Overview of potential to reduce lives lost from Chronic Obstructive Pulmonary Disease (COPD)

All figures per year	England	Per 100,000	Comments
Potential lives saved from intervention	3,500	6.53	Lives that could be saved if all localities above the median in terms of COPD deaths achieve the median
Potential lives saved U75	1054	1.97	
Reduction in potential years of life lost (U75)	19,455	36.32	
Cost (£)		n/a	
Cost-saving (£)		n/a	
Net cost (£)		n/a	
Strength of evidence	4		

Rationale

If the local areas currently above the median death rate for COPD could achieve the median death rate, 3,500 lives could be saved. Furthermore, if local areas could achieve the death rate of the lower quartile areas, 7,800 lives could be saved. This improvement in mortality will be achieved through the cumulative impact of evidence-based care across the COPD pathway both in long term treatment and during acute episodes (non-invasive ventilation, pulmonary rehabilitation and controlled oxygen treatment).

The following **FIVE** COPD factsheets present interventions that could contribute to achieving this number of lives saved (in local areas above the median) but could also be effective in delivering improvements in local areas where the death rate is already lower.

Factsheet 1: Non–invasive ventilation in acute exacerbations of Chronic Obstructive Pulmonary Disease (COPD)

All figures per year	England	Per 100,000	Comments
Potential lives saved from intervention (lower)	240	0.45	Estimates derived from national audit record of proportion receiving high dose oxygen in ambulance or on admission and audit evidence of magnitude of reduction in mortality with controlled dosing
Potential lives saved from intervention (lower)	240	0.45	
Potential lives saved from intervention (upper quartile)	730	1.36	
Potential lives saved U75 (lower quartile)	72	0.13	
Potential lives saved U75 (upper quartile)	220	0.41	
Reduction in potential years of life lost (lower quartile)	1334	2.49	
Reduction in potential years of life lost (U75)	4058	7.58	
Cost (£)		n/a	
Cost-saving (£)		n/a	
Net cost (£)		n/a	Likely to be cost saving
Strength of evidence	3		

COPD causes 115,000 emergency admissions per year, 24,000 deaths per year and 16,000 deaths within 90 days of admission. Type 2 respiratory failure occurs in a quarter of COPD admissions.

A Cochrane systematic review found that non–invasive ventilation (NIV) significantly reduces mortality in people with COPD who develop type 2 respiratory failure, with a number needed to treat of 8 to save 1 life. This level of impact is reflected in the NICE Quality Standard and the COPD and Asthma Outcomes Strategy recommendations.

Despite this the Respiratory Atlas of Variation 2012 shows that there is substantial geographical variation in availability of NIV for eligible patients.

The National COPD Audit 2008 http://www.rcplondon.ac.uk/resources/chronic-obstructive-pulmonary-disease-audit also revealed frequent failure or delay in provision of NIV when indicated:

- 34% of patients with a strong clinical indication for NIV did not receive NIV
- Where NIV was provided, less than half of patients received NIV within the recommended one hour and 38% waited more than 3 hours.

The COPD Strategy Consultation Impact Assessment http://www.brit-thoracic.org.uk/Portals/0/Clinical%20Information/COPD/AIE%20-%20in%20DH%20template.pdf found that NIV is a cost saving intervention as it is likely to reduce the need for more costly invasive ventilation and to shorten length of stay.

Factsheet 2: Pulmonary Rehabilitation following acute exacerbations of Chronic Obstructive Pulmonary Disease (COPD)

All figures per year	England	Per 100,000	Comments
Potential lives saved from intervention	260	0.49	Derived from Cochrane estimate of NNT, 90 day mortality rates and assumption that additional 10% receive PR
Potential lives saved (U75)	78	0.15	
Reduction in potential years of life lost (U75)	1445	2.70	
Cost (£)		0	
		0	Cost saving estimated in Impact Assessment for consultation on COPD Strategy, 2009
Net cost (£)	-£12.1m	0	
Strength of evidence	2		

Acute exacerbation of COPD is one of the most common reasons for emergency admission to hospital with 115,000 admissions per year. Mortality rates are high with one in 12 patients dying during their hospital stay and one in 6 dying within 90 days.

A Cochrane systematic review found that pulmonary rehabilitation reduces mortality and readmission rates when delivered after admission for acute exacerbation of COPD, with a number needed to treat of six to save one life. This impact is reflected in the NICE Quality Standard and the COPD and Asthma Outcomes Strategy recommendations. There is also emerging evidence that pulmonary rehabilitation in stable COPD also improves survival. Despite this there is substantial geographical variation in provision of pulmonary rehabilitation to eligible patients. According to the National COPD Audit 2008 http://www.rcplondon.ac.uk/resources/chronic-obstructive-pulmonary-disease-audit

- 50% of trusts said they had full provision for eligible patients
- 32% of trusts said they had partial provision for eligible patients
- 10% trusts said they no provision for eligible patients.

The COPD Strategy Consultation Impact Assessment found that post exacerbation pulmonary rehabilitation (PR) is a cost saving intervention.

The British Thoracic Society Pulmonary Rehabilitation Guideline 2013 sets out the standards required of an effective PR programme. A COPD Commissioning Toolkit 2012 (which includes PR) was published in 2012 as part of the Outcomes Strategy for COPD and Asthma.

Factsheet 3: Case finding targeted at those at high risk of having undiagnosed Chronic Obstructive Pulmonary Disease (COPD)

All figures per year	England	Per 100,000	Comments
Potential lives saved from intervention	400	0.75	Illustrative figure showing reduction in mortality if we could identify those currently undiagnosed. Assumes a 25% reduction in 90 day mortality in the 10% of patients who are currently undiagnosed at the time of admissions
Potential lives saved U75	120	0.22	
Reduction in potential years of life lost (U75)	2223	4.15	
Cost (£)		n/a	
Cost-saving (£)		n/a	
Net cost (£)		n/a	
Strength of evidence		1	

An estimated 2 million people have undiagnosed and untreated COPD[i]. Failure to diagnose is not confined to mild disease. Over half those with moderate disease are undetected and 20% of undiagnosed have severe or very severe disease. Many patients are first diagnosed when they are in their fifties.
http://publications.nice.org.uk/chronic-obstructive-pulmonary-disease-cg101

10% of emergency admissions for acute exacerbation of COPD are in people whose COPD is undiagnosed. These patients are likely to have had significant disabling symptoms for some time, and the acute admission with its 14% risk of death within 90 days could have been prevented by earlier diagnosis and proactive treatment

Both the NICE Quality Standard http://publications.nice.org.uk/chronic-obstructive-pulmonary-disease-quality-standard-qs10

and the COPD and Asthma Outcomes Strategy https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/216139/dh_128428.pdf recommend targeted case finding in those at higher risk of COPD.

The COPD and Asthma Outcomes strategy makes the point that success in case finding and diagnosis will require a pro-active approach to tackling health inequalities given the social gradient is in the prevalence of COPD and asthma.

Systematic and opportunistic case finding interventions in targeted populations could have a significant impact on premature mortality in the medium and longer term. Indeed a number of studies have shown that impaired lung function is an independent predictor of mortality from all causes with FEV1 being a stronger predictor of cardiovascular mortality than cholesterol.

Targeting case finding on those at high risk of having undiagnosed COPD will result in earlier diagnosis and evidence based chronic disease management. If this delivers only a 25% reduction in mortality in people who would otherwise have been admitted with undiagnosed COPD, it would save around 400 lives per year.

Potential targeting approaches include:

1. Roll out and implementation of GP audit tools for case finding, such as GRASP-COPD. http://www.primis.nottingham.ac.uk/documents/case-studies/copd-case-study.pdf
2. Audit practice information systems to identify people who receive multiple prescriptions for oral steroids and/or antibiotics;
3. Support implementation of opportunistic COPD case finding in primary care through electronic decision support tools;
4. Discuss the COPD diagnosis with patients and carers, including what they can do to help manage their condition, for example signpost to advice on stop smoking and benefits of exercise;
5. Right Care patient decision support tools are available for COPD at http://sdm.rightcare.nhs.uk/pda/chronic-obstructive-pulmonary-disease/introduction/
6. Target case finding based on population segmentation and social marketing, as described in the COPD Prevention and Early Identification Toolkit 2011
7. Misdiagnosis of COPD is common so case finding tests should be followed by quality assured diagnostic spirometry, with trained staff interpreting the results. The NHS Improvement guide 'First steps to improving COPD care ' (2012) http://www.nhsiq.nhs.uk/resource-search/publications/nhs-imp-first-steps-copd.aspx recommends that COPD diagnoses should have spirometry taken and recorded in the last 15 months other tests may be necessary to confirm the diagnosis, such as a CT scan.

Factsheet 4: Controlled oxygen to minimise toxicity during acute exacerbations Chronic Obstructive Pulmonary Disease (COPD)

All figures per year	England	Per 100,000	Comments
Potential lives saved from intervention	230	0.43	Derived from Cochrane estimate of NNT and national audit evidence of under provision
Potential lives saved U75	69	0.13	
Reduction in potential years of life lost (U75)	1278	2.39	
Cost (£)		0	
Cost-saving (£)		0	Cost saving estimated in impact assessment for consultation on COPD strategy, 2009
Net cost (£)	-£1.5m	0	
Strength of evidence	2		

COPD causes 115,000 emergency admissions per year, 24,000 deaths per year and 16,000 deaths within 90 days of admission.

High flow oxygen is routinely administered to patients in emergency settings. High dose oxygen is contraindicated in people with COPD because it can trigger life threatening respiratory failure. The dose of oxygen should always be individualised and titrated to the patient's oxygen saturation (easily measured with routinely available equipment). Clear standards are described in the British Thoracic Society Emergency Oxygen Guideline 2008.

There is substantial audit evidence that oxygen overdosing and toxicity is common in people with acute exacerbations of COPD and that significantly higher mortality rates are seen in patients who receive higher oxygen doses.

The 2008 National COPD Audit http://www.rcplondon.ac.uk/resources/chronic-obstructive-pulmonary-disease-audit found that:

- 30% of COPD patients were given high dose(> 35%) oxygen in ambulances;
- 35% of patients were receiving high dose oxygen in the Emergency Department when blood gases were taken;
- Mortality was 11% when >35% oxygen was given, compared with 7% when lower concentrations of oxygen.

Implementation of some simple, inexpensive measures could have a significant effect on mortality, for example:

1. Oxygen alert cards for people with COPD;
2. Routine use in ambulances of pulse oximetry to determine individualised oxygen dose;
3. Prompt blood gas analysis on admission with acute exacerbation of COPD;
4. Oxygen prescription and target saturation following admission, in line with British Thoracic Society guidelines.

Factsheet 5: Systematic acute and long term care across the Chronic Obstructive Pulmonary Disease (COPD) pathway

COPD causes 115,000 emergency admissions per year, 24,000 deaths per year and 16,000 deaths within 90 days of admission.

NICE 2010 clinical guidance, the NICE Quality Standard and the NHS Companion Document to the Outcomes Strategy for COPD and Asthma describe the key interventions that together improve outcomes in COPD. These include:

1. Stratification of patients by severity and impact
2. Optimise prescribing – evidence-based choice of drugs and correct use of inhalers
3. Support for self-management including provision of patient-held rescue medication (oral steroids and antibiotics)
4. Support for smoking cessation
5. Identification and management of co-morbidities
6. Referral for pulmonary rehabilitation
7. Routine pulse oximetry and referral where indicated for oxygen assessment.

The 'Respiratory Atlas of Variation 2012' and other sources show that there is substantial variation in the quality of chronic disease management provided in primary care. Evidence-based guidance is often not implemented. In addition co-morbidities such as heart failure are often undiagnosed or poorly managed and therefore contribute to poor outcomes.

[i] Healthcare Commission (2006) Clearing the air: a national study of chronic obstructive pulmonary disease. London: Healthcare Commission