Report of
The National Chronic Obstructive Pulmonary Disease Audit 2008: clinical audit of COPD exacerbations admitted to acute NHS units across the UK

November 2008

St Elsewhere General Hospital

Royal College of Physicians of London,
British Thoracic Society and
British Lung Foundation

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On behalf of the National COPD Audit 2008 Steering Group.

Acknowledgements

We would like to thank all the people who have contributed to the development of the methodology and questions for the National COPD Audit 2008. We consulted widely and received extremely helpful, enthusiastic input from colleagues and patient representatives, all of which was considered by the project team prior to the refinement of the tools.

We are particularly indebted to members of the Steering Group who unreservedly gave the Project Team direction, support and the benefit of their expert opinions.

Thanks are extended to a number of individuals, teams and groups that specifically assisted with the development and piloting of the audit methodology and questions, namely:

- Dr Charlotte Bolton, Alena Ball and Danielle Richards: Llandough Hospital, Cardiff

- Dr Charlotte Campbell and Sheila Cooper: Wycombe Hospital, Buckinghamshire
- Dr Paul Tate and Dr David Ross: St Richard's Hospital, West Sussex
- Dr Catherine Thompson, Victoria Parker and Felicity Chastney: Salisbury District Hospital, Wiltshire
- Stephen Callaghan: Liverpool Primary Care Trust
- Nicky Hughes: Cardiff Local Health Board
- Dr Margaret O'Brien: Northern Health & Social Services Board
- Maureen Carroll and colleagues: NHS Lanarkshire
- Taunton Breathe Easy Group
- The Lung Club, Whipps Cross University Hospital Chest Clinic
- Blackdown Hills Breathe Easy Group

We acknowledge and very much appreciate the time and effort given by all clinical and audit colleagues across the NHS, in order to contribute to this project.

Thanks are also due to the hundreds of General Practitioners and patients who contributed to the audit by way of completing and returning a survey about COPD care to the Project Team.

Finally, thanks are extended to The Health Foundation that fully funded the National COPD Audit 2008.

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Executive Summary

Chronic Obstructive Pulmonary Disease (COPD) is the fifth biggest cause of death in the UK, the second most common cause of emergency admission to hospital and one of the most costly in-patient conditions treated by the National Health Service (NHS) (British Lung Foundation 2007)[1]. With effective services and treatment, exacerbations of COPD can be shortened, so reducing the need for hospital admission, reducing lengths of stay and improving the outcomes and quality of life for patients.

Previous national audits of acute COPD care in 1997 and 2003 have highlighted the limitations and variability of COPD management. Since that time the National Institute for Clinical Excellence (NICE)[2] has published its guideline on the management of chronic obstructive pulmonary disease in adults in primary and secondary care (2004), and a National Clinical Strategy for COPD (formerly know as the National Service Framework for COPD) for England is currently being prepared (due for publication in 2008).

This third round of national COPD audit has been carried out to assess progress since the 2003 National COPD Audit and the 2004 NICE guidance. The audit aims to:

- Enable units to compare their performance against national standards.
- Identify resource and organisational factors that may account for observed variations in outcome.
- Facilitate improvement in the quality of care.
- Identify changes since the 2003 National COPD Audit (Royal College of Physicians and British Thoracic Society, 2003)[3].

The National COPD Audit 2008 builds on previous audits of acute COPD care, with two additional elements. As before, a cross-sectional resource and process of care survey was followed by a clinical audit of up to 60 cases admitted to hospital with an exacerbation of COPD.

For the first time, hospital teams then sent a survey to the General Practitioners of the first 30 audited patients. Also, 30 of their 60 patients were asked to complete a survey and return it anonymously to the project team at the Clinical Effectiveness and Evaluation unit (CEEu) at The Royal College of Physicians of London.

In recognition of the developing integration of COPD services across primary and secondary care, UK Primary Care Organisations were asked

[1] British Lung Foundation, 2007. Invisible lives: Chronic Obstructive Pulmonary Disease (COPD) finding the missing millions. Available at: http://www.lunguk.org/NR/rdonlyres/E027CA18-B5C6-49AB-96FA-C4AF55E6F484/0/InvisibleLivesreport.pdf (20 August 2008)
[2] National Institute for Clinical Excellence, 2004. National clinical guideline on management of chronic obstructive pulmonary disease in adults in primary and secondary care.
[3] Royal College of Physicians and British Thoracic Society, 2003. Report of the 2003 National COPD Audit. Available at: http://www.rcplondon.ac.uk/clinical-standards/ceeu/Current-work/Documents/NCROP%20nationalCOPDaudit2003report.pdf (20 August 2008)

to complete an organisational survey of the resources and process of care for people with COPD in their locality.

Key Findings of Clinical Case Audit

▪ Outcomes

1. Overall mortality rates at 90 days have shown a reduction from 15.5% (2003) to 13.9% (2008).

2. Cause of death was recorded as COPD in 65% of those who died, a reduction from the 71% observed in 2003.

3. Median length of stay has fallen by 1 day (from 6 to 5 days) compared to 2003.

4. There has been an increase from 26% to 34% in the proportion of patients having a shorter stay of at most 3 days since 2003.

5. There has been a 2% increase (to 33%) in the readmission rate since 2003. The median time to readmission was 38 days.

6. There has been an increase from 47% to 53% in patients discharged under the care of a respiratory physician.

7. 25% of patients are discharged with oxygen, prescribed via concentrator in 80% of cases.

▪ Patient characteristics

1. There has been an increase in the proportion of admissions that are female so that COPD is now a disease of equal importance in both men and women.

2. The mean age of admissions has increased by one year to 73 years for men and 72 years for women.

3. 90% of patients still live at home, 36% on their own.

4. 39% of patients received some form of personal care at home, whether paid or unpaid.

5. The median % predicted forced expiratory volume in 1 second (FEV1) for those patients with spirometry recorded in the last 5 years was 38%.

6. 67% of recorded Medical Research Council (MRC) dyspnoea scores are Grade 4-5 in the steady state prior to admission.

7. There are fewer current smokers (33%) than in 2003 (41%).

8. There is a very high level of co-morbidity, the association with cardiovascular disease being particularly strong.

9. 51% of the patients had been admitted for COPD within the preceding 24 months.

▪ Process of care measures

1. Most are better documented than in 2003.

2. Recording of spirometry remains poor (55%) and unchanged since 2003.

3. Medical Research Council (MRC) dyspnoea scale (47%) and body mass index (BMI) (29%) were documented infrequently.

5. 78% of patients were seen by a respiratory specialist healthcare worker during their admission, an increase of 8% since 2003.

6. Resuscitation status was poorly recorded.

7. The majority of Chest X-Ray (CXR) comments recorded in the notes were made by junior medical staff.

▪ Management

1. The great majority of patients received systemic steroids (86%) and antibiotics (81%) within the first 24 hours although only 61% reported a change in colour of sputum.

2. The recording of oxygen prescription on the drug chart within the first 24 hours was very poor (16%).

▪ Respiratory failure

1. 20% of patients were acidotic on admission. An additional 6% became acidotic later in their admission.

2. If pH was not at its lowest at admission, the lowest recorded pH was a median of 12 hours into the admission.

3. 79% of patients with pH <7.35 had a repeat blood gas within 24 hours, but only 26% of these were taken within 1 hour of the previous sample and 54% within 2 hours.

4. 30% of patients received high flow oxygen before arterial blood gases (ABGs) were taken compared to 42% in 2003.

5. 12% of patients received ventilatory support at any time during admission.

6. 1% received invasive ventilation.

7. It is reported that 3% of acidotic patients did not receive ventilatory support as appropriate facilities were unavailable.

8. Only 59% of patients had a documented management plan for escalation/withdrawal of treatment in the event of non-invasive ventilation (NIV) failure.

9. 11% of decisions not to escalate to ventilatory support were made by very junior medical staff. Only 15% of decisions were made by respiratory consultants.

10. 51% of patients who received ventilatory support did not do so until at least 3 hours after admission.

11. For 20% of the patients receiving ventilatory support, this was commenced after 24 hours into the admission.

- **Early Discharge Schemes**

1. 18% of patients were accepted onto a scheme, an increase of 4% since 2003.

2. Patients spent a median of 8 days on a scheme, an increase of 1 day since 2003.

3. Of those patients taken on to an Early Discharge Scheme, the proportion discharged within 48 hours has increased from 26% to 35% since 2003.

Recommendations

1. Greater attention should be given to the recording of information known to predict outcome in COPD exacerbations.

2. In patients without previously documented spirometry, this should be recorded either at discharge or within 90 days of discharge in order to confirm the diagnosis and assist with further management and prognosis.

3. Recording of key process items should be emphasised to admitting teams.

4. All patients with COPD exacerbation should be seen by a respiratory specialist during their admission.

5. The management of acute respiratory failure requires closer adherence to guidelines, particularly within the first 4 hours of admission, and greater input into decision making by respiratory specialists during the crucial first 12 hours.

6. There should be further development of integrated early discharge schemes.

Introduction

The National COPD Audit 2008 was led by a partnership between the Clinical Effectiveness and Evaluation unit (CEEu) of The Royal College of Physicians of London (RCP), the British Thoracic Society (BTS) and the British Lung Foundation (BLF).

Governance of the project

The National COPD Audit 2008 was governed by 2 groups (Appendix A).

- A Steering Group, comprising representatives from Respiratory Medicine and Nursing, Physiotherapy, Geriatric and Intensive Care Medicine, Public Health, Primary Care and Patients. The Group met on a quarterly basis to ensure the audit's relevance to those receiving and delivering COPD services in the UK.

- A smaller executive Implementation Group, drawn from membership of the Steering Group, met on a monthly basis to monitor progress, support and direct the project.

Audit methodology

The 2008 National COPD Audit was similar to previous audits of acute COPD care undertaken in 1997 and 2003, albeit with 3 additional elements. Thus, a cross-sectional resource and organisation of care audit was followed by a clinical audit of up to 60 cases admitted to hospital with an exacerbation of COPD during the data collection period. The resources and organisational audit collected general data with more specific quality indicators for NIV, pulmonary rehabilitation, early discharge and oxygen services. Further information was requested for palliative care provision and examples of good practice in this and other areas of COPD care were requested. Clinical cases were identified prospectively, with process of care and 90 day clinical outcomes audited retrospectively.

In 2008, for the first time, hospital teams were additionally requested to forward a survey to the General Practitioners of the first 30 audited patients admitted with a COPD exacerbation.

The teams were asked also to request that 30 of their 60 audited patients complete a survey and return it anonymously to the project team at the CEEu via a pre-paid envelope. An organisational survey of United Kingdom NHS Primary Care Organisations (PCOs) was undertaken, with participating PCOs completing a cross-sectional paper-based questionnaire about the resources and organisation of care for people with COPD in their locality.

The purpose of these surveys was to explore aspects of COPD around the acute care pathway from different perspectives and, thus, the National COPD Audit 2008 comprised five distinct elements:

1. The National COPD Audit 2008: resources and organisation of care in acute NHS units across the UK

2. The National COPD Audit 2008: clinical audit of COPD exacerbations admitted to acute NHS units across the UK

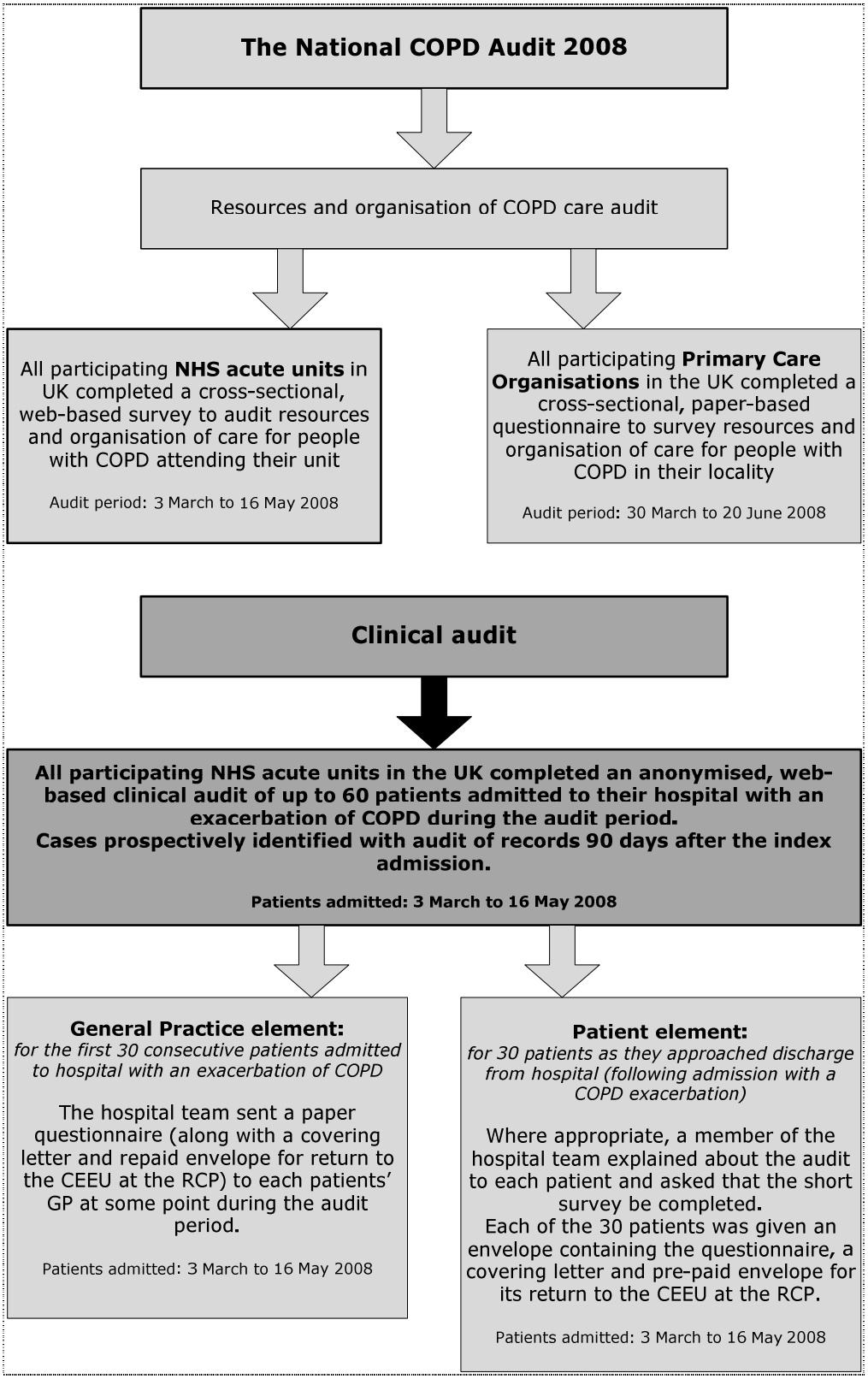
3. The National COPD Audit 2008: General Practitioner survey

4. The National COPD Audit 2008: patient survey

5. The National COPD Audit 2008: Primary Care Organisation resources and organisation of care survey

This report describes only the results from the clinical audit in Acute NHS units across the UK i.e. element 2 (illustrated dark grey with black arrow in Figure 1 below).

Figure 1: The National COPD Audit 2008: methodology



Recruitment

Efforts to ensure a high participation rate began in July 2007. The audit was promoted via the RCP and BTS websites, flyers were distributed at specialist conferences, information was widely disseminated to respiratory colleagues via global emails from the BTS, and a letter to raise awareness of the audit was sent to the Chief Executive Officers of all NHS Acute Trusts in September 2007. It requested the support of both respiratory and clinical audit colleagues.

A letter to clinical audit departments, respiratory and medical consultants followed in October 2007. It outlined plans for the forthcoming audit and sought 'registration' by way of units identifying two local leads – a clinician and a clinical audit colleague to oversee their participation.

Concerted efforts were subsequently made to identify potential leads at Trusts that did not respond to the initial letter inviting participation. Various sources were used to identify colleagues: BTS Directory of Training Posts and Services in Adult and Paediatric Respiratory Medicine 2007; Binley's Directory of NHS Management Autumn / Winter 2007/2008; contacting individual hospitals by phone or email; asking colleagues at neighbouring hospitals to identify a potential lead.

Development of the audit questions

The clinical audit pro-forma is shown in Appendix B. It builds on the 2003 National COPD Audit pro-forma, so allowing some assessment of change over time to be made, a high priority for stakeholders.

Following wide e-mail consultation with all members of the BTS recorded as having an interest in COPD in the BTS Directory of Training Posts and Services in Adult and Paediatric Respiratory Medicine 2007, a number of modifications were made to the 2003 audit questions, reflecting changes in patterns of COPD service provision since 2003.

Definitions

- ***Definition of a 'unit'***

The term 'unit' was used to describe each organisation that participated in the audit: specifically, for the purposes of the audit, a 'unit' was defined as 'a hospital that admits acute unselected emergency admissions'.

Thus, where a whole Trust has participated in the audit, the term 'unit' refers to that Trust. Where a hospital has participated in the audit as part of a Trust, the term 'unit' refers only to that hospital within the Trust. Participants were asked to define 'units' in terms of the functionality of their Respiratory Medicine Departments.

- ***Chronic Obstructive Pulmonary Disease (COPD)***

To ensure accurate diagnosis of COPD exacerbation, the lead clinician at each unit was encouraged to review the medical notes of patients included in the audit to check for any evidence of misdiagnosis. Any patients whom the lead clinician considered to have been misdiagnosed (i.e. diagnosis appeared to be COPD on admission but later deemed incorrect) were to be excluded from the audit. Also excluded were any patients where the diagnosis was changed to exacerbation of COPD from another presenting condition, as this would have affected their early management in hospital.

Units were asked to include only the index admission for patients having more than one admission within the data collection period. A very small number of such patients, however, were identified within units and these were excluded. Some hospitals may have included patients transferred from another hospital and it is possible these have been included in the audit as cases for both hospitals. No question was asked this time about transfers but in the 2003 audit patient transfers comprised only 1.3% of the total audit sample.

- ***Admission***

For the purposes of the National COPD Audit 2008 an admission is defined as "an episode in which a patient with an acute COPD exacerbation is admitted to a ward and stayed in hospital for 4 hours or more (this includes Emergency Medicine Centres / Medical Admission Units or similar but excludes Accident and Emergency Units) prior to discharge or acceptance to an early discharge scheme". A stay in hospital of less than 4 hours would be classed as a non-admission and would not be included.

- ***Early discharge schemes***

Early discharge schemes have a variety of names, including 'hospital at home', or may be known by local acronyms. Units were asked to include in the audit those patients who presented to hospital with COPD exacerbation and were then accepted onto an early discharge or hospital at home scheme, so reducing length of stay. Patients seen at home by such schemes but not presenting to hospital were excluded from the audit.

Web-based data collection tool

Clinical audit data were collected and submitted to a web-based data collection tool by local staff and overseen by a Respiratory Consultant within each participating unit.

The National COPD Audit 2008 web-based data collection tool was developed by Net Solving Ltd. It was accessible via the RCP's Web-Site (Appendix C). Security and confidentiality were maintained throughout the audit period by using site-specific codes and passwords for each unit. At no point during the audit was patient identifiable information collected.

Online 'help-notes' for each question were accessible within the tool. These contained the rationale for each question, suggestions for sources of data and, where appropriate, references to the guidance from which standards emerged.

A number of documents designed to support participation in the audit were posted within the web-tool, including copies of the methodology and questions. Weekly project updates were also sent to participating teams to direct them through the phases of the audit and share progress.

Participating units were able to enter and save data both during and at the end of an in-putting session. In addition, each question had a 'comments' icon to allow auditors to free-text further information to clarify their answer as necessary.

Units were encouraged to check the accuracy of their completed dataset prior to submitting and 'locking', at which point the project team at the CEEu would export it to an Excel file in preparation for analysis. Participating teams were similarly encouraged to export a copy of their own data to an Excel file for their future reference.

The tool and audit questions were tested by four acute units during the pilot phase of the audit between November 2007 and January 2008. Following evaluation of this phase, minor modifications were made to the audit tool, questions and supporting documents e.g. clarifications to 'help-notes' and ordering of the questions.

Data collection period

Collection and submission of the clinical audit data took place between Monday 3rd March and 16 May 2008. Follow-up data at 90 days following the index audit admission was also collected and entered via the web-based data collection tool which remained open until 1st September 2008.

Telephone and email support

The project team provided dedicated support to deal with queries or comments from participants throughout the audit; a telephone helpline was available from Monday to Friday, 9.30am to 4.30pm and queries could be emailed directly to the project team. Where similar queries were being raised frequently, they were shared with teams via the weekly project updates, along with responses from the Clinical Directors.

Reliability of data

In order to gain a measure of the reliability of the data submitted, units were asked to identify a second individual to re-enter clinical data on the

first 5 patients included in the audit. It was stressed that this re-entry should be done without reference to the data that was collected and entered by the first auditor. 199 units submitted 952 cases for analysis. The levels of reliability were generally good with kappa values of 0.60 and higher dominating the results. Many were over 0.80 (very good). There are no data items against which we would issue a 'health warning'. For further details of the reliability analyses please see Appendix D.

Presentation of results

This report gives your individual results alongside the summary results for all units participating in this audit. For some results the variation between units is summarised by the hospital median result and hospital inter-quartile range (IQR) and shown graphically by histograms.

Where applicable, 2003 National COPD Audit data is recorded beneath tables to allow an assessment of change.

Please note in tables and text that percentages have been rounded to the nearest percentage. Sometimes, when categories are combined to give a combined percentage, it is the numbers that are added and not the percentages.

Sections 1 to 15 give your results for each question asked in the audit, alongside the national summary.

RESULTS 2008

Patient data were received from 232 units within 177 Trusts. Response rate for Trusts was 96% (177/184) (Appendix E). 9716 admissions (episodes) were available for analysis. Overall the median number of admissions per unit was 46, inter-quartile range 29-58, range 1-64. 55% (5354) were admissions during March 2008, 36% (3530) during April 2008 and 9% (832) during May 2008.

You contributed **60** admissions to the analyses.

Who completed the audit proforma

Multiple responses were possible – i.e. combinations of auditors.

	National Audit (9716)	
FY1	5%	452
Fy2 and / or ST1 and / or ST2 and / or SHO	10%	1006
ST3 and above and / or SpR	25%	2420
Associate Specialist	0.5%	50
Staff Grade	2%	215
Respiratory Consultant	15%	1475
Respiratory Physiologist [Lung Function Technician]	0.1%	9
COPD Nurse	15%	1500
Other Specialist Respiratory Nurse	20%	1984
Specialist Respiratory Physiotherapist	3%	254
Other*	9%	896

*Other includes clinical audit / governance (709), other nursing (139), occupational therapist (30)

2003 Audit: Nurse 22%, SpR 26%, SHO 15%, Audit staff 25%, other 19%.

Section 1: Social-demographic characteristics

Key messages:

- There has been an increase in the proportion of admissions that are female so that COPD is now a disease of equal importance to both men and women.
- The average age of admissions has increased but there is still a high proportion of patients under the age of 85.
- The recording of ethnicity has improved.
- Over 90% of patients live at home, 36% on their own.

Gender

Males (4906) and females (4810) both made up 50% of the audit sample (9716). This compares with 53% males and 47% females in the 2003 audit.

Age
Mean (SD) age was 73 (10) years (your unit mean was **( )** years). 22% (2130) were aged under 65 years, 30% (2960) 65-74 years, 35% (3420) 75-84 years and 12% (1206) 85 years and older.

Mean (SD) for males was 73 (10) years and mean (SD) for females was 72 (11) years. Mean ages in the 2003 audit were 72 for males and 71 for females.

Ethnicity
Ethnicity was known for 91% (8863), up from 80% in the 2003 audit. When known 98% of the audit sample were recorded as being white. Ethnicity was known in **( )** of your audit sample.

Accommodation
54% (5269) lived in a house/flat with another person, 36% (3515) lived alone in a house/flat, 4% (429) lived in sheltered accommodation and 5% (503) were in a residential placement. In the 2003 audit 36% lived alone, 58% with others.

Personal care
60% (5802) received no care, 13% (1291) had unpaid care living in, 9% (901) unpaid care coming in, 4% (383) paid care living in, 11% (1022) paid care coming in, 2% (169) both paid and unpaid care, 1% (148) other/not known.

Section 2: Admission data

Key messages:

- The recording of important clinical information and investigations has improved.
- Weight (38%), height (33%) and body mass index (BMI) (29%) remain poorly recorded.
- Nearly all patients (98%) were admitted with increasing breathlessness.
- When recorded, 66% of patients had increasing volumes of sputum but only 61% a change in colour.
- The majority of Chest X-Ray (CXR) comments recorded in the notes are made by junior medical staff.
- There has been an increase of 8% in the number of non-respiratory consultants commenting on the admission CXR. The decrease in missing data since 2003 may explain some or all of this.

Initial care

	National audit (9716)		Your Unit ( )
Patient admitted as an in patient	99%	9622	
If yes, patient was initially admitted under the care of:			
Respiratory Consultant	30%	2865	
Care of Elderly Physician	15%	1445	
General Physician	55%	5272	
Other / Not known *	0.4%	40	

***** includes A&E (16), intensive care (10), not known (6).

2003 Audit: admitted to hospital under: respiratory physician 29%, COE physician 16%, general physician 49%, other/not known 5%.

Respiratory rate

RR / min	National audit (9716)		Your Unit ( )
Recorded	93%	9040	
If recorded:			
<20	18%	1645	
20-29	63%	5693	
30+	19%	1702	
Median (IQR)	24	20-28	**Median:**

2003 Audit: known for 81%. Median (IQR): 24 (20-28).

Breathlessness and sputum

	National audit (9716)		Your Unit ( )
Level of breathlessness recorded	98%	9532	
Increasing level of breathlessness	98%	9300/9532	
No sputum	6%	577	
Volume of sputum recorded	84%	7642/9139	
Increasing volume of sputum	66%	5024/7642	
Colour of sputum recorded	86%	7843/9139	
Changes in the colour of sputum	61%	4781/7843	

2003 Audit: increasing level of breathlessness 95%, no sputum 20%, increasing volume of sputum 71%, changes in colour of sputum 64%. Colour of sputum: white/grey 33%, yellow/green 67%.

Guideline standard

"In all patients with an exacerbation referred to hospital

- ***a chest radiograph should be obtained***
- ***arterial blood gas tensions should be measured and the inspired oxygen concentration must be recorded."***

(Grade D recommendation)

NICE, 2004. National clinical guideline on management of chronic obstructive pulmonary disease in adults in primary and secondary care

Peripheral oedema

	National audit (9716)		Your Unit ( )
Recorded	75%	7277	
Peripheral oedema present (noted at any time during admission)	32%	2310/7277	

2003 Audit: recorded 76%. If recorded, peripheral oedema present 32%.

Chest X-Ray appearance on admission

	National audit (9716)		Your Unit ( )
CXR - no abnormality	17%	1662	
Changes consistent with COPD	37%	3563	
Changes consistent with pneumonia	16%	1530	
Suspected or definite cancer	2%	155	
Other abnormality	19%	1820	
X-ray poor quality and unhelpful	0.7%	68	
No comment made	8%	817	
Not taken	1%	101	

2003 Audit: CXR - no abnormality 14%, changes consistent with COPD 38%, changes consistent with pneumonia 14%, suspected or definite cancer 2%, other abnormality 20%, X-ray poor quality or unhelpful 1%, not recorded 15%.

Who commented on Chest X-Ray appearance

	National audit (8798 CXR with comment)		Your Unit ( )
FY1	6%	525	
FY2 and/or ST1 and/or ST2 and/or SHO	34%	3005	
ST3 and above and/or SpR	19%	1690	
Associate Specialist	0.2%	16	
Staff Grade	1%	109	
Respiratory Consultant	9%	812	
Non-Respiratory Consultant	17%	1515	
Radiologist	6%	566	
Don't know	6%	560	

2003 Audit: respiratory consultant 7%, non-respiratory consultant 9%, registrar 10%, SHO 32%, PRHO 4%, radiologist 11%, not known 27%.

Serum albumin level (g/dl)

	National audit (9716)		Your Unit ( )
Recorded	73%	7131	
Median (IQR)	39	(35-42)	
<34 g/dl	18%	1300	

2003 Audit: Recorded 67%, if recorded then 20% <34 g/dl.

Blood urea level (mmol/l)

	National audit (9716)		Your Unit ( )
Recorded	92%	8936	
Median (IQR)	6.2	(4.6-8.7)	
>7.1 mmol/l	38%	3402	

2003 Audit: Recorded 92%, if recorded then 36% >7.1 mmol/l.

Blood creatinine level (umol/l)

	National audit (9716)		Your Unit ( )
Recorded	96%	9289	
Median (IQR)	83	(68-105)	

2003 Audit: Recorded 92%.

Height, weight and BMI

	National audit (9716)		Your Unit ( )
HEIGHT			
Recorded	33%	3163	
Median (IQR) m	1.64	(1.57-1.72)	
WEIGHT			
Recorded	38%	3721	
Median (IQR) Kg	65	(54-79)	
BMI			
Known	29%	2805	
Median (IQR)	24	(20-29)	

2003 Audit: weight known for 40% overall, BMI for 28% overall.

Section 3: Medical History

Key messages:

- The percentage of current smokers has fallen from 41% to 33% since 2003 though the definition of an ex-smoker has changed slightly since the 2003 audit. This may explain some of the fall. The recording of pack years remains low at 55%.
- Cardiovascular diseases remain a major co-morbidity in COPD patients.
- Recording of Medical Research Council (MRC) dyspnoea score is poor (47%), but 67% of those recorded are Grade 4-5 in the steady state prior to admission.
- Performance status was not derivable in 10% of cases, despite its importance in prognosis.
- Only 3% of patients had evidence of documented cor pulmonale on admission.

Performance status in the weeks prior to admission with an exacerbation of COPD

	National audit (9716)		**Your Unit ( )**
Normal activity	8%	806	
Strenuous activity limited	14%	1320	
Limited activity but self care	43%	4214	
Limited self care	19%	1826	
Bed or chair bound - no self care	6%	582	
Unknown	10%	968	

2003 Audit: normal activity 10%, strenuous activity limited 17%, limited activity but self-care 41%, limited self-care 18%, bed or chair bound – no self care 3%, unknown 12%.

Guideline standard
"One of the primary symptoms of COPD is breathlessness. The MRC dyspnoea scale should be used to grade the breathlessness according to the level of exertion required to elicit it" (Grade D recommendation)

NICE, 2004. National clinical guideline on management of chronic obstructive pulmonary disease in adults in primary and secondary care

What was the patients Medical Research Council (MRC) dyspnoea score in the stable state before this exacerbation?

	National audit (9716)		Your Unit ( )
Recorded	47%	4561	
If recorded:			
Grade 1	6%	255	
Grade 2	9%	428	
Grade 3	18%	843	
Grade 4	36%	1627	
Grade 5	31%	1408	

Other significant medical conditions

Multiple responses possible.

	National audit (9716)		Your Unit ( )
Recorded	99%	9608	
Specific conditions: % of 9608			
Ischaemic Heart Disease	25%	2439	
Left Heart failure (LVF)	7%	645	
Cor pulmonale	3%	319	
Lung cancer	2%	180	
Cardiac arrhythmia e.g. AF	10%	961	
Locomotor problems	11%	1090	
Stroke	6%	619	
Diabetes	12%	1130	
Visual impairment	2%	218	
Neurological condition	5%	528	
Alcohol-related condition	3%	250	
Psychiatric condition	7%	708	
Other malignant disease	6%	602	
Thromboembolytic Disease-pulmonary embolism, DVT	3%	313	
Other cardiovascular disease	19%	1862	
Other gastro-intestinal condition	9%	844	
Other endocrine disorder	5%	467	
Other	14%	1391	
None of above (including other) stated	23%	2169	
1 or more significant medical conditions	77%	7439	
3 or more significant medical conditions	19%	1865	

2003 Audit: heart disease 38%, stroke 6%, other chest problems 11%, diabetes 10%, loco-motor problems 12%, visual impairment 3%.

Guideline standard:
"An up to date smoking history, including pack years smoked (number of cigarettes smoked per day, divided by 20, multiplied by the number of years smoked), should be documented for everyone with COPD." (Grade D recommendation)

NICE, 2004. National clinical guideline on management of chronic obstructive pulmonary disease in adults in primary and secondary care

Smoking status

	National audit (9716)		**Your Unit ( )**
Recorded	94%	9116	
If recorded:			
Current smoker	33%	3053	
Ex-smoker (stopped prior to hospital admission)	64%	5793	
Life long non-smoker	3%	270	

2003 Audit: recorded 95%. If recorded: current smoker 41%, Ex-smoker (stopped >3 months) 55%, life-long non-smoker 4%.

If a smoker / ex-smoker, how many pack years?

	National audit (8846 current or Ex smokers)		**Your Unit ( )**
Recorded	55%	4838	
Median (IQR)	40years	30-60	
<20 pack years	8%	388	

2003 Audit: recorded 46%, <20 pack years 9%, Median 40 years.

Section 4: Pharmacological intervention

Key messages:

- The great majority of patients received systemic steroids (86%) and antibiotics (81%) within the first 24 hours although only 61% of patients report a change in colour of sputum.
- The recording of oxygen prescription on the drug chart within the first 24 hours was very poor (16%).

Guideline standard
"In the absence of significant contraindications oral corticosteroids should be used, in conjunction with other therapies, in all patients admitted to hospital with an exacerbation of COPD" (Grade A recommendation)

NICE, 2004. National clinical guideline on management of chronic obstructive pulmonary disease in adults in primary and secondary care

Systemic corticosteroids for > 24 hours as an in-patient

	National audit (9716)		Your Unit ( )
Recorded	99%	9617	
Systemic corticosteroids	86%	8318/9617	

2003 Audit: known 97%. If known, systemic corticosteroids 84%.

Guideline standard
"Antibiotics should be used to treat exacerbations of COPD associated with a history of more purulent sputum" (Grade A recommendation)

"Patients with exacerbations without more purulent sputum do not need antibiotic therapy unless there is consolidation on a chest radiograph or clinical signs of pneumonia"(Grade B recommendation)

"Initial empirical treatment should be an aminopenicillin, a macrolide, or a tetracycline" (Grade D recommendation)

NICE, 2004. National clinical guideline on management of chronic obstructive pulmonary disease in adults in primary and secondary care

Antibiotics in the first 24 hours of admission

	National audit (9716)		Your Unit ( )
Recorded	99%	9615	
Antibiotics received	81%	7794/9615	
• amoxicillin / ampicillin	25%	2369/9615	
• benzylpenicillin	3%	274/9615	
• cephalosporin	6%	551/9615	
• co-amoxiclav	20%	1955/9615	
• macrolide	27%	2563/9615	
• tetracycline / doxycycline	17%	1647/9615	
• Other *	7%	683/9615	

* other includes tazocin (144), ciprofloxacin (126), levofloxacin (92), moxifloxacin (56), quinolone (34).

Oxygen prescribed on drug chart as in-patient in first 24 hours?

	National audit (9716)		Your Unit ( )
oxygen prescribed	16%	1556	

Section 5: Arterial blood gases on admission

Key messages:

- 20% of patients were acidotic on admission.
- 30% of patients received high flow oxygen before arterial blood gases (ABGs) were taken, compared to 42% in 2003.

Guideline standard
"When the patient arrives at hospital, arterial blood gases should be measured and the inspired oxygen concentration noted in all patients with an exacerbation of COPD. Arterial blood gas measurements should be repeated regularly, according to the response to treatment" (Grade D recommendation)

NICE, 2004. National clinical guideline on management of chronic obstructive pulmonary disease in adults in primary and secondary care

Proportion of patients in which arterial blood gases were taken

	National audit (9716)		**Your Unit ( )**
Recorded	99%	9596	
blood gases taken	87%	8340/9596	

2003 Audit: recorded 97%. If recorded, blood gases taken 85%.

Arterial blood gas results

		National audit		Your Unit
pH	8215 cases			
	<7.26	7%	557	
	7.26-7.34	14%	1121	
	7.35+	80%	6537	
	Median (IQR)	7.41	7.36-7.45	
Bic	7826 cases			
	<23	14%	1096	
	23-30	65%	5104	
	>30	21%	1626	
	Median (IQR)	26	24-30	
PCO2	8229 cases			
	<= 6.0	56%	4628	
	> 6.0	44%	3601	
	Median (IQR)	5.8	4.9-7.2	
PO2	8231 cases			
	<7.3	21%	1691	
	7.3-8.0	14%	1125	
	>8.0	66%	5415	
	Median (IQR)	8.9	7.6-11.3	

2003 Audit: median pH 7.40, Bic 27, PCO2 5.9, PO2 9.2.

Percentage in whom lowest pH was on admission

	National audit		Your Unit
pH value was the lowest during the admission	78%	6085/7763	

Patient on air or oxygen

	National audit (9176)		Your Unit ( )
Air	33%	3183	
Oxygen	50%	4864	
Not recorded	17%	1669	

2003 Audit: air 32%, oxygen 56%, not known 11%.

Patient on controlled oxygen

	National audit (4864 on oxygen)		Your Unit ( )
Controlled*	70%	3300/4685	

* <=28% or <=4 litres

2003 Audit: if on oxygen, controlled oxygen 76%.

High flow oxygen (> 35%) (e.g. in ambulance) before arterial blood gases taken

	National audit (9716)		**Your Unit ( )**
Recorded	52%	5052	
High flow oxygen received	30%	1491/5052	
Interval between receiving high flow oxygen and gases being taken:			
Taken on high flow oxygen (>35%)	33%	491/1491	
< = 15 minutes	6%	86/1491	
> 15 to < = 60 minutes	24%	354/1491	
> 60 minutes	38%	560/1491	

2003 Audit: recorded 58%. If recorded, high flow oxygen received 42%. Note the qualifier >35% was not included in the 2003 question.

Section 6: Lowest pH (if not at admission)

Key messages:

- In 17% (1678) of 8215 with known pH values at admission, the lowest pH value was recorded later during the admission. The median (IQR) reduction in pH for these 1678 cases was 0.05 (0.02 to 0.09).
- The proportion either acidotic at admission or later during admission was 26% (2143/8215).
- 51% (465/918) of those found to be acidotic later on during the admission were not acidotic at admission.
- Of 1678 patients acidotic at admission, 27% (453/1678) had a lower pH recorded later. The median (IQR) reduction in pH for these 453 was 0.04 (0.02 to 0.07).
- 7% (465/6537) of non-acidotic patients at admission became acidotic later on during the admission. The proportion either acidotic at admission or later during admission was 26% (2143/8215).
- The median time to lowest pH occurring later during admission was 12 hours into the admission. Nearly two thirds (64%) were receiving >28% oxygen at this time.

		What was the lowest arterial pH recorded during the admission?				
		Lowest was recorded at admission	**Lowest was recorded After admission**			
			<7.26	7.36-7.34	7.35+	Total
arterial pH at admission	<7.26	427	130	0	0	557
	7.36-7.34	798	142	181	0	1121
	7.35+	5312	151	314	760	6537
	Total	6537	423	495	760	8215

		National audit (1678)		Your Unit
Lowest pH (if not at admission)	1678 cases			
	<7.26	25%	423	
	7.26-7.34	29%	495	
	7.35+	45%	760	
	Median (IQR)	7.33	7.25-7.39	
Bic value accompanying this pH	1617 cases			
	<23	18%	298	
	23-30	50%	810	
	>30	31%	509	
	Median (IQR)	27	24-32	
PCO2 accompanying this pH	1674 cases			
	<= 6.0	29%	484	
	> 6.0	71%	1190	
	Median (IQR)	7.6	5.8-9.8	
PO2 accompanying this pH	1671 cases			
	<7.3	19%	321	
	7.3-8.0	12%	194	
	>8.0	69%	1156	
	Median (IQR)	9.2	7.7-11.4	

Hours into the admission of lowest pH

	National audit (1678)		Your Unit ( )
Median (IQR)	12 hours	(3-48)	

On air or oxygen

	National audit (1678)		Your Unit ( )
Air	12%	195	
Oxygen	80%	1344	
Not recorded	8%	139	

Controlled on oxygen

	National audit (1344 on oxygen)		Your Unit ( )
Controlled*	64%	846/1314	

* <=28% or <=4 litres

Section 7: pH below 7.35 during admission

Key messages:

- 79% of patients with pH<7.35 had a repeat blood gas within 24 hours, but only 26% of these were taken within 1 hour of the previous sample and 54% within 2 hours**.**

Further set of arterial blood gases within 24 hours

	National audit	(9716)	**Your Unit ( )**
pH<7.35 during admission	22%	2143	
Further set of gases taken <24h	79%	1635/2077	
< 1 hour	26%	430/1635	
1 to < 2 hours	28%	454/1635	
2 to 4 hours	21%	349/1635	
> 4 hours	25%	402/1635	

2003 Audit: pH <7.35 at any time during the admission 23%.

If pH < 7.35 during admission

		National audit		**Your Unit**
Further pH	1625 cases			
	<7.26	21%	335	
	7.26-7.34	44%	721	
	7.35+	35%	569	
	Median (IQR)	7.32	7.27-7.36	
Bic value accompanying further pH	1557 cases			
	<23	14%	208	
	23-30	49%	759	
	>30	38%	590	
	Median (IQR)	29	25-33	
PCO2 accompanying further pH	1624 cases			
	<= 6.0	14%	235	
	> 6.0	86%	1389	
	Median (IQR)	8.2	6.7-9.8	
PO2 accompanying further pH	1621 cases			
	<7.3	27%	440	
	7.3-8.0	13%	207	
	>8.0	60%	974	
	Median (IQR)	8.6	7.1-10.4	

On air or oxygen

	National audit (1635)		Your Unit ( )
Air	9%	147	
Oxygen	66%	1076	
NIV	20%	324	
Not recorded	5%	88	

Controlled on oxygen

	National audit (1076 on oxygen)		Your Unit ( )
Controlled*	77%	807/1051	

* <=28% or <=4 litres

Section 8: Ventilatory support

Key messages:

- 12% of patients received ventilatory support.
- There was a documented plan for escalation or withdrawal of support in only 59% of 1168 patients receiving non-invasive ventilation (NIV).
- Only 1% of patients received invasive ventilation.
- Use of doxapram has now almost completely ceased.
- In 51% of patients who received ventilatory support, treatment was commenced after the first three hours of presentation.
- 20% of patients who received ventilatory support commenced treatment at some time beyond 24 hours into their admission.
- It is reported that 3% of acidotic patients did not receive ventilatory support as appropriate facilities were unavailable.
- Most of the 149 medical decisions not to escalate treatment were made by doctors of ST3 level or above, but only 15% of such decisions were made by Respiratory Consultants whilst 11% decisions were taken by very junior medical staff.
- There was evidence of a 'Do Not Resuscitate' (DNR) order signed within the first 24 hours in only 11% of the total audit population.

Guideline standards
"NIV should be considered in all patients with an acute exacerbation of COPD in whom a respiratory acidosis (pH <7.35 $PaCO_2$> 6kPa), persists despite immediate maximum standard medical treatment on controlled oxygen therapy for no more than 1 hour" (Grade A recommendation)

"Repeat arterial blood gases:
- ***After 1 hour of NIV therapy and 1 hour after every subsequent change in settings***
- ***After 4 hours, or earlier in patients who are not improving clinically"*** (Grade C recommendation)

"A management plan in the event of NIV failure should be made at the outset. A decision to intubate and proceed to invasive mechanical ventilation should normally be made within 4 hours of starting NIV or sooner. Improvements in respiratory rate, heart rate and arterial blood gas parameters are usually apparent within this time" (Grade C recommendation)

Royal College of Physicians, British Thoracic Society and The Intensive Care Society national guidelines, 2002. Non invasive ventilation in chronic obstructive pulmonary disease: management of acute type 2 respiratory failure

Guideline standards
"NIV should be used as the treatment of choice for persistent hypercapnic ventilatory failure during exacerbations despite optimal therapy" (Grade A recommendation)

"Patients with exacerbations of COPD should receive treatment on intensive care units, including invasive ventilation when this is thought to be necessary" (Grade C recommendation)

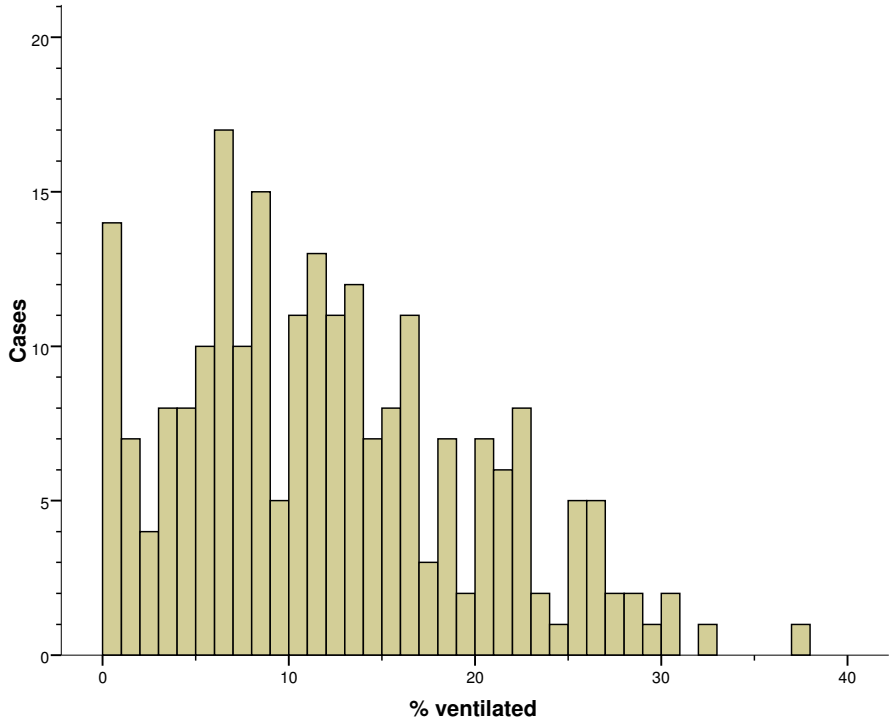
"It is recommended that doxapram is used only when non-invasive ventilation is either unavailable or considered inappropriate" (Grade D recommendation)

NICE, 2004. *National clinical guideline on management of chronic obstructive pulmonary disease in adults in primary and secondary care*

Ventilatory support at any time during admission

	National audit (9716)		Your Unit ( )
Yes	12%	1168	
No	87%	8406	
Not recorded	1%	142	

2003 Audit: Yes 10%, No 86%, not known 4%.



Type of ventilatory support

	National audit (9716)		Your Unit ( )
Invasive ventilatory support	1%	122	
Non-invasive ventilation	11%	1077	
Doxapram	0.2%	15	

2003 Audit: invasive 1%, non-invasive 9%, doxapram 0.5%.

Time after presentation that ventilatory support given

	National audit (1168 with support)		Your Unit ( )
< 30 minutes	11%	124	
30 to < 60 minutes	14%	159	
1 to < 3 hours	25%	289	
3 - 24 hours	31%	366	
At a later stage in the admission	20%	230	

Documented plan for escalation/withdrawal of treatment in event of NIV failure

	National audit (1168 with support)		Your Unit ( )
Yes	59%	689	
No	23%	272	
Not recorded	18%	207	

Do Not Resuscitate (DNR) order signed within first 24 hours

	National audit (9716)		Your Unit ( )
Yes	11%	1108	
No	70%	6823	
Not recorded	18%	1785	

Reason for not ventilating if patient had pH<7.35

	National audit (2143 with pH<7.35 during admission)		Your Unit ( )
• Did not receive either invasive or non-invasive ventilation	50%	1079/2143	
• Patient refused	4%	38	
• No facilities	3%	30	
• Medical decision not to escalate to NIV or invasive ventilation	14%	149	
• Patient responded to medical therapy	60%	648	
• Failed	0.4%	4	
• No apparent reason	19%	210	

2003 Audit: of patients with pH<7.35, 62% did not receive either invasive or non-invasive ventilation. Reason known for only one-third and of these: medically inappropriate 85%, no facilities 11%, patient refused 4%, failed 1%.

Who decided not to escalate to NIV or invasive ventilation

	National audit (149 medical decision)		Your Unit ( )
FY1	1%	1	
FY2 and / or ST1 and / or SHO	10%	15	
ST3 or above and / or SpR	50%	75	
Associate specialist	1%	1	
Staff grade	1%	2	
Respiratory Consultant	15%	23	
Other*	21%	32	

*other comprised non-respiratory consultants (General, COE, ITU, A & E, palliative)

The reasons why it was deemed inappropriate not to give invasive or NIV supports are listed individually in Appendix F.

Section 9: Spirometry

Key messages:

- There was evidence of a spirometry result recorded in the last 5 years in only 55% of patients, a figure unchanged from 2003.
- The median % predicted FEV_1 for those patients with spirometry recorded in the last 5 years was 38%.
- The 2008 population had similar median FEV_1 and % predicted FEV_1 as in 2003

Guideline standard
"Spirometry should be measured in all patients before discharge"
(Grade D recommendation)

NICE, 2004. *National clinical guideline on management of chronic obstructive pulmonary disease in adults in primary and secondary care*

Spirometry recorded in the last 5 years

	National audit (9176)		**Your Unit ( )**
Yes with results	55%	5372	
Yes, documented as recorded in primary care but no results available	2%	191	
No - spirometry not recorded	12%	1208	
No - spirometry not performed	9%	850	
Not known	22%	2095	

FEV1 level (most recent)
Known for 55% (5365/9716)

		National audit (5365 with FEV1)		**Your Unit ( )**
Male	Median (IQR)	0.99	(0.73-1.37)	
Female	Median (IQR)	0.75	(0.58-1.04)	

2003 Audit: FEV1 known for 55%. Median males 0.92, females 0.74.

FEV1 % of predicted

Known for 54% (5270/9716)

	National audit (5270 with %predicted)	Your Unit ( )
Median (IQR)	38% (28-52)%	

2003 Audit: % predicted known for 43%. Median 37%.

Section 10: Respiratory Specialist

Key messages:

- There has been an increase from 70% to 78% in the proportion of patients seeing a respiratory specialist during admission.

Patient seen by respiratory specialist (respiratory nurse or physiotherapist or respiratory physician) during admission

	National audit (9176)		Your Unit ( )
Yes	78%	7595	
No	21%	2005	
Not recorded	1%	116	

2003 Audit: Yes 70%, No 27%, not known 3%.

Section 11: Discharge / Death

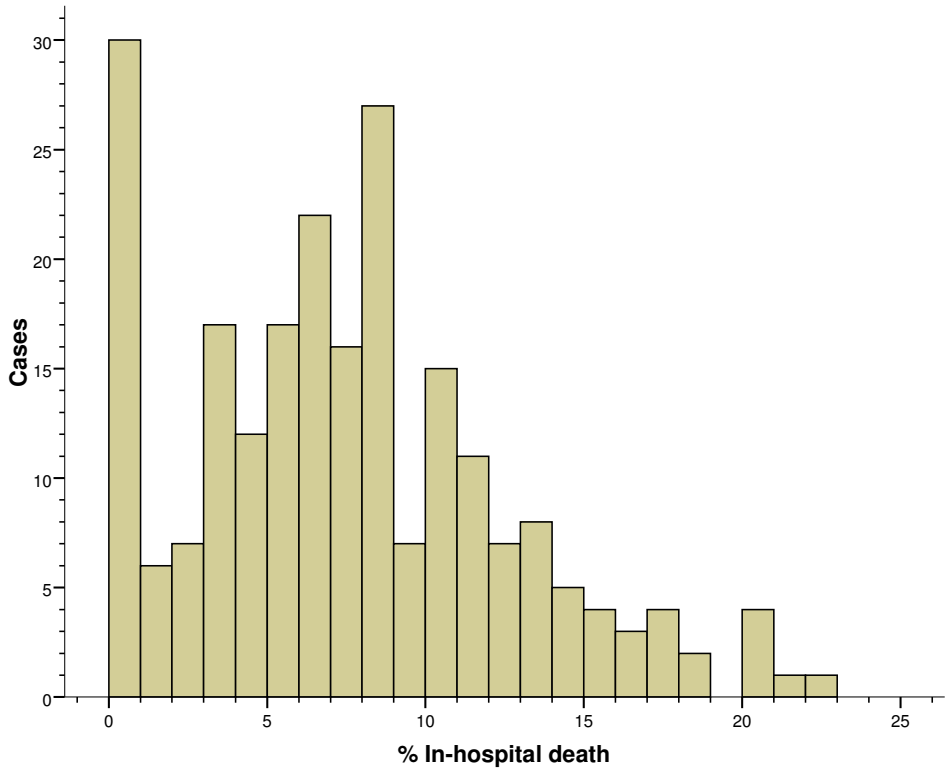
Key messages:

- There has been little change for inpatient mortality rates from 2003 (7.5%) to 2008 (7.7%).
- Overall mortality rates at 90 days have shown a reduction from 15.5% (2003) to 13.9% (2008).
- Of those patients dying within 90 days of admission, fewer succumbed from COPD or its consequences in 2008 compared to 2003 (65% from 71%).

Patient died in hospital during index admission

	National audit (9716)		Your Unit ( )
Yes, died	7.7%	745	
No, discharged	92.3%	8971	

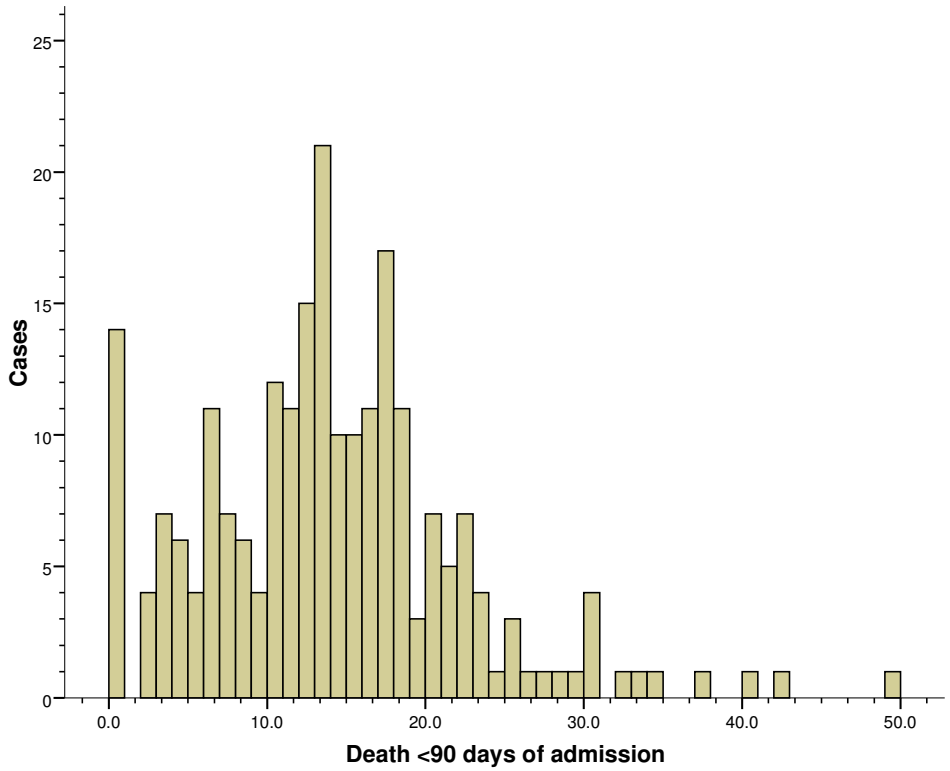
2003 Audit: Yes 7.5%, No 92.5%.



Patient still alive at 90 days after admission

	National audit (9716)		Your Unit ( )
Recorded	96%	9300	
If recorded:			
Yes, alive	86.2%	8011	
No, died <90days	13.9%	1289	

2003 Audit: known for 96%, if known yes alive 84.5%, No died 15.5%.



Reason for 90 day status being 'Not recorded'

	National audit (416)		Your Unit ( )
Notes not available	16%	68	
No information from GP	54%	224	
Too early – not 90 days	25%	102	
Other/not known*	5%	22	

2003 Audit: Notes not available 7%, No information from GP 36%, other 13%, not known 44%.

Cause of death <90 days

	National audit (1289)		Your Unit ( )
COPD or complication of COPD	65%	838	
Other causes (please specify)	21%	276	
Not recorded	14%	175	

2003 Audit: COPD or complication of COPD 71%, other causes 17%, not known 12%.

Section 12: Discharge from hospital or to an Early Discharge Scheme

Key messages:

- Median length of stay has fallen by 1 day compared to 2003.
- More patients (34% compared to 26%) are recorded as having short admissions of at most 3 days duration than in 2003.
- There has been an increase from 47% to 53% in patients discharged under the care of a respiratory physician.
- 25% of patients are discharged on oxygen, prescribed by concentrator in 80% of cases.

Length of Stay in hospital

	National audit (8966/8971)		**Your Unit ( )**
0-3 days	34%	3057	
4-7 days	31%	2740	
8-14 days	21%	1858	
15+ days	15%	1311	
Median (IQR) LOS	5 days	(3-10) days	

2003 Audit (discharges): median 6 days, IQR 3-11 days. 0-3 days 26%, 4-7 days 34%, 8-14 days 25%, 15+ days 16%.

Whose care was the patient under when discharged

	National audit (8971)		**Your Unit ( )**
Respiratory Consultant	53%	4730	
Care of the Elderly Physician	11%	1021	
General Physician	34%	3025	
Not recorded	2%	152	
Other*	0.5%	43	

*other included A&E (27).

2003 Audit (discharges): respiratory physician 47%, care of elderly physician 15%, general physician 33%, not recorded 2%, other 2%.

Patient discharged from hospital on oxygen?

	National audit (8971)		**Your Unit ( )**
Yes, on oxygen	25%	2219	
No	70%	6285	
Not recorded	5%	467	
Prescribed by oxygen concentrator	80%	1767/2219	
First time prescribed for use at home	21%	455/2219	

Section 13: Early Discharge Scheme

Key messages:

- There has been a 4% increase in the number of patients accepted onto an early discharge scheme (14 to 18%) since 2003.
- The number of patients accepted onto an EDS taken as a rapid discharge within 48 hours has increased from 26 to 35% since 2003.
- There has been an increase of 1 day in the median time patients remain under the care of an early discharge scheme since 2003 (7 to 8 days).

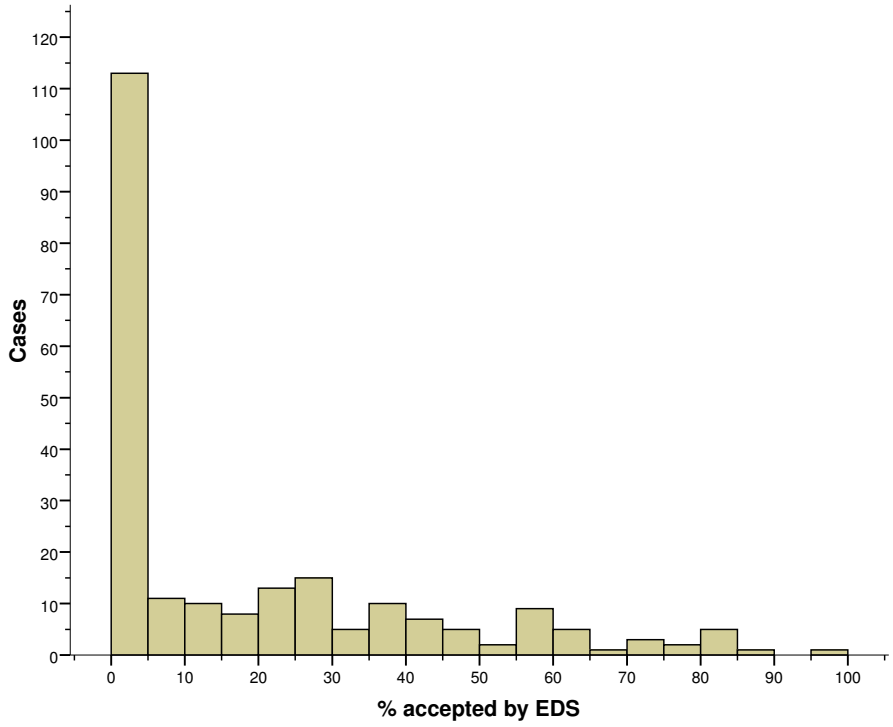
Guideline standard
" *Hospital-at-home and assisted discharge schemes are safe and effective and should be used as an alternative way of managing patients with exacerbations of COPD who would otherwise need to be admitted or stay in hospital"* (Grade A recommendation)

NICE, 2004. National clinical guideline on management of chronic obstructive pulmonary disease in adults in primary and secondary care

Patient accepted by an early discharge (or hospital at home) scheme?

	National audit (8971)		**Your Unit ( )**
Yes, accepted	18%	1630	
No	78%	6987	
Not known	4%	354	

2003 Audit (discharges): Yes 14%, No 81%, not known 4%.



Type of discharge

	National audit (1630)		Your Unit ( )
Rapid discharge < 48 hours	35%	576	
Assisted discharge > 48 hours	63%	1025	
Other / not known	2%	29	

2003 Audit (discharges): Assisted discharge > 48 hours 63% Rapid discharge < 48 hours 26%, other 9%, not known 2%.

Length of time in the scheme (days, calculated)

	National audit (1609/1630)		Your Unit ( )
0-3 days	19%	308	
4-7 days	31%	495	
8-14 days	31%	499	
15+ days	19%	307	
Median (IQR) LOS	8 days	(5-14) days	

2003 Audit: known for 61% in scheme: median (IQR) LOS 7 days (4-12) days.

Section 14: Subsequent admission

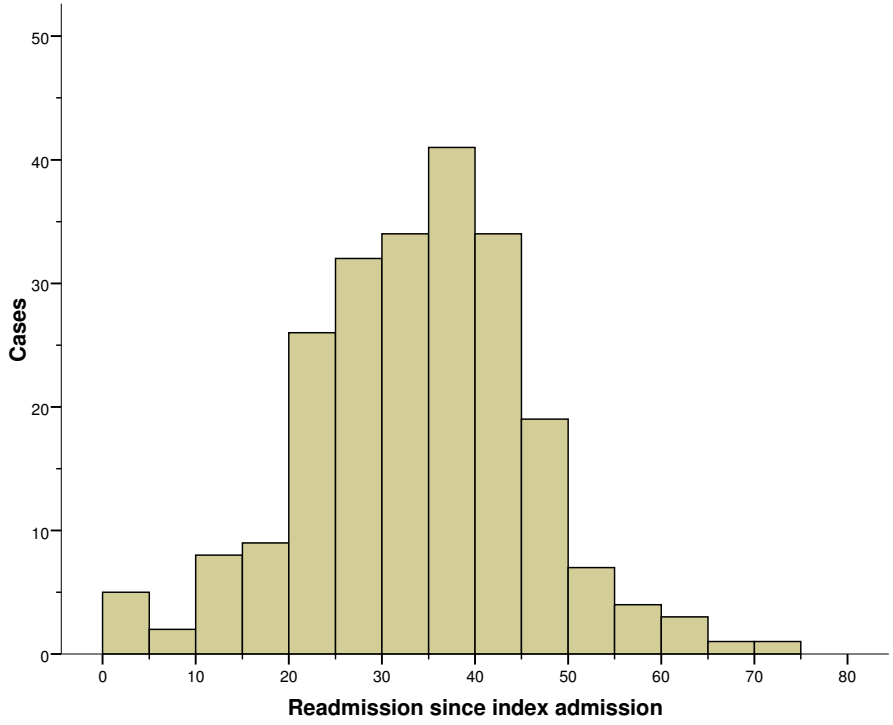
Key messages:

- There has been a 2% increase in the readmission rate since 2003.
- The median time to readmission was 38 days.

Patient admitted to hospital, or accepted by an Early Discharge Scheme, since index admission

	National audit (8971)		**Your Unit ( )**
Yes	33%	2971	
No	64%	5706	
Not known	3%	294	

2003 Audit (discharges): yes 31% within 90 days of index admission, No 67%, not known 3%.



The most recent ***subsequent*** admission / acceptance by an Early Discharge Scheme was a median 38 days, IQR 20 to 66 days after the index audit admission date (data known for 2963/2971).

Section 15: Previous admission

Key messages:

- Half of the patients had been admitted for COPD within the preceding 24 months.

Prior to this audit, patient previously admitted to hospital for COPD, or accepted by an early discharge scheme for COPD in the preceding 24 months

	National audit (9716)		**Your Unit ( )**
Yes	51%	4909	
No	45%	4360	
Not documented	5%	447	

2003 Audit: 67% previously admitted (at any time – note that the preceding 24 month period restriction was new to the 2008 audit).

The most recent ***previous*** admission / acceptance by an Early Discharge Scheme was a median 104 days (3.4 months) , IQR 46 to 266 days (1.5 to 8.7 months) before the index audit admission date (data known for 4903/4909).

APPENDICES

Appendix A Membership of The National COPD Audit 2008 Steering and Implementation Groups

The National COPD Audit 2008 Steering Group

- Professor Mike Roberts, Associate Director of the National COPD Audit 2008: Consultant Respiratory Physician, Whipps Cross University Hospital NHS Trust, Barts and The London School of Medicine and Dentistry, Queen Mary University of London.
- Dr Robert Stone, Associate Director of the National COPD Audit 2008 and Consultant Respiratory Physician, Musgrove Park Hospital, Taunton.
- Dr Ian Basnett, Public Health Consultant, Tower Hamlets Primary Care Trust, London.
- Rhona Buckingham, National COPD Audit 2008 Project Manager, Clinical Effectiveness and Evaluation unit, Royal College of Physicians.
- Maria Buxton, Consultant Physiotherapist, Central Middlesex Hospital and Brent Primary Care Trust.
- Dr John Coakley, Medical Director, Homerton University Hospital NHS Foundation Trust.
- Denise Daly, Consultant Physiotherapist, Royal Surrey County Hospital, Guildford.
- Sheila Edwards, Chief Executive, British Thoracic Society.
- Professor Brian Harrison, British Thoracic Society.
- Dr Steve Holmes, General Practitioner, General Practice Airways Group (GPIAG).
- Kevin Holton, Head of the COPD National Service Framework (NSF) Team, Department of Health.
- Dr Harold Hosker, Consultant Respiratory Physician, Airedale General Hospital, Keighley.
- Jane Ingham, Director of Clinical Standards, Royal College of Physicians.
- Dr Lawrence McAlpine, Consultant Physician, Monklands Hospital, Airdrie.
- Dr Phyo Myint, Honorary Consultant Physician, Norfolk and Norwich University Hospitals.
- Fiona Phillips, Public Health Consultant, COPD National Service Framework (NSF) Team, Department of Health.
- Dr Jonathan Potter, Clinical Director, Clinical Effectiveness and Evaluation unit, Royal College of Physicians.
- Samantha Prigmore, Respiratory Nurse Consultant, St George's Hospital, London.
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- Carol Rivas, Research Fellow, Queen Mary's School of Medicine & Dentistry, University of London.
- Anil Seiger, Manager, Clinical Effectiveness and Evaluation unit, Royal College of Physicians.
- Dame Helena Shovelton, Chief Executive, British Lung Foundation.
- Teresa Smith, Chest Clinic Manager, King Edward VII Hospital, Windsor.
- Dr Stephanie Taylor, Reader in Applied Research, Barts and The London School of Medicine & Dentistry, Queen Mary, University of London.

The National COPD Audit 2008 Implementation Group

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- Professor Brian Harrison, British Thoracic Society.
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- Anil Seiger, Manager, Clinical Effectiveness and Evaluation unit, Royal College of Physicians.
- Dame Helena Shovelton, Chief Executive, British Lung Foundation.
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Appendix B The National COPD Audit 2008: clinical pro-forma

Question Number	Question	Variables	Help notes
Patient demographics			
1	Patient audit number	To be assigned by the system	*The patient audit number is automatically assigned by the system*
2	Auditor discipline (tick all that apply)	☐ FY1 ☐ Fy2 and / or ST1 and / or ST2 and / or SHO ☐ ST3 and above and / or SpR ☐ Associate Specialist ☐ Staff Grade ☐ Respiratory Consultant ☐ Respiratory Physiologist [Lung Function Technician] ☐ COPD Nurse ☐ Other Specialist Respiratory Nurse ☐ Specialist Respiratory Physiotherapist ☐ Other, please specify	*Please record all auditor disciplines that apply*
3	Year of Birth	YYYY	*Please record the patients' year of birth YYYY*
4	Gender	☐ Male ☐ Female	*Please select either Male or Female*

5	Ethnic Group	**White** ☐ White British ☐ White Irish ☐ White (other) **Black / Black British** ☐ Black British ☐ Black Caribbean ☐ Black African ☐ Black Other **Chinese / Other** ☐ Chinese ☐ Other, please specify	**Asian** ☐ Asian British ☐ Asian Indian ☐ Asian Pakistani ☐ Asian / Bangladeshi ☐ Asian Other **Mixed** ☐ White / Black Caribbean ☐ White / Black African ☐ White / Asian ☐ Other ☐ Not documented	*Select the ethnic group as reported by the patient himself / herself. If this information is not recorded in the patients' notes, please record 'Not documented'.*
6	Accommodation	☐ Residential placement ☐ Sheltered accommodation ☐ House / Flat alone ☐ House / Flat with another person		*This refers to where the patient lives.* *If patient lives in a nursing home, please select 'Residential placement'* *If patient lives in a warden controlled flat, please select 'sheltered accommodation'*
7	Personal care received	☐ No care received ☐ Unpaid care, living in ☐ Paid care, living in ☐ Unpaid care, comes in ☐ Paid care, comes in ☐ Paid and unpaid care ☐ Other (please specify)		*This refers to the main source of care.* *This refers to support in personal activities such as dressing, toileting, bathing and washing, feeding and getting about the house.* *If the patient is fully independent, please select 'no care received'.* *If the patient receives care from family or a friend living in the house, please select 'unpaid care, living in'.*

			If the patient receives care from a paid carer who lives in the house, please select 'live in care' *If the patient receives help from local family or friends, please select 'unpaid care, comes in'* *If the patient receives care from paid carers coming in regularly, please select 'paid care, comes in'.* *If the patient receives a mixture of care, i.e. where two or more groups share full responsibility on a more-or-less equal basis, please select 'paid and unpaid care'.*
Reliability case			
8	Is this a reliability case	☐ Yes ☐ No	
9	If this is a reliability case, please enter the patient audit number of the original case		
Admission data			
1.1	Date of admission to hospital n.b. should have been admitted between 3 March 2008 and 18 August 2008	DD / MM / YYYY	*The date of admission to be found in the initial clerking records.* *For inclusion in the audit a diagnosis of CODD should have been made by a physician at the time of admission i.e. on physician led post-take ward round.*

			If the patient is accepted by an early discharge scheme or hospital at home scheme, and not admitted, please enter the date of first contact with the unit. Include patients admitted via A & E with COPD exacerbation
1.2 a.	Was the patient admitted as an in patient? If yes, was the patient initially admitted under the care of a:	☐ Yes ☐ No ☐ Respiratory Consultant ☐ Care of Elderly Physician ☐ General Physician ☐ Not recorded ☐ Other, please specify	*a. This is the consultant that the patient was first admitted under. For patients accepted by an early discharge or hospital at home schemes, and not admitted please enter the consultant responsible for the patient's care. If this is the patient's GP, please tick 'other.*
1.3 a. b. c.	Respiratory rate at admission (RR / min) Was there a record of: Increasing level of breathlessness Increasing volume of sputum Changes in the colour of sputum	☐ Respiratory rate ☐ Not recorded ☐ Yes ☐ No ☐ Not recorded ☐ Yes ☐ No ☐ Not recorded ☐ Yes ☐ No ☐ Not recorded ☐ No sputum	*Please enter the respiratory rate first recorded on admission - this may be on the A&E sheet, nursing observation chart or medical clerking. If there is no RR recorded in the first 4 hours state 'not recorded'.* *a. Please enter 'yes' where there is any documented record of increasing breathlessness in the 14 days prior to admission referred to in the medical clerking record.* *b. Please enter 'yes' where there is any documented record of an increase in the volume of sputum in the 14 days prior to admission referred to in the medical clerking record.*

			c. Please enter 'yes' where there is any documented record of an increase in the volume of sputum in the 14 days prior to admission referred to in the medical clerking record. *If it is recorded that the patient was admitted with any of these 3 symptoms without specifically stating that they were increased above usual level (but equally not specifically stating that they were not increased above the usual level) the implication is that the admitting clinician recorded them as significant and managed the patient accordingly and a 'yes' should be entered.*
1.4	Peripheral oedema present (noted at any time during the admission)	☐ Yes ☐ No ☐ Not recorded	*Please enter 'yes' if oedema is present bilaterally. This information may be found in the initial clerking or in subsequent medical or nursing notes.*
1.5	Chest X-Ray appearance on admission	☐ CXR - no abnormality ☐ Changes consistent with COPD ☐ Changes consistent with pneumonia ☐ Suspected or definite cancer ☐ Other abnormality ☐ X-ray poor quality and unhelpful ☐ No comment made ☐ Not taken	*This question relates to the chest X-ray appearance **within the first 24 hours**. Where the patient has had more than one chest X-ray taken within the first 24 hours please refer to the first X-ray. Record all abnormalities detected in the patient's chest X-ray as documented by the most senior member of staff commenting on the X-ray.*

a.	Comment made by:	☐ FY1 ☐ Fy2 and / or ST1 and / or ST2 and / or SHO ☐ ST3 and above and / or SpR ☐ Associate Specialist ☐ Staff Grade ☐ Respiratory Consultant ☐ Non-Respiratory Consultant ☐ Radiologist ☐ Don't know	*Where comments are made describing a number of potential problems NOT seen e.g. no evidence of pneumothorax, then please enter 'no abnormalities'. Any comment about chest x-ray not included within current options should be recorded as 'other abnormality'* *a. Chest X-ray 'comment made by' **within the first 24 hours**. Please indicate the grade of the most senior member of staff who passed comment on the chest X-ray within the first 24 hours. Where comments have been transcribed by junior staff please indicate the grade of staff who is actually passing comment. Only tick radiologist if no other doctor has passed comment on the X-ray. Staff grade associate specialist may be a research doctor (trust grade) with no equivalence to ST / FY levels.*
1.6	Serum albumin level (g/dl)	_____ g/dl ☐ Not recorded	*Please only refer to measurements taken during this admission. Where more than one result is recorded, please enter the first result. If the results are held electronically you may look them up on the computer and record these results. Please record the first result taken within 24 hours of admission. Results for tests taken after this period are inadmissible.*
1.7	Blood urea level (mmol/l)	_____ mmol/ ☐ Not recorded	*Please only refer to measurements taken during this admission. Where more than one result is recorded, please enter the first result. If the results are held electronically you may look them up on the computer and record these results.* *Please record the first result taken within 24 hours of admission. Results for tests taken after this period are inadmissible.*

1.8	Blood creatinine level (umol/l)	_____ umol/l ☐ Not recorded	*Please only refer to measurements taken during this admission. Where more than one result if recorded, please enter the first result. If the results are held electronically you may look them up on the computer and record these results.* *Please record the first result taken within 24 hours of admission. Results for tests taken after this period are inadmissible*
1.9	Weight (kg)	_____ kg ☐ Not recorded	*Take the most recent measure within the year or the admission weight recorded in the nursing TPR record. This information may be in the out-patient notes, spirometry or pulmonary function reports or nursing admission forms including observation charts.*
1.10	Height (m)	_____ m ☐ Not recorded	*This information may be in the out-patient notes, spirometry or pulmonary function records. There are no time restrictions on height measurement. Please enter any recorded measurement made as an adult. (If you come across two different measures, please use the most recent).*
1.11	BMI (calculated)		*The web-tool will automatically calculate this.*
Medical history			
2.1	Performance status in the weeks prior to admission with an exacerbation of COPD	☐ Normal activity ☐ Strenuous activity limited ☐ Limited activity but self care ☐ Bed or chair bound - no self care ☐ Unknown	*This is the level of activity of patient prior to admission / normal abilities of patient prior to the exacerbation which caused the current admission. This information may be found in initial clerking or nursing notes, if available, but may need some interpretation.* *Normal activity. Common activity to be expected of a healthy individual of that age.*

			Strenuous activity limited. Patient can perform most daily functions, but may become short of breath walking >100 yards, or more than one flight of stairs. *Limited activity but self care. Patient finds any movement outside the home difficult, but is responsible for their own care* *Limited self care. Patient is reliant on relatives, or nursing for more strenuous functions on a regular basis.* *Bed or chair bound - no self care. Patient is unable to move usefully, and cannot perform most day to day activities.* *Unknown. There is no evidence of status in the notes, and the patient was not unable to describe their normal functions coherently. NB please try not to use this category simply because no specific note on performance status exists.*
2.2	What was the patients Medical Research Council (MRC) dyspnoea score in the stable state before this exacerbation?	☐ Grade 1 ☐ Grade 2 ☐ Grade 3 ☐ Grade 4 ☐ Grade 5 ☐ Not recorded	The MRC score may be recorded in the admission case notes or in a recent outpatient clinic letter. If it is not look at the information provided in the admission notes or a recent outpatient visit and try to estimate the MRC score. If it is not possible to do this easily then mark as 'not recorded' • **Grade 1** – Not troubled by breathlessness except on strenuous exercise • **Grade 2** – Short of breath when hurrying or walking up a slight hill • **Grade 3** – Walks slower than contemporaries on level ground because of breathlessness, or has to stop for breath when walking at own pace. • **Grade 4** – Stops for breath after walking about 100 metres [109 yards] or after a few minutes on level ground.

			• **Grade 5** – Too breathless to leave the house or breathless when dressing or undressing.
2.3 a	Does the patient have any other significant medical conditions If yes, please tick which conditions are recorded in the patients medical records	☐ Yes ☐ No ☐ Not recorded ☐ Ischaemic Heart Disease ☐ Left Heart failure (LVF) ☐ Cor pulmonale ☐ Lung cancer ☐ Cardiac arrhythmia e.g. AF ☐ Locomotor problems ☐ Stroke ☐ Diabetes ☐ Visual impairment ☐ Neurological condition ☐ Alcohol-related condition ☐ Psychiatric condition ☐ Other malignant disease ☐ Thromboembolytic Disease - pulmonary embolism, DVT ☐ Other cardiovascular disease ☐ Other gastro-intestinal condition ☐ Other endocrine disorder ☐ Other, please specify	*Please tick the appropriate boxes. 'Significant' means a condition requiring medical treatment or causing symptoms. Locomotor problems include peripheral vascular disease, arthritis and amputation.*
2.4	Smoking status	☐ Current smoker ☐ Ex-smoker (stopped prior to hospital admission) ☐ Life long non-smoker ☐ Not recorded	*Please enter the smoking status as recorded during the index admission.* *If smoking status was not recorded during the index admission please select 'not recorded'.* *If the patient stopped prior to this exacerbation, please enter 'ex smoker'. If patient stopped since then mark as 'smoker'.*

a.	If a smoker / ex-smoker, how many pack years?	_____ pack years ☐ Not recorded	*Pack years are calculated by multiplying the number of packs smoked per day by number of years that a patient has been a smoker. E.g. 1 pack (20 cigarettes) per day x 10 years = 10 pack years.*
Pharmacological Intervention			
3.1	Did the patient receive systemic corticosteroids for more than 24 hours as an in-patient?	☐ Yes ☐ No ☐ Not recorded	*Systemic means oral (tablet) or parenteral (IV/IM). This information can be found on the drug chart or in the patient notes. Commonly used systemic corticosteroids include Prednisolone, Hydrocortisone, Methylprednisolone and Triamcinolone.* *Please ignore information about dosages and routes (e.g. oral or IV). We are interested in whether or not the patient received systemic corticosteroids.*
3.2	Did the patient receive antibiotics in the first 24 hours of his / her admission?	☐ Yes ☐ No ☐ Not recorded	
a.	If yes, which antibiotic did the patient receive?	☐ benzylpenicillin ☐ amoxicillin / ampicillin ☐ co-amoxiclav ☐ cephalosporin ☐ macrolide ☐ tetracycline / doxycycline ☐ Other (please specify)	*Indicate all that apply.*
3.3	Did the patient have oxygen prescribed on the drug chart as an in-patient in the first 24 hours?	☐ Yes ☐ No	*Indicate yes or no as appropriate.*

Respiratory status / ventilatory support			
4.1	Were arterial blood gases taken on admission?	☐ Yes ☐ No ☐ Not recorded	*Please only refer to measurements taken on admission. Please enter the results of the **first** arterial blood gases taken during the admission.*
a.	If yes, what were the results: pH	_____ ph ☐ Not recorded	
i.	Is this pH value the lowest during the admission?	☐ Yes ☐ No ☐ Not recorded	
b.	Bic (mmol/L)	_____ mmol/L ☐ Not recorded	*For Bic please enter the actual reading.*
c.	PCO2 (kPa)	_____ kPa ☐ Not recorded	*The test results may be attached to the notes or transcribed. If multiple arterial blood gases were taken, please enter the results of the first arterial sample.*
d.	PO2 (kPa)	_____ kPa ☐ Not recorded	
4.2	Was the patient on:	☐ Air ☐ Oxygen ☐ Not recorded	
a	If on oxygen, was the oxygen rate recorded as a percentage or a numerical flow rate?	☐ Percentage (preferred) ☐ Flow rate ☐ Amount of oxygen not stated	a. It is preferable to enter a percentage if given by mask or flow rate can be entered if given by nasal cannuale but if oxygen is given only by flow rate do not attempt to transcribe this into a percentage fraction of inspired oxygen. Select 'amount of oxygen not stated' if the percentage or flow rate is unclear or not recorded.
	i. Percentage of oxygen ii. Numerical flow rate	_____ % _____litres / min	

4.3 a	Did the patient receive high flow oxygen (> 35%) (for example in the ambulance) before arterial blood gases were taken? a. If yes, what interval was there between receiving high flow oxygen and the gases being taken?	☐ Yes ☐ No ☐ Not recorded ☐ taken on high flow oxygen (> 35%) ☐ < = 15 minutes ☐ > 15 to < = 60 minutes ☐ > 60 minutes	*Indicate yes, no or not recorded as appropriate.*
Lowest pH			
4.4 a. b. c.	What was the lowest arterial pH recorded during the admission? What were the results for Bic (mmol/L) PCO2 (kPa) PO2 (kPa)	_____ pH _____ mmol/L ☐ Not recorded _____ kPa ☐ Not recorded _____ kPa ☐ Not recorded	*Record the lowest pH,* ***if this was not the pH taken on admission.*** *If the lowest pH was recorded on admission, you will not need to answer this section. Questions 4.4, 4.6 and 4.6 will be disabled by the webtool.* *For Bic, please enter the actual reading.*
4.5	Was the patient on	☐ Air ☐ Oxygen ☐ Not recorded	*This refers to the lowest pH arterial blood gas measurement in question 4.4*

a.	If on oxygen, was the oxygen rate recorded as a percentage or a numerical flow rate? i. Percentage of oxygen ii. Numerical flow rate	☐ Percentage (preferred) ☐ Flow rate ☐ Amount of oxygen not stated _____ % _____litres / min	*a. It is preferable to enter a percentage if given by mask or flow rate can be entered if given by nasal cannuale but if oxygen is given only by flow rate do not attempt to transcribe this into a percentage fraction of inspired oxygen. Select 'amount of oxygen not stated' if the percentage or flow rate is unclear or not recorded.*
4.6	How many hours into the admission was this taken?	_____ hours	*This refers to the lowest pH arterial blood gas measurement in question 4.4*
pH below 7.35 on admission			
4.7 a. b.	If a pH of <7.35 was demonstrated during the admission, was there a further set of arterial blood gases taken within 24 hours? If yes, what was the approximate interval? If yes, what were the results: i. pH ii. Bic (mmol/L) iii. PCO2 (kPa) iv. PO2 (kPa)	☐ Yes ☐ No ☐ Not recorded ☐ < 1 hour ☐ 1 to < 2 hours ☐ 2 to 4 hours ☐ > 4 hours _____ ph ☐ Not recorded _____ mmol/L ☐ Not recorded _____ kPa ☐ Not recorded _____ kPa ☐ Not recorded	*Indicate yes, no or not recorded as appropriate.*

4.8	For the further set of gasses was the patient on	☐ Air ☐ Oxygen ☐ NIV ☐ Not recorded	*Indicate all options that apply*
a.	Was the oxygen recorded as a percentage (preferred) or a numerical flow rate? i. Percentage of oxygen ii. Numerical flow rate	☐ Percentage (preferred) ☐ Flow rate ☐ Amount of oxygen not stated _____ % _____litres / min	*a. It is preferable to enter a percentage if given by mask or flow rate can be entered if given by nasal cannuale but if oxygen is given only by flow rate do not attempt to transcribe this into a percentage fraction of inspired oxygen. Select 'amount of oxygen not stated' if the percentage or flow rate is unclear or not recorded.*
Ventilatory support			
4.9	Did the patient receive ventilatory support at any time during this admission?	☐ Yes ☐ No ☐ Not recorded	*Indicate all that apply. This may be documented in the case notes or in an NIV prescription plan if available.*
a.	If yes, tick all that apply	☐ Invasive ventilatory support ☐ Non-invasive ventilation ☐ Doxapram ☐ Not recorded	
b.	If yes, how long after presentation was this?	☐ < 30 minutes ☐ 30 to < 60 minutes ☐ 1 to < 3 hours ☐ 3 - 24 hours ☐ At a later stage in the admission	

c.	If yes, was a plan for escalation or withdrawal of treatment in the event of NIV failure documented?	☐ Yes ☐ No ☐ Not recorded	
d.	Was a Do Not Resuscitate (DNR) order signed within the first 24 hours?	☐ Yes ☐ No ☐ Not recorded	
4.10	If the patient had a pH < 7.35 and did not receive either invasive or non-invasive ventilation, what was the reason for this?	☐ Patient refused ☐ No facilities ☐ Medical decision not to escalate to NIV or invasive ventilation ☐ Patient responded to medical therapy ☐ Failed ☐ No apparent reason	*Please indicate the reason for the patient not receiving invasive or non-invasive ventilation.*
a.	If decided not to escalate to NIV or invasive ventilation, who made this decision?	☐ FY1 ☐ FY2 and / or ST1 and / or SHO ☐ ST3 or above and / or SpR ☐ Associate specialist ☐ Staff grade ☐ Respiratory Consultant ☐ Other, please specify	
b.	Please give a reason why it was deemed inappropriate not to give invasive or NIV	_____ (freetext answer)	

Spirometry			
4.11	Has spirometry been recorded in the last 5 years?	☐ Yes ☐ No - spirometry not recorded ☐ No - spirometry not performed ☐ Not known	
a.	FEV1 level (most recent)	_____ L	*a. If there is more than one FEV1 result, please enter the most recent.* *Where pre and post bronchodilator values are recorded please use the higher reading. Please enter FEV1 in litres to one decimal place. The measurements may be found in outpatient notes or in-patient notes or pulmonary function or spirometry reports. Increasingly spirometry is performed in primary care. This may be referred to in a GP referral letter or outpatient referral.* *b. Please enter % predicted value of FEV1.*
b.	% of predicted	_____	
c.	Documented as performed in primary care but no results available	☐	
Respiratory specialist			
4.12	Was the patient seen by a respiratory specialist (respiratory nurse / physiotherapist or respiratory physician) during this admission?	☐ Yes ☐ No ☐ Not recorded	*Specialist respiratory physician refers to Registrar level (including Specialist Registrars (SpRs) and staff grades) or above, within the respiratory team.*

Discharge / Death			
5.1	Did the patient die in hospital during their index admission?	☐ Yes ☐ No	*Please only include deaths during this admission and NOT during a readmission.* *This information may be found in the medical or nursing records.*
5.2 a.	Was the patient still alive at 90 days after their admission? If 'Not recorded' why is this?	☐ Yes ☐ No ☐ Not recorded ☐ Notes not available ☐ No information from GP ☐ Other, please specify	*Please enter 'yes' if the patient was alive 90 days from the date of their admission.* *This information may be obtained by telephoning the patient's GP and confirming the patient's identity, using their NHS number.* ***PLEASE DO NOT CONTACT THE PATIENT OR THEIR FAMILY UNDER ANY CIRCUMSTANCES***
5.3	Date of death	DD / MM / YYYY	*If appropriate, record the date of death*
5.4	Did the patient die from:	☐ COPD or complication of COPD ☐ Not recorded ☐ Other causes (please specify)	*Please indicate the cause of death where known.*
5.5	Date of discharge from hospital or to an Early Discharge Scheme	DD / MM / YYYY	

5.6	Whose care was the patient under when discharged from hospital or transferred to an Early Discharge Scheme?	☐ Respiratory Consultant ☐ Care of the Elderly Physician ☐ General Physician ☐ Not recorded ☐ Other, please specify	*Please indicate whose care the patient was under at the time of discharge.*
5.7	Was the patient discharged from hospital on oxygen?	☐ Yes ☐ No ☐ Not recorded	*Please indicate yes, no or not recorded as appropriate.*
	If yes,		
a.	Was this prescribed by oxygen concentrator?	☐ Yes ☐ No	
b.	Was this the first time oxygen was prescribed for this patient to use at home?	☐ Yes ☐ No	
Early Discharge Scheme			
5.8	Was the patient accepted by an early discharge (or hospital at home) scheme?	☐ Yes ☐ No ☐ Not known	We suggest you collect all the patients in the study and ask all questions relating to EDS to the EDS co-ordinator/ lead at the same time for the sake of efficiency.
a.	If yes, Date of acceptance by an Early Discharge / Hospital at Home Scheme	DD / MM / YYYY	This question refers to whether the patient is admitted to an Early Discharge Scheme following the index admission. i.e. the admission that is being audited.
b.	Was this for:	☐ Rapid discharge < 48 hours ☐ Assisted discharge > 48 hours ☐ Other, please specify	

c. d.	Date of discharge from Early Discharge Scheme Length of time in the scheme (days, calculated)	DD / MM / YYYY _____ days	
Post index admission			
5.9 a.	Has the patient been admitted to hospital, or accepted by an Early Discharge Scheme, since this index admission? If yes, what was the date of admission or acceptance by an Early Discharge Scheme, for this second episode of care?	☐ Yes ☐ No ☐ Not known DD / MM / YYYY	*This question refers to acceptance to EDS or an admission since the index admission i.e. the index admission is the one that is being audited* *This includes:* • *Hospital admission followed by readmission to hospital* • *Hospital admission followed by acceptance by an early discharge (or hospital at home) scheme* • *Early discharge scheme followed by hospital admission* • *Early discharge scheme followed by a re -acceptance by an early discharge scheme.* *If the patient has more than one readmission only include the date of their first readmission.* *If your hospital or Primary Care Trust / Local Health Board operates an Early Discharge Scheme please discuss this question with the scheme leader.*

Pre index admission			
5.10	Prior to this audit, has the patient previously been admitted to hospital for COPD, or accepted by an early discharge scheme for COPD in the preceding 24 months?	☐ Yes ☐ No ☐ Not documented	*Answer 'yes' if the patient has a record of a previous admission in the 24 months prior to this audit, with an exacerbation of COPD. Look in the history section of the notes and the nursing Kardex for this information.*
a.	If yes, what was the date of their most recent admission / acceptance by an Early Discharge Scheme	DD / MM / YYYY	*Look at the admitting history to see if any mention of previous admissions is made. Other sources may be old case notes and the GP or outpatient letters.*

Appendix C The National COPD Audit 2008: web-based data collection tool screen shots

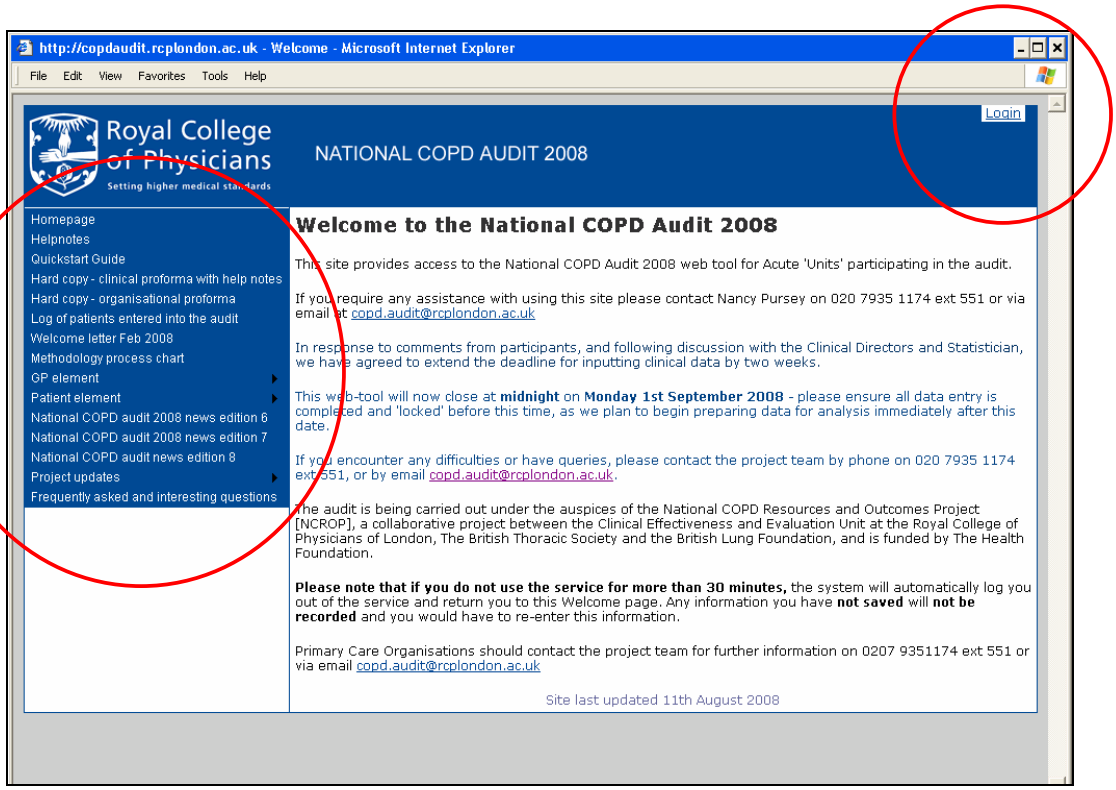
http://copdaudit.rcplondon.ac.uk/2008/modules/page/page.aspx?pc=welcome

Welcome Page

- The **main body** of the Welcome Page was used to share key messages throughout the audit period: such as deadlines, contact details for the project team at the Royal College of Physicians.

- The 'Welcome Page' of the National COPD Audit 2008 web-based data collection tool had a **vertical menu** on the left hand side which linked to information that supported the audit including: a diagram of the audit methodology, the 'welcome letter' that was sent to participating units at the beginning of the audit, help-notes, copies of audit pro-formas, peripheral surveys and the associated covering letters (for general practitioners and patients), weekly project updates and newsletters.

- Participating units accessed the web-based data collection tool via the **'Login'** icon (top right).



- From here, the **Terms of Agreement** had to be accepted before proceeding. These stated:

WARNING
This database contains information which is available to the staff of the Hospitals whose patients have received investigations or treatment in those hospitals.

It is an offence to view these data if you are not authorised to do so.

It is an offence to make use of this database other than for the purpose for which it was created.

Under no circumstances should users pass on their login or password to others.

If a user believes that their password has been compromised they should inform the Clinical Effectiveness and Evaluation Unit at the Royal College of Physicians.

Users should only be able to see data in records of their own institutions.

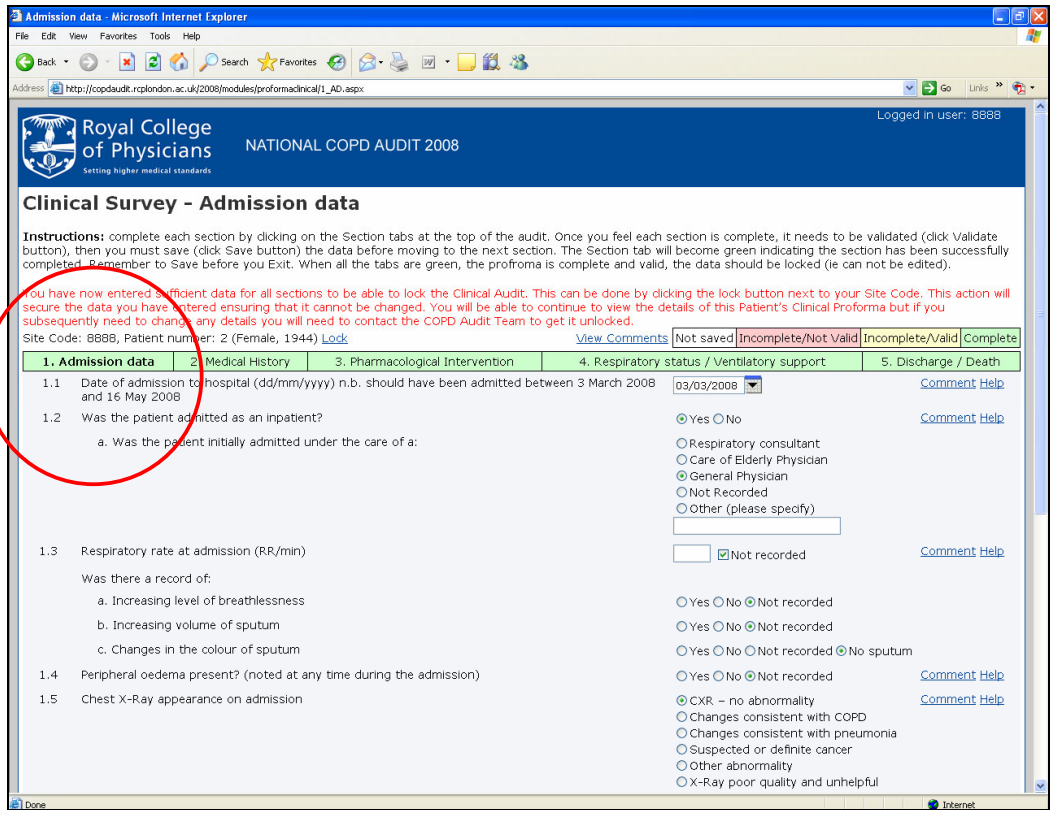
If a user detects what he or she believes is a breach of security or confidentiality then it is their responsibility not to disseminate the information obtained and to report the event to the Clinical Effectiveness and Evaluation Unit at the Royal College of Physicians immediately.

Clinical proformas

- Having entered a unique Site Code and Password, participating units could access the **Clinical pro-formas** and enter data.

- The pro-forma was divided into **five sections** – indicated by tabs across the top of the survey: admission data, medical history, pharmacological intervention, respiratory status / ventilatory support and discharge / death.

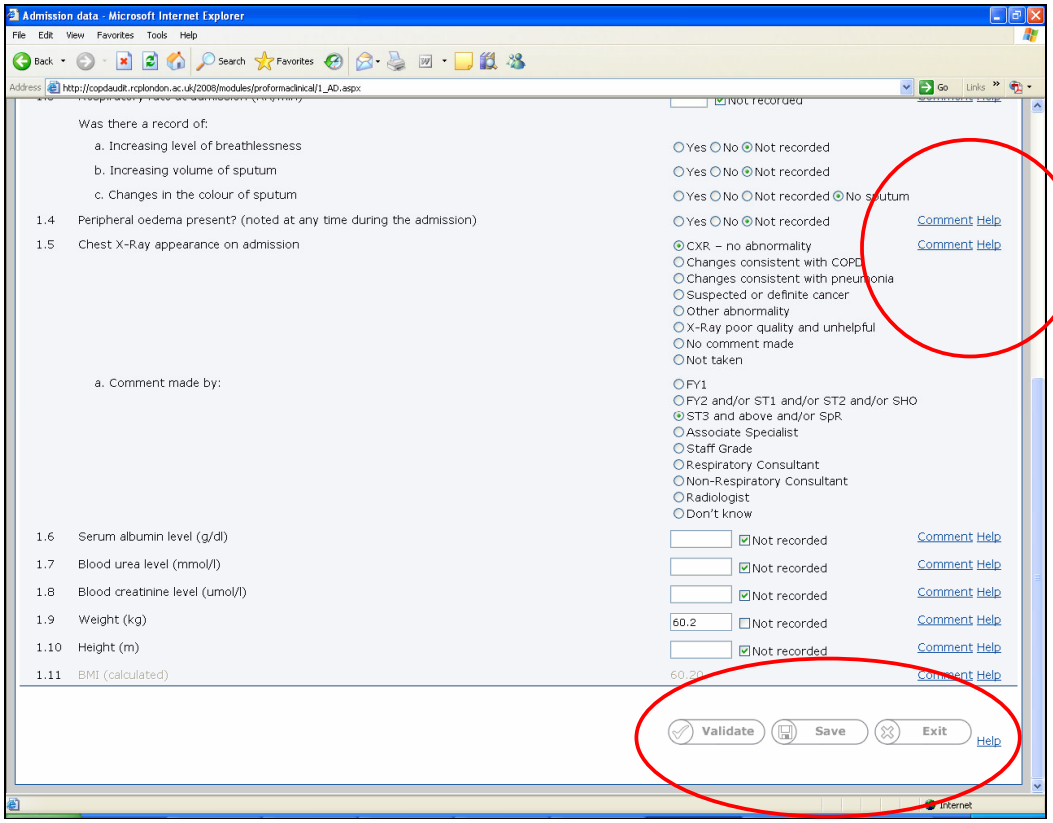
- **Data entry** comprised of simply 'clicking' in the box next to the question being answered and typing the answer. Beside each question, a '**Help**' icon contained the rationale for the question, suggestions for sources of data and where appropriate, references to the guidance from which standards emerged.



- The **'Comments'** icon, next to each question enabled auditors to free text further information to clarify their answer as necessary.

- **Section tabs** turned from red, when data entry was incomplete or invalid, to green when the section had been completed.

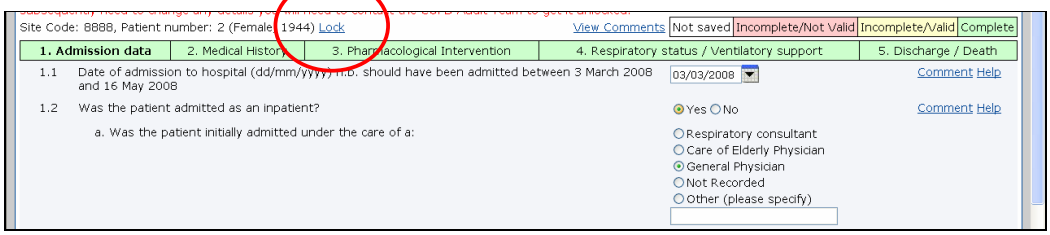
- Data was validated by clicking the **'Validate'** icon and then saved by clicking the **'Save'** icon at the bottom of the page. The **'Exit'** icon allowed the auditor to leave the tool without losing data. Where data were invalid, the web-tool automatically identified them and requested clarification.



Locking data

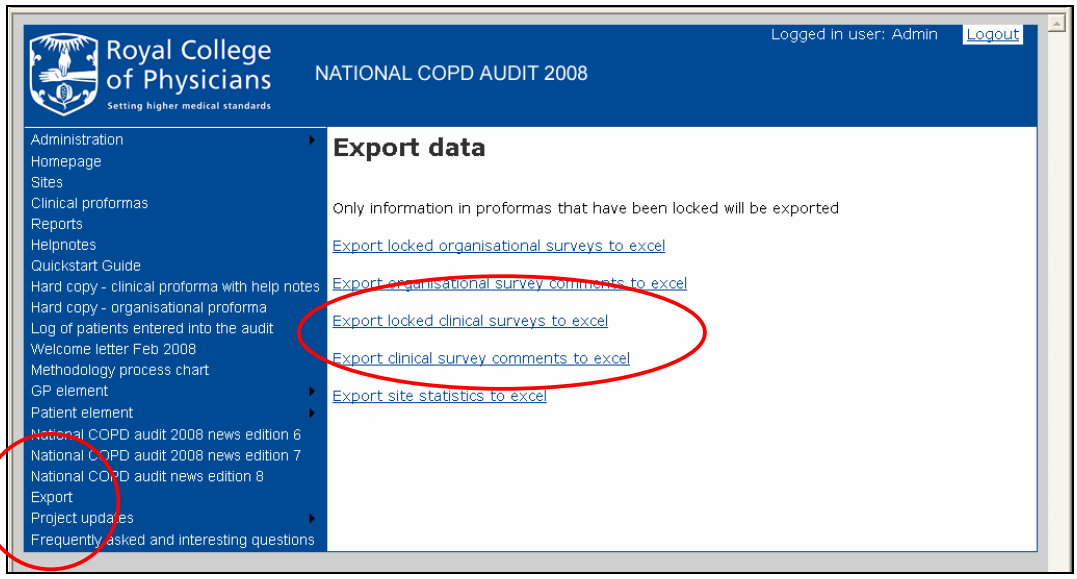
- Once all data were entered and validated – all section tabs green – the data were checked and 'locked' by the participating unit. **'Locked'** data could not be changed without contacting the project team and asking that they be **'unlocked'**.

- Only 'locked' data were exported by the project team at the Royal College of Physicians for analysis by the statisticians.



Exporting data

- The National COPD Audit 2008 web-tool had the facility for participating units to save and **export** data to an Excel file for their own records.


Logged in user: Admin
Logout
Royal College of Physicians
Setting higher medical standards
NATIONAL COPD AUDIT 2008
Administration
Homepage
Sites
Clinical proformas
Reports
Helpnotes
Quickstart Guide
Hard copy - clinical proforma with help notes
Hard copy - organisational proforma
Log of patients entered into the audit
Welcome letter Feb 2008
Methodology process chart
GP element
Patient element
National COPD audit 2008 news edition 6
National COPD audit 2008 news edition 7
National COPD audit news edition 8
Export
Project updates
Frequently asked and interesting questions
Export data
Only information in proformas that have been locked will be exported
Export locked organisational surveys to excel
Export organisational survey comments to excel
Export locked clinical surveys to excel
Export clinical survey comments to excel
Export site statistics to excel

Appendix D The National COPD Audit 2008: data reliability

Units were asked to re-audit their first 5 cases, using a different auditor. 199 sites submitted 952 cases.

Reliability (agreement between auditors) is not the same as validity (accuracy of measure). However establishing good agreement between auditors is an important part of the process of validation as valid data by definition will have to be reliable.

For categorical data the kappa statistic was used to measure agreement. Kappa values of 0.41 to 0.60 are said to indicate moderate agreement, values of 0.61 – 0.80 indicate good agreement whilst values of over 0.80 are very good. In practice any value of kappa much below 0.50 will indicate inadequate agreement.

Generally speaking the kappa coefficients of each data item give an assessment of agreement which is an amalgamation of two separate components. One is agreement between auditors as to whether or not they find the required information, and the other is agreement in the codes/categories of auditors when both have found information. The kappa statistic does not measure the nature of any disagreement between auditors and for this we need to inspect the raw data tables. Any future attempt to improve on the reliability of any audit item will bear most fruit if it focuses on the more frequent discrepancies in judgement.

Summary
The levels of agreement were generally good with kappa values of 0.60 and higher dominating the results. The dataset was noticeably more complete than in the previous audit, with kappa values for repeat audit items at similar levels.

Problems in finding data (i.e. one auditor finding information about a patient that the other auditor did not find) were most noticeable (affecting at least 10% of cases) for the following items:

- Pack years of smoking (142 cases)
- Weight (136)
- Height (120)
- BMI (100)
- CXR comments made by (98)
- FEV1 most recent in last 5 years (98)
- FEV1 % predicted in last 5 years (107)
- Increasing volume of sputum (155)
- Changes in colour of sputum (131)
- Peripheral oedema (171)
- Performance status (101)
- MRC dyspnoea score (184)
- Admission gases – patient on air or oxygen (113)
- Admission gases – did patient receive high flow oxygen (265)
- Admission gases – interval between high flow oxygen and gases being taken (98)

Data items with an overall kappa value below 0.60 were as follows:

- Personal care received (0.57)
- Patient admitted as an inpatient (0.58)
- Increasing level of breathlessness (0.52)
- Increasing volume of sputum (0.59)
- Performance status (0.52)
- MRC dyspnoea score (0.56)
- Medical condition – cor pulmonale (0.59)
- Medical condition – locomotor problems (0.49)
- Medical condition – other cardiovascular disease (0.51)
- Medical condition – other gastro-intestinal condition (0.55)
- Did patient receive high flow oxygen (0.48)
- Interval between high flow oxygen and gases being taken (0.57)

Dates:

Date of:	Date given by				Rate of agreement between auditors in dates given	
	Both auditors	One auditor only	Neither auditor	Kappa (Yes Vs No)	Overall	Further details about nature of disagreement
Admission to hospital	952	-	-	na	95% (909/952)	26 (1 day), 3 (2 days), 4 (3-5 days), 7 (6-8 days), 3 (>30 days)
Discharge from hospital	883	2	67	0.98	88% (780/883)	43 (1 day), 10 (2 days), 15 (3-5 days, 21 (6-30 days), 14 (>30 days)
Acceptance by EDS*	147	29	707	0.89	85% (125/147)	12 (1 day), 5 (2 days), 3 (3-5 days), 2 (6-30 days)
Discharge from EDS*	145	28	710	0.89	80% (116/145)	6 (1 day), 1 (2 days), 6 (3-5 days), 11 (6-30 days), 5 (>30 days)
Re-admission to hospital or EDS*	245	57	581	0.85	85% (208/245)	13 (1 day), 1 (2 days), 3 (3-5 days), 8 (6-30 days), 12 (>30 days)
Previous admission	451	88	413	0.82	75% (339/451)	14 (1 day), 1 (2 days), 13 (3-5 days), 26 (6-30 days), 40 (1-12 months), 18 (>1 year)
Death	131	10	811	0.96	97% (127/131)	2 (2 days), 1 (3days), 1 (>30 days)

* (denominator =883 both auditors agree patient discharged from hospital)

Numerical data

	Data given by				Rate of agreement between auditors in data given	
	Both auditors	One auditor only	Neither auditor	Kappa (Yes Vs No)	Overall	Further details about nature of disagreement
Year of birth	952	-	-	-	98% (932/952)	4 (1 yr), 5 (2-4 yr), 4 (5-9 yr), 4 (10-19 yr), 3 (20+ yr)
Length of stay in hospital	883	2	67	0.98	85% (753/883)	63 (1 day), 13 (2 days), 18 (3-5 days), 23 (6-30 days), 13 (>30 days)
Length of stay in EDS*	145	28	710	0.89	70% (102/145)	15 (1 day), 5 (2 days), 8 (3-5 days), 10 (6-30 days), 5 (>30 days)
Pack years of smoking	417	142	393	0.70	81% (338/417)	35 (1-10 yrs), 19 (11-30 yrs), 25 (>30 yrs)
Serum Albumin (g/L)	666	72	214	0.81	94% (626/666)	6 (1 g/L), 10 (2 g/L) 12 (3-5 g/L), 6 (6-9 g/L), 6 (10-24 g/L)
Blood Urea (umol/L)	872	25	55	0.80	91% (796/872)	37 (<1 umol/L), 26 (1-2 umol/L), 9 (3-5 umol/L), 4 (>5 umol/L)
Blood creatinine mmol/L	906	26	20	0.59	91% (828/906)	16 (<5 mmol/L), 21 (5-9 mmol/L), 23 (10-19mmol/L), 18 (>=20mmol/L)
pH	820	38	94	0.81	85% (700/820)	61 (0.01), 32 (0.02-0.04), 16 (0.05-0.09), 11 (>=0.100)
Bic	773	61	118	0.76	82% (630/773)	90 (1unit), 18 (2units), 24 (3-5 units), 11 (>5 units)
PCO2	825	39	88	0.80	84% (689/825)	107 (<1unit), 19 (1-2units), 7 (3-5 units), 3 (>5 units)
PO2	827	39	86	0.79	84% (695/827)	79 (<1unit), 18 (1-2units), 24 (3-5 units), 11 (>5 units)
Respiratory rate per minute	890	28	34	0.69	81% (719/890)	92 (<5 per min), 53 (5-9 per min), 26 (>=10 per min)
Weight (Kg)	301	136	515	0.70	74% (224/301)	27 (<1Kg), 17 (1.0-1.9Kg), 18 (2.0-4.9Kg), 15 (>=5Kg)
Height (cm)	255	120	577	0.72	83% (211/255)	13 (1cm), 9 (2cm), 14 (3-5cm), 8 (>5cm)
BMI	225	100	627	0.74	66% (148/225)	48 (<1unit). 23 (1-2unit), 6 (>=3unit)
FEV1 most recent in last 5 yrs	516	98	338	0.79	75% (387/516)	53 (<0.10), 32 (0.10-.0.19), 31 (0.20-0.49) 13 (>=0.50)
FEV1 % predicted in last 5 years	496	107	349	0.77	74% (367/496)	45 (<5%), 35 (5-9%), 23 (10-19%), 26 (>=20%)

Gases with Lowest pH (if NOT on admission)						
pH	143	60	749	0.79	80% (115/143)	15 (0.01), 6 (0.02-0.04), 5 (0.05-0.09), 2 (>=0.100)
Bic	140	60	752	0.79	75% (105/140)	21 (1unit), 6 (2units), 5 (3-5 units), 3 (>5 units)
PCO2	143	60	749	0.79	80% (115/143)	22 (<1unit), 5 (1-2units), 1 (3-5 units)
PO2	143	60	749	0.79	79% (113/143)	17 (<1unit), 6 (1-2units), 6 (3-5 units), 1 (>5 units)
If a pH of <7.35 was demonstrated during the admission, was there a further set of arterial blood gases taken within 24 hours?						
2nd pH	160	30	762	0.90	75% (120/160)	14 (0.01), 12 (0.02-0.04), 9 (0.05-0.09), 5 (>=0.100)
2nd Bic	155	31	766	0.89	75% (116/155)	15 (1unit), 7 (2units), 7 (3-5 units), 10 (>5 units)
2nd PCO2	160	29	763	0.90	78% (125/160)	17 (<1unit), 16 (1-2units), 2 (3-5 units)
2nd PO2	160	30	762	0.90	78% (124/160)	14 (<1unit), 9 (1-2units), 7 (3-5 units), 6 (>5 units)

* (denominator =883 both auditors agree patient discharged from hospital)

Categorical data

Categories as below	Kappa	Data available from One auditor but not recorded by other auditor	Data available for both auditors	
			N disagree	Notable discrepancies between auditor
DEMOGRAPHICS				
Gender (M,F)	0.99	-	6	
Age (<65, 65-74, 75-85, 85+)	0.98	-	12	
Ethnicity (Asian, Black, Chinese, Mixed,White, other, NK)	0.68	49	8	
Accommodation (Residential, sheltered, House/Flat alone, House/Flat with others, other)	0.86	-	75	59 (living 'alone' vs 'with another person' in house/flat
Personal care received (non care, unpaid living in, paid living in, unpaid come in, paid come in, paid and unpaid, other)	0.57	13	224	81 (unpaid care living in vs 'no care), 37 (unpaid care comes in vs no care), 21 (paid care comes in vs no care) 20 (unpaid care comes in vs paid care comes in)
ADMISSION DATA				
Patient admitted as an inpatient (Yes, No, Don't know)	0.58	-	10	10/17 involving a NO response from either auditor
Physician under whom admitted to hospital (Care Of Elderly, General, Respiratory, Other, not recorded)	0.73	7	148	59 (General Vs Resp), 47 (General vs COE), 26 General vs Other)
Respiratory rate per minute (<20, 20-29, 30+ ,Not recorded)	0.81	28	77	40 (<20 vs 20-29), 35 (20-29 vs 30+)
Increasing level of breathlessness (Yes, No, Not recorded)	0.52	19	18	18 (YES vs NO) of 30 cases stated NO by either auditor
Increasing volume of sputum (Yes, No, Not recorded)	0.59	155 (80 NR vs YES, 75 NR vs NO)	81	81 (YES vs NO) of 297 cases stated NO by either auditor
Changes in colour of sputum (Yes, No, No sputum, Not recorded)	0.62	131 (74 NO vs NR, 44 YES vs NR)	100	60 (YES vs NO), 35 (NO v NO sputum), 5 (YES vs NO sputum)
Peripheral oedema (Yes, No, Not recorded)	0.65	171 (139 NO vs NR, 32 YES vs NR)	41	41 (YES vs NO) of 253 cases stated YES by either auditor
Serum Albumin (<34, 34+, Not recorded) g/L	0.84	72 (61 NR vs 34+, 11 NR vs <34)	13	13 (<34 vs 34+)
Blood Urea (<=7.1, >7.1) umol/L	0.91	25 (14 NR vs <=7.1, 11 NR vs >7.1)	20	20 (<=7.1 vs >7.1)
CXR appearance (no abnormality, suspected or definite cancer, changes consistent with COPD, changes consistent with pneumonia, other abnormality, poor quality or unhelpful, no comment made, None)	0.67	38	242	51 (COPD vs other abn), 39 (COPD vs pneumonia), 38 (COPD vs no abnormality), 32 (pneumonia vs other abn)

CXR comments made by (FY1, FY2/ST1/ST2/SHO, ST3 and above and/or SpR, associate specialist, staff grade, respiratory consultant, non-respiratory consultant, radiologist, NK)	0.64	98 (31 NK vs FY2)	136	34 (FY2 vs Non Resp Cons), 23 (FY2 vs Resp cons), 23 (FY2 vs ST3)
MEDICAL HISTORY				
Performance status (Normal activity, strenuous activity limited, limited activity but self care, limited self-care, bed or chair bound – no self care, Not known)	0.52	101 (56 NK vs limited activity but self-care, 17 NK vs limited self-care)	233	91 (limited activity self care vs limited self care), 54 (strenuous activity limited vs limited activity self care), 26 (normal activity vs limited activity self care), 19 (normal activity ve strenuous activity limited), 19 (limited self care vs bed bound)
MRC dyspnoea score (1,2,3,4,5, not recorded)	0.56	184 (63 NK vs '5', 64 NK vs '4', 34 NK vs '3', 20 NK vs '2', 12 NK vs '1')	95	27 (3 vs 4), 26 (4 vs 5)
Other significant medical conditions (Yes, No, Not recorded)	0.75	8	76	76 (YES vs NO) of 774 cases stated YES by either auditor
• Ischaemic Heart Disease	0.84	-	58	58 (YES vs NO) of 267 cases stated YES by either auditor
• Left Heart failure (LVF)	0.62	-	44	44 (YES vs NO) of 84 cases stated YES by either auditor
• Cor pulmonale	0.59	-	31	31 (YES vs NO) of 55 cases stated YES by either auditor
• Lung cancer	0.79	-	9	9 (YES vs NO) of 26 cases stated YES by either auditor
• Cardiac arrhythmia e.g. AF	0.79	-	34	34 (YES vs NO) of 107 cases stated YES by either auditor
• Locomotor problems	0.49	-	86	86 (YES vs NO) of 136 cases stated YES by either auditor
• Stroke	0.73	-	20	20 (YES vs NO) of 49 cases stated YES by either auditor
• Diabetes	0.89	-	23	23 (YES vs NO) of 126 cases stated YES by either auditor
• Visual impairment	0.63	-	20	20 (YES vs NO) of 38 cases stated YES by either auditor
• Neurological condition	0.70	-	19	19 (YES vs NO) of 42 cases stated YES by either auditor
• Alcohol-related condition	0.67	-	17	17 (YES vs NO) of 35 cases stated YES by either auditor
• Psychiatric condition	0.66	-	34	34 (YES vs NO) of 70 cases stated YES by either auditor
• Other malignant disease	0.60	-	30	30 (YES vs NO) of 54 cases stated YES by either auditor
• Thromboembolytic Disease - pulmonary embolism, DVT	0.81	-	11	11 (YES vs NO) of 36 cases stated YES by either auditor
• Other cardiovascular disease	0.51	-	112	112 (YES vs NO) of 188 cases stated YES by either auditor
• Other gastro-intestinal condition	0.55	-	62	62 (YES vs NO) of 106 cases stated YES by either auditor
• Other endocrine disorder	0.70	-	23	23 (YES vs NO) of 52 cases stated YES by either auditor
Smoking status (Current, Ex –stopped before hospital admission, Life long non-smoker, Not recorded)	0.82	46 (30 NR vs EX)	48	44 (current vs EX)
PHARMACOLOGICAL INTERVENTION				
Received systemic corticosteroids >24hrs as inpatient (Yes, No, Not recorded)	0.73	7	50	50 (YES vs NO) of 857 cases stated YES by either auditor
Did the patient receive antibiotics in the first 24 hours of his / her admission? (Yes, No, Not recorded)	0.83	3	43	43 (YES vs NO) of 814 cases stated YES by either auditor
• benzylpenicillin	0.82	-	10	10 (YES vs NO) of 34 cases stated YES by either auditor
• amoxicillin / ampicillin	0.80	-	68	68 (YES vs NO) of 253 cases stated YES by either auditor
• co-amoxiclav	0.82	-	61	61 (YES vs NO) of 243 cases stated YES by either auditor

• cephalosporin	0.79	-	23	23 (YES vs NO) of 70 cases stated YES by either auditor
• macrolide	0.71	-	104	104 (YES vs NO) of 296 cases stated YES by either auditor
• tetracycline / doxycycline	0.87	-	33	33 (YES vs NO) of 168 cases stated YES by either auditor
Did the patient have oxygen prescribed on the drug chart as an in-patient in the first 24 hours? (Yes, No)	0.67	-	87	87 (YES vs NO) of 202 cases stated YES by either auditor
RESPIRATORY STATUS				
Arterial blood gases taken on admission (Yes, No, Not recorded)	0.77	12	30	30 (YES vs NO) of 865 cases stated YES by either auditor
• PH (<7.26, 7.26-7.34, 7.35+)	0.94	-	18	
• Bic (<23, 23-30, >30)	0.92	-	29	
• PCO2 (<=6.0, >6.0)	0.95	-	20	
• PO2 (<7.3, 7.3-8.0, >8.0)	0.91	-	37	
• Was patient on: (Oxygen, air, Not recorded)	0.70	113 (57 NR vs air, 56 NR vs oxygen)	60	60 (Air vs Oxygen)
• Controlled on oxygen (YES <=28% / <=4L, NO, Not known)	0.87	13	14	
Did the patient receive high flow oxygen (> 35%) (for example in the ambulance) before arterial blood gases were taken? (Yes, No, Not recorded)	0.48	265 (206 NR vs NO, 59 NR vs YES)	39	39 (YES vs NO) of 149 cases stated YES by either auditor
If yes, what interval was there between receiving high flow oxygen and the gases being taken? (taken on high flow oxygen, >35%, <=15mins, >15 to<=60 mins, >60 mins, Not recorded)	0.57	98 (77 NR vs interval stated, 21 NR vs HFO)	24	
Was the pH value the lowest recorded during the admission (Yes, No, Not recorded)	0.70	92 (85 NR vs YES, 7 NR vs NO)	53	53 (YES vs NO) of 603 cases stated YES by either auditor
Gases taken for lowest pH if not the pH at admission (results are for when both auditors gave gas results n=143)				
• PH (<7.26, 7.26-7.34, 7.35+) n=143	0.97	-	3	
• Bic (<23, 23-30, >30) n=140	0.93	-	6	
• PCO2 (<=6.0, >6.0) n=143	0.98	-	1	
• PO2 (<7.3, 7.3-8.0, >8.0) n=143	0.84	-	10	
Was patient on: (Oxygen, air, Not recorded)	0.76	64 (55 NR vs oxygen)	6	6 (Air vs Oxygen)
• Controlled on oxygen (YES <=28% / <=4L, NO, Not known) n=113	0.84	4	5	
If a pH of <7.35 was demonstrated during the admission, was there a further set of arterial blood gases taken within 24 hours? (Yes, No, Not recorded)	0.88	32 (21 NR vs YES)	9	9 (YES vs NO) of 170 cases stated YES by either auditor
If yes (n=161 both auditors), what was the approximate interval? (<1 hour, 1 to <2, 2 to 4,>4 hours)	0.65	-	42	29 within 1 category
• PH (<7.26, 7.26-7.34, 7.35+) n=160	0.84	-	16	
• Bic (<23, 23-30, >30) n=155	0.84	-	15	
• PCO2 (<=6.0, >6.0) n=160	0.83	-	5	
• PO2 (<7.3, 7.3-8.0, >8.0) n=160	0.84	-	14	
Was patient on: (Oxygen, air, NIV, Not recorded)	0.81	39 (31 NR vs Oxygen)	18	15 (NIV vs Oxygen)
• Controlled on oxygen(YES <=28% / <=4L, NO, Not known) n=97	0.75	5	4	
VENTILATORY SUPPORT				
Did the patient receive ventilatory support at any time during this admission? (Yes, No, Not recorded)	0.83	23 (22 NR vs NO, 1 NR vs YES))	15	15 (YES vs NO) of 121 cases stated YES by either auditor
• Invasive	0.74	-	5	5 (YES vs NO) of 12 cases stated YES by either auditor
• Non-invasive	0.90	-	19	19 (YES vs NO) of 116 cases stated YES by either auditor
• Doxipram	1.00	-	0	0 (YES vs NO) of 1 case stated YES by either auditor

If yes, how long after presentation was this? (<30min, 30-<60, 1 to <3 hours, 3-24 hours, at a later stage in admission) n=106 both yes	0.71	-	24	
Was a plan for escalation or withdrawal of treatment in the event of NIV failure documented? (Yes, No, Not recorded)	0.84	27 (16 NR vs YES, 11 NR vs NO)	10	5 (YES vs NO) of 72 cases stated YES by either auditor
If the patient had a pH < 7.35 and did not receive either invasive or non-invasive ventilation, what was the reason for this? (patient refused, no facilities, medical decision, patient responded, failed, no apparent reason)	0.79	30	14	
SPIROMETRY				
Has spirometry been recorded in the last 5 years? (yes, No spirometry not recorded, No spirometry not performed, not known, Not recorded)	0.61	134 (60 NK vs YES, 47 NK vs Not recorded, 27 NK vs Not performed	82	42 (Not recorded vs Not performed), 23 (Not recorded vs YES), 17 (Not performed Vs YES)
Documented as performed in Primary care but no results available (Yes, No)	0.57	-	12	12 (YES vs NO) of 20 cases stated YES by either auditor
RESPIRATORY SPECIALIST				
Was the patient seen by a respiratory specialist (respiratory nurse / physiotherapist or respiratory physician) during this admission? (Yes, No, Not recorded)	0.76	13	64	64 (YES vs NO) of 786 cases stated YES by either auditor
DISCHARGE / DEATH				
Whose care was the patient under when discharged from hospital or transferred to an Early Discharge Scheme? (respiratory consultant, COE physician, general physician, Not recorded, other) n=883 both agree discharged	0.83	14	64	47 (Resp cons vs General Phys), 15 (other vs General Phys)
Was the patient discharged from hospital on oxygen? (Yes, No, Not recorded) n=883 both agree discharged	0.74	43 (30 NR vs NO, 13 NR vs YES)	60	60 (YES vs NO) of 269 cases stated YES by either auditor
Was this prescribed by oxygen concentrator? (Yes, No, Not recorded) n=883 both agree discharged	0.74	73 (59 NR vs YES, 14 NR vs NO)	24	24 (YES vs NO) of 176 cases stated YES by either auditor
Was this the first time oxygen was prescribed for this patient to use at home? (Yes, No, Not recorded) n=883 both agree discharged	0.80	73 (58 NR vs NO, 15 NR vs YES)	4	4 (YES vs NO) of 41 cases stated YES by either auditor
Patient alive at 90 days after their admission (Yes, No, Don't know)	0.88	29 (26 NR vs YES, 3 NR vs NO)	5	5 (YES vs NO) of 128 cases stated NO by either auditor
If not recorded, why is this (notes unavailable, no info from GP, other, not recorded)	0.61	29 (15 NR vs no info from GP, 10 NR vs other)	0	
Patient died in hospital (Yes, No)	0.98	-	2	2 (YES vs NO) of 69 cases stated YES by either auditor
Patient died from (COPD or complications of COPD, Other causes, not recorded)	0.91	12	4	4 (COPD vs other)
EARLY DISCHARGE SCHEME				
Was the patient accepted by an early discharge (or hospital at home) scheme? (Yes, No/ Don't know) n=883 both agree discharged	0.79	40 (37 NK vs NO, 3 NK vs YES)	26	26 (YES vs NO) of 173 cases stated YES by either auditor
Was this for (rapid discharge <48hrs, assisted discharge > 48 hrs, other) n=147 other, both agreed EDS	0.76	-	18	13 (rapid vs assisted)
SUBSEQUENT ADMISSION				
Has the patient been admitted to hospital, or accepted by an Early Discharge Scheme, since this index admission? (Yes, No, Not recorded) n=883 both agree discharged	0.80	31 (28 NR v NO, 3 NR vs YES)	54	54 (YES vs NO) of 299 cases stated YES by either auditor
PREVIOUS ADMISSION				
Prior to this audit, has the patient previously been admitted to hospital for COPD, or accepted by an early discharge scheme for COPD in the preceding 24 months?(Yes, No, Not documented)	0.77	43 (30 ND vs NO, 13 ND vs YES)	76	76 (YES vs NO) of 527 cases stated YES by either auditor

Appendix E The National COPD Audit 2008: participating NHS Units

- Aberdeen Royal Infirmary
- Addenbrooke's Hospital
- Aintree Chest Centre, University Hospital Aintree
- Airedale General Hospital
- Alexandra Hospital, Redditch
- Altnagelvin Area Hospital
- Antrim Area Hospital
- Arrowe Park Hospital
- Barnet Hospital
- Barnsley District General Hospital
- Basildon University Hospital
- Basingstoke and North Hampshire Hospital
- Bedford Hospital
- Belfast City Hospital
- Birmingham Heartlands Hospital
- Bishop Auckland General Hospital
- Blackpool Victoria Hospital
- Borders General Hospital
- Bradford Royal Infirmary
- Bridlington and District Hospital
- Bristol Royal Infirmary
- Bronglais District General Hospital
- Broomfield Hospital
- Caithness General Hospital
- Calderdale Royal Hospital
- Causeway Hospital
- Central Middlesex Hospital
- Charing Cross Hospital
- Chase Farm Hospital
- Chelsea and Westminster Hospital
- Cheltenham General Hospital
- Chesterfield Royal Hospital
- City Hospital, Birmingham
- Colchester General Hospital
- Conquest Hospital
- Countess of Chester Hospital
- Craigavon Area Hospital
- Crosshouse Hospital
- Cumberland Infirmary
- Daisy Hill Hospital
- Darent Valley Hospital
- Darlington Memorial Hospital
- Derbyshire Royal Infirmary and Derby City General Hospital
- Derriford Hospital
- Dewsbury and District Hospital
- Diana, Princess of Wales Hospital
- Doncaster Royal Infirmary
- Dorset County Hospital
- Downe Hospital
- Ealing Hospital NHS Trust
- East Surrey Hospital
- Eastbourne District General Hospital
- Epsom General Hospital and St Helier Hospital
- Fairfield General Hospital
- Friarage Hospital
- Frimley Park Hospital
- George Eliot Hospital
- Glan Clwyd Hospital
- Glasgow Royal Infirmary
- Gloucestershire Royal Hospital
- Good Hope Hospital
- Grantham and District Hospital
- Hairmyres Hospital
- Hammersmith Hospital
- Harrogate District Hospital
- Hemel Hempstead General Hospital
- Hereford County Hospital
- Hillingdon Hospital
- Homerton University Hospital
- Horton General Hospital
- Huddersfield Royal Infirmary
- Hull and East Yorkshire Hospitals
- James Paget University Hospital
- Jersey General Hospital
- Kent & Canterbury Hospital
- Kent & Sussex Hospital
- Kettering General Hospital
- King George Hospital
- King's College Hospital
- King's Mill Hospital
- Kingston Hospital
- Lagan Valley Hospital
- Lincoln County Hospital
- Llandough Hospital
- Lorn & Islands District General Hospital
- Lymington New Forest Hospital
- Macclesfield District General Hospital
- Maidstone Hospital
- Manchester Royal Infirmary
- Manor Hospital
- Mater Hospital
- Mayday University Hospital
- Medway Maritime Hospital
- Milton Keynes General Hospital
- Monklands Hospital
- Montagu Hospital
- Musgrove Park Hospital, Taunton
- Neath Port Talbot Hospital
- Nevill Hall Hospital
- New Cross Hospital
- Newham University Hospital
- Nobles Hospital
- Norfolk and Norwich University Hospital
- North Bristol NHS Trust (Southmead Hospital)
- North Devon District Hospital
- North Manchester General Hospital
- North Middlesex University Hospital
- North Tyneside General Hospital
- Northampton General Hospital

- Northern General Hospital
- Northwick Park and St Mark's Hospital
- Papworth Hospital
- Perth Royal Infirmary
- Peterborough District Hospital
- Pinderfields General Hospital
- Pontefract General Infirmary
- Poole Hospital
- Prince Charles Hospital
- Prince Philip Hospital
- Princess Elizabeth Hospital
- Princess of Wales Hospital
- Princess Royal Hospital
- Princess Royal Hospital, Haywards Heath
- Queen Alexandra Hospital
- Queen Elizabeth Hospital, Gateshead
- Queen Elizabeth Hospital, Woolwich
- Queen Elizabeth The Queen Mother Hospital
- Queen Margaret Hospital, Dunfermline
- Queen's Hospital, Burton upon Trent
- Queen's Hospital, Romford
- Rochdale Infirmary
- Rotherham General Hospital
- Royal Albert Edward Infirmary
- Royal Alexandra Hospital
- Royal Berkshire Hospital
- Royal Blackburn Hospital
- Royal Bolton Hospital
- Royal Cornwall Hospital
- Royal Devon and Exeter Hospital
- Royal Free Hospital
- Royal Glamorgan Hospital
- Royal Gwent Hospital
- Royal Hampshire County Hospital
- Royal Infirmary of Edinburgh
- Royal Lancaster Infirmary
- Royal Liverpool University Hospital
- Royal Oldham Hospital
- Royal Preston Hospital
- Royal Shrewsbury Hospital
- Royal Sussex County Hospital
- Royal United Hospital, Bath
- Royal Victoria Infirmary and Freeman Hospital
- Russells Hall Hospital
- Salford Royal NHS Foundation Trust
- Salisbury District Hospital
- Sandwell General Hospital
- Scarborough General Hospital
- Scunthorpe General Hospital
- Selly Oak Hospital
- Singleton Hospital
- Solihull Hospital
- South Tyneside District Hospital
- Southampton General Hospital
- Southend University Hospital
- Southern General Hospital
- Southport and Formby District General Hospital
- St George's Hospital
- St James's University Hospital
- St Mary's Hospital, Isle of Wight
- St Mary's Hospital, London
- St Peter's Hospital
- St Richards Hospital
- St Thomas' Hospital
- Staffordshire General Hospital
- Stepping Hill Hospital
- Stirling Royal Infirmary
- Stobhill Hospital
- Sunderland Royal Hospital
- Tameside General Hospital
- The Churchill Hospital and John Radcliffe Hospital
- The Great Western Hospital
- The James Cook University Hospital
- The Luton & Dunstable Hospital
- The Princess Alexandra Hospital
- The Princess Royal University Hospital
- The Queen Elizabeth Hospital, King's Lynn
- The Queen Elizabeth II Hospital and Hertford County Hospital
- The Royal Bournemouth Hospital
- The Royal Hallamshire Hospital
- The Royal Hospitals, Belfast
- The Royal London Hospital
- The Royal Surrey County Hospital NHS Trust
- The Whittington Hospital
- Torbay Hospital
- Trafford General Hospital
- Tyrone County Hospital
- Ulster Hospital
- University College London Hospital
- University Hospital Lewisham
- University Hospital North Durham
- University Hospital North Staffordshire
- University Hospital of Hartlepool
- University Hospital of North Tees
- University Hospital of Wales
- University Hospital, Coventry
- University Hospitals of Leicester NHS Trust
- Victoria Infirmary, Glasgow
- Wansbeck General Hospital
- Warrington Hospital
- Warwick Hospital
- West Cumberland Hospital
- West Middlesex University Hospital
- West Suffolk Hospitals
- West Wales General Hospital
- Western General Hospital
- Western Infirmary and Gartnavel General Hospital
- Weston General Hospital
- Wexham Park Hospital
- Whipps Cross University Hospital
- Whiston Hospital
- William Harvey Hospital

- Wishaw General Hospital
- Withybush General Hospital
- Worcestershire Royal Hospital
- Worthing Hospital
- Wrexham Maelor Hospital
- Wycombe Hospital
- Wythenshawe Hospital
- Yeovil District Hospital
- York Hospital
- Ysbyty Gwynedd

Appendix F The National COPD Audit 2008: reasons why it was deemed inappropriate to give invasive or non-invasive ventilation

- In view of significant co morbidity (COPD, home oxygen and chronic renal failure) and physical frailty, patient would not be for cardio-pulmonary rehabilitation / intensive treatment unit in event of cardio-respiratory arrest as it would be in his best interest and unsuccessful.
- Poor quality of life
- Given the severe COPD – I don't think that a) he is either a candidate for NIV or b) likely to tolerate it given tendency to go off ward / self discharge
- Unlikely to benefit from ITU admission; LTOT/ wheelchair bound; exercise tolerance very poor.
- Would never wean due to underlying shortness of breath / COPD.
- 6 days into admission patient continued to deteriorate, significant co-morbidities, very poor functional capacities and multiple admissions.
- 83 year old with dementia and poor premorbid state.
- 97 year old with dementia and COPD
- Acidosis felt not to be from a respiratory cause
- Acute coronary syndrome, atrial fibrillation and cardiac failure more of an issue and responded to medical therapy initially.
- Advanced disease and co-morbidities
- After cardiorespiratory arrest call withdrew critical care
- Agitated
- Bullus lesion and risk of pneumothorax
- Cancer of the lung
- Cachexia, severe COPD.
- Co-morbidity
- Co-morbidity & advanced age
- Compensated, likely a chronic condition and treated medically
- Decision by medical team with family agreement
- Decision was made for NIV but patient died before NIV mask was applied
- Deemed not acidotic enough
- Dementia made it impossible
- Dementia, hypoglycaemia
- Deterioration, family wishes
- Development of multi-organ failure
- Diagnosed with metastatic lung cancer
- Did not go below 7.35 and began to improve.
- Discussion between SHO, Patient and patient's daughter - consensus that ITU admission not appropriate.
- Discussion with family and patient agreed futility
- DNAR order implemented
- Documented on previous admissions also.
- Due to co-existent pulmonarfibrosis and chronic renal failure
- Due to pre morbid condition
- Due to severe COPD; discussed with patient and family. History ICU admission 2004.
- End stage COPD; frail
- End stage COPD and Parkinsons disease
- End stage COPD palliation
- End stage COPD plus developed a pneumothorax
- End stage COPD very poor quality of life patient refusal for active treatment - family agreed
- End stage COPD. Previous multiple NIV. Non compliance with treatment
- End stage disease - for palliative care
- End stage disease
- Evidence of cor pulmonale and therefore poor prognosis
- Family felt her quality of life was deteriorating
- Fear of inability to wean off ventilator. Patient responded to treatment. Clinically improving i.e., tachypnoiec settled.
- For palliative care only
- Frail elderly not responding to maximal medical treatment
- Frail lady end stage COPD following discussion with patient and family it was agreed to take palliate care approach
- Frailty
- Futile
- Futility
- Futility
- General frailty, severity of underlying conditions
- Gravely ill, felt futile
- Hold off for new?

- Husband states his wife's wish not to have invasive or prolonged interventions
- Immobile, nursing home resident, with severe COPD, and severe pneumonia
- Improving without NIV, not clinically indicated.
- In view of multiple co-morbidities and the patient's poor pre-morbid status
- It was also documented that the patient refused
- It was felt that the patient was not appropriate for HDU at the time of assessment as "he clinically looks very robust". Decision was taken to persevere with medical therapy.
- Lung cancer
- Medical and family decision
- Medical futility, end stage
- Medically inappropriate
- Metabolic acidosis
- Metabolic acidosis
- Metabolic acidosis
- Metabolic acidosis; age; ITU admission unlikely; made in discussion with family
- Metabolic acidosis, not respiratory
- Mild hypercapnia only?; left ventricular failure?; carcinoma; nothing else recorded
- Multiple comorbidites, poor prognosis.
- No comments in medical notes acknowledging acidosis.
- No deterioration in wheeze
- No indication - patient only slightly wheezy with no other chest symptoms
- No reason recorded
- No reason recorded in medical notes
- No reason recorded in notes
- None given
- Not a candidate for ICU; Do Not Attempt to Resuscitate order in situ
- Not appropriate – in view of limited expected irreversibility- unable to tolerate BIPAP
- Not documented- but believe the pt refused as she had had it previously
- Not documented
- Not felt needed as improved with optimising medical Rx
- Not for further treatment in view of poor general status
- Not for ITU management in view of reduced exercise tolerance and worsened lung pathology.
- Not indicated
- Not recorded
- Not recorded
- Not recorded
- Not suitable for ICU and placed on the Care of the Dying pathway
- Palliative
- Patient's age and medical condition
- Patient arrested? possibility of a pulmonary embolus
- Patient compatible and known untreatable cancer
- Patient confused, multiple co-morbidities (undiagnosed liver pathology ? malignant) and possible ischaemic limbs with 9cm abdominal aortic aneurysm
- Patient died suddenly - haemophysis
- Patient dying
- Patient entering terminal phase of disease. NIV deemed inappropriate. Daughter consulted and patient did not want any machines used.
- Patient felt to be dying
- Patient had suspected underlying malignancy of lung and was put on dying pathway and was thought not to benefit from invasive and NIV
- Patient had cognitive impairment and poor functional status
- Patient had non small cell lung cancer with bony metastases. T1 N1 M1. Did not tolerate chemo well and therefore was stopped. Been house bound for long time. Inappropriate to escalate.
- Patient housebound, cachectic. Worsening pneumonia and renal failure - correctly thought would not benefit from NIV
- Patient not responding to treatments. Deteriorating condition
- Patient receiving hospice care prior to admission.
- Patient seemed to be dying
- Patient very unwell. After discussion with family it was decided not to give NIV.
- patient was terminally sick
- Patient was too drowsy for Bipap. ITU registrar decided not for invasive ventilation in view of being chair bound and co-morbidities.
- PC02<6
- pH increased when oxygen decreased.
- Please the main reason was metabolic acidosis which improved with conservative treatment
- Poor premorbid status, hoists to transfer, dementia
- Poor prognosis, unable to tolerate
- Poor quality of life prior to admission; patient deteriorated further; patient dying
- Poor quality of life with many co-morbidities and advanced COPD
- Poor quality of life/Poor prognosis
- Pre-admission state inappropriate for escalation

- Pre morbid state very poor; Do Not Resuscitate order in situ
- Profoundly unwell with acute renal failure, unlikely to have any benefit from BiPAP, poor quality of life
- Patient arrested and died following gastro intestinal bleed
- Patient dying
- Patient had had NIV previously on numerous occasions but does not tolerate it well
- Patient had not tolerated it on the previous admission
- Patient has dementia- though this was not documented as a reason
- Patient responded to intravenous drugs
- Patient responded well to therapy
- Patient responding to conventional medical therapy
- Recurrent aspiration causing repeated respiratory infections in a frail man
- Reduced Glasgow Coma Scale and poor respiratory effort, therefore not for BIPAP. Significant morbidity and poor functional status; not for non invasive ventilation.
- Responded to medical therapy
- Severe COPD and alcoholic liver disease
- Severe COPD, significant co-morbidities, unlikely to benefit from further invasive treatment.
- Severe COPD. Had not tolerated NIV on previous admissions. Decision had been made after discussion with patient and family.
- Severe impairment of quality of life. Patient has been declining treatment and relatives in agreement.
- Severe pneumonia, poor oxygenation and mixed metabolic and respiratory acidosis. Becoming drowsy, not tolerating even oxygen mask. End stage COPD, on LTOT, not appropriate to offer invasive ventilation.
- Severe pneumonia, recent poor quality of life, patient and family in agreement with decision.
- Stabilised on medical management
- States: "Patient doesn't require NIV at present"
- Trial on lower level of oxygen
- Unconscious / severe respiratory acidosis, judged unlikely to respond
- Underlying lung cancer
- Unlikely to benefit
- Very poor quality of life prior to admission