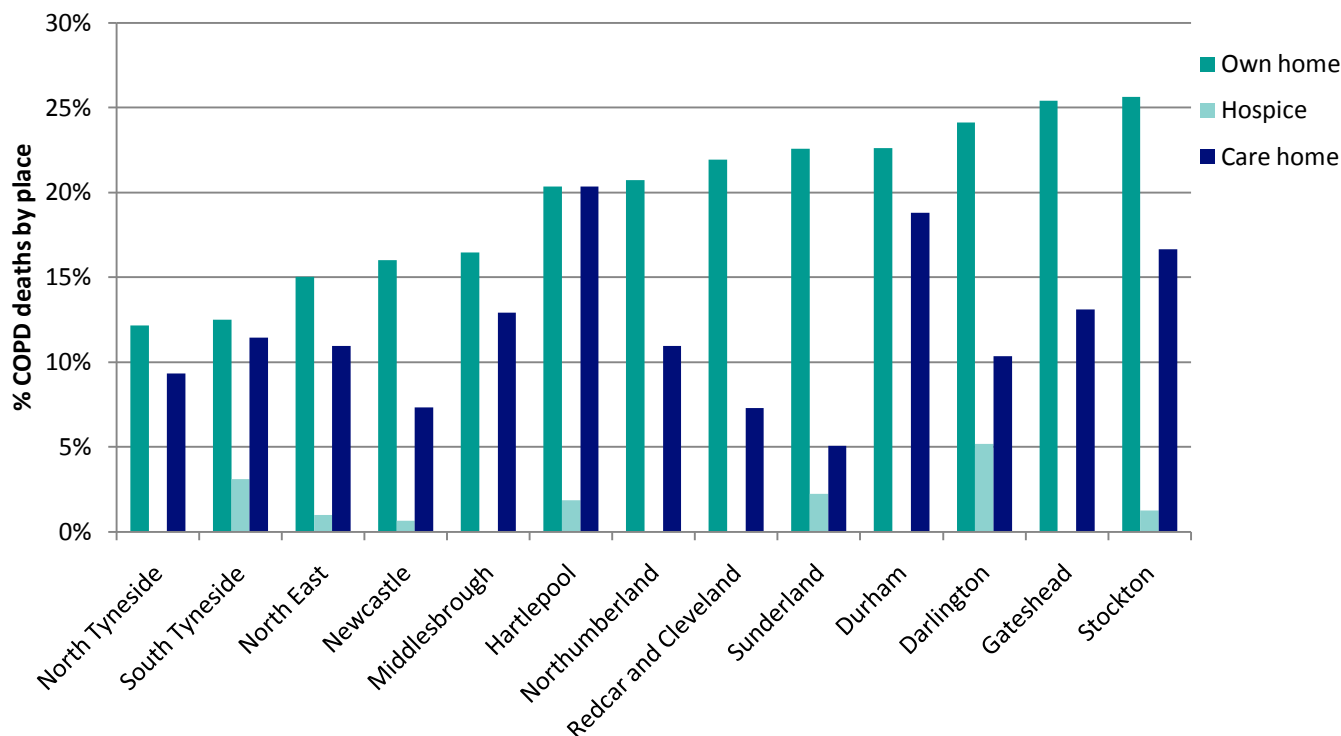
Figure 12 (based on data from the Office for National Statistics Public Health Mortality File) shows that less than 20% of people in the North East who die from COPD die in a hospice or their own homes. However it also shows that these percentages are increasing. The vast majority of COPD deaths in the North East (around 43%) occur in hospitals.

Figure 12. Place of death for people dying of COPD in the North East, 2005-9



The place of death for COPD patients by Local Authority shows considerable variation. Darlington has the highest percentage of COPD deaths taking place in hospices (5%), Hartlepool has the highest percentage taking place in care homes (20%) and Stockton has the highest percentage occurring in the patients own home (26%). The percentage of COPD deaths occurring in hospitals ranges from 56% in Stockton to 79% in North Tyneside.

Figure 13. Place of death for people dying of COPD by LA in the North East, 2005-9



Conclusions

COPD is a common disease with a significant impact on quality of life and, in 2009/10, it cost the North East NHS an estimated £49.2 million, 1% of the total budget¹⁹. Many people in the North East are likely to be unaware that they have COPD. The prevalence of COPD has been discussed in this paper but it is likely that the true number of people with COPD in the region is currently underestimated.

COPD is a largely preventable disease and an early diagnosis of COPD increases the likelihood of a patient being encouraged to stop smoking: the single most important factor for both preventing COPD and reducing disease progression. Early diagnosis can also ensure that a patient receives appropriate treatment to delay the increase in disease severity. It is notable that there is an Early Awareness and Diagnosis programme to raise knowledge about cancer symptoms, as well as a Cerebrovascular Disease risk assessment programme, however there is, as yet, no national programme to increase early diagnosis for COPD. A COPD outcomes strategy is expected to be published by the Department of Health in the near future.

Good practice for the treatment of COPD has been identified by NICE⁴. There are substantial numbers of emergency hospital admissions for COPD, indicating a poor quality of life for patients, and substantial costs to the NHS. Research on COPD in England has shown that deprivation and smoking prevalence are the strongest predictors of emergency hospital admissions, along with estimated prevalence of COPD (a stronger predictor than recorded prevalence due to underdiagnosis) and GP supply¹³. Influenza immunisation and patient-reported good access to GP consultations were also noted to be factors protective of emergency hospital admissions. A COPD project in Easington resulted in the development of a self-management plan, to enable COPD patients to care for themselves at home, and a new care pathway for patients having an acute COPD attack²⁰. Early results indicate that these

programmes are popular with patients and are likely to reduce emergency admissions, with patients opting to get support at home instead.

COPD kills around 1,500 people in the North East every year, a much higher death rate than the England average, and the gap is increasing. Patients should have a choice concerning their place of death, and many patients have expressed a preference to die at home or in a hospice environment. Unfortunately, fewer than 20% of people who die from COPD are in their own homes. End of life care plans should be developed for all patients with late stage COPD. The National End of Life Care Intelligence Network provides a range of tools to identify population needs and to help support planning for the capacity, resources and skill mix needed to improve end of life care¹⁸.

Recommendations

- Commissioners need to develop early awareness campaigns for COPD. They also need to ensure that all patients have good access to primary care teams.
- Primary care teams should implement a risk assessment programme for COPD alongside the existing CVD programme.
- Primary care teams need early diagnosis and treatment plans for their COPD patients. These plans should include: an evidence-based approach to ensuring vulnerable patients, such as those with COPD, are immunised against influenza and have access to smoking cessation services; expert patient schemes; and pulmonary rehabilitation.
- Primary and secondary care teams need to support late stage COPD patients by helping them to develop end of life care plans.

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