

# 'COPD Admissions – avoiding exacerbations and admissions'

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# Overview

- COPD admissions in Oxon
- What causes hospital admissions?
- What is an exacerbation and why does it matter?
- Treatment of acute exacerbations
- Prevention of acute exacerbations
  - NICE update
  - New data on azithromycin

# Early Identification: Finding the 'missing millions'

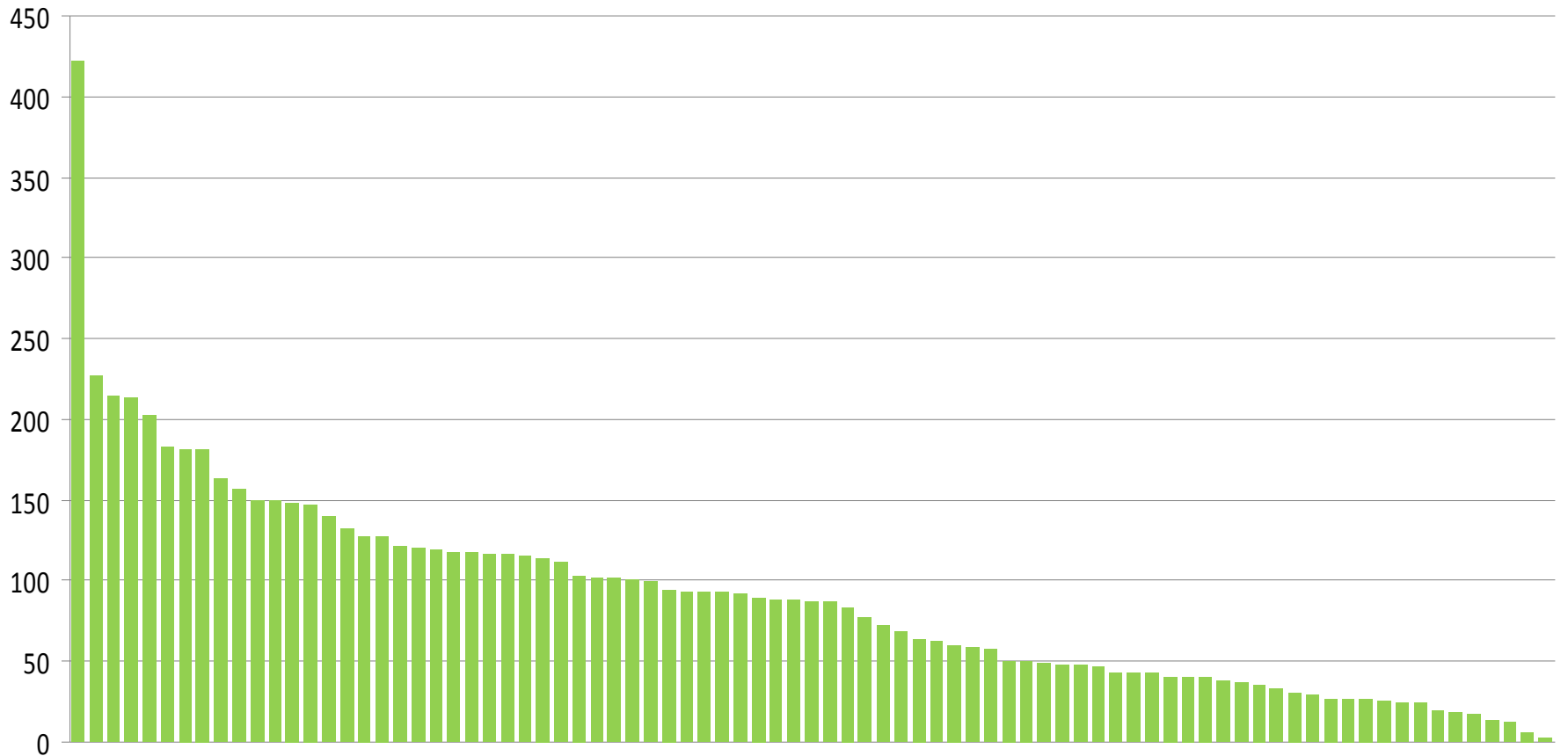
## In Oxfordshire

- COPD measured prevalence is 1% and
  - COPD estimated prevalence is 2.4%
  - only 54% diagnosed and 5,992 patients undiagnosed
- 
- 10% of all emergency COPD admissions are undiagnosed at point of admission
  - Over 50% of COPD cost to the NHS is from inpatient hospitalisation

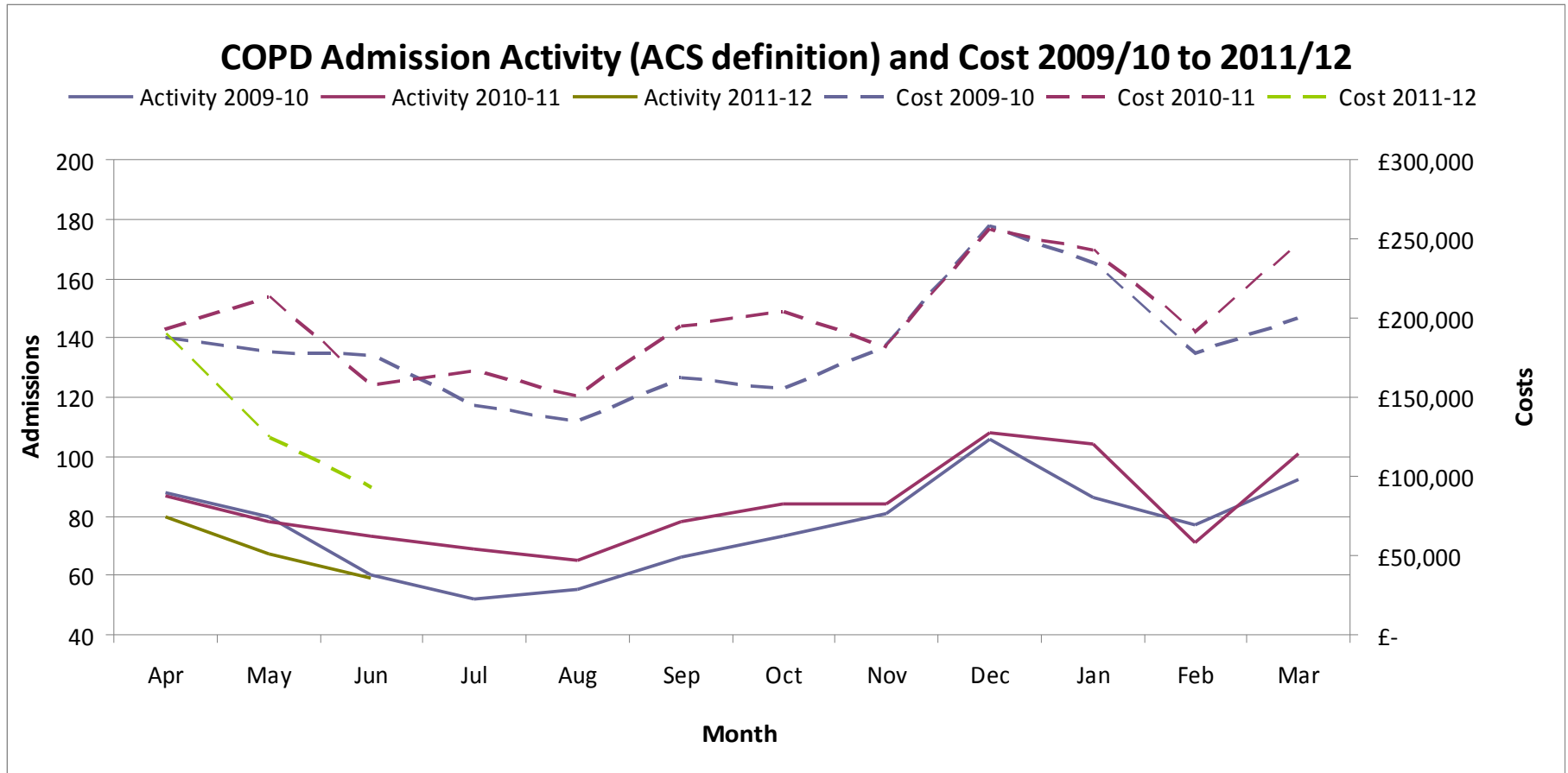
# QoF COPD Register size by Oxfordshire GP Practice - 2009/10

■ No. on Register

Source: QMAS



# Year on year COPD admissions



# COPD admissions

	<b>Admissions</b>	<b>Cost</b>
<b>2009-10</b>	916	£2.19m
<b>2011-12</b>	1002	£2.39m
<b>2011-12 (Apr-June)</b>	206 (30 fewer than last year)	£407,000 (£160k less than last year)

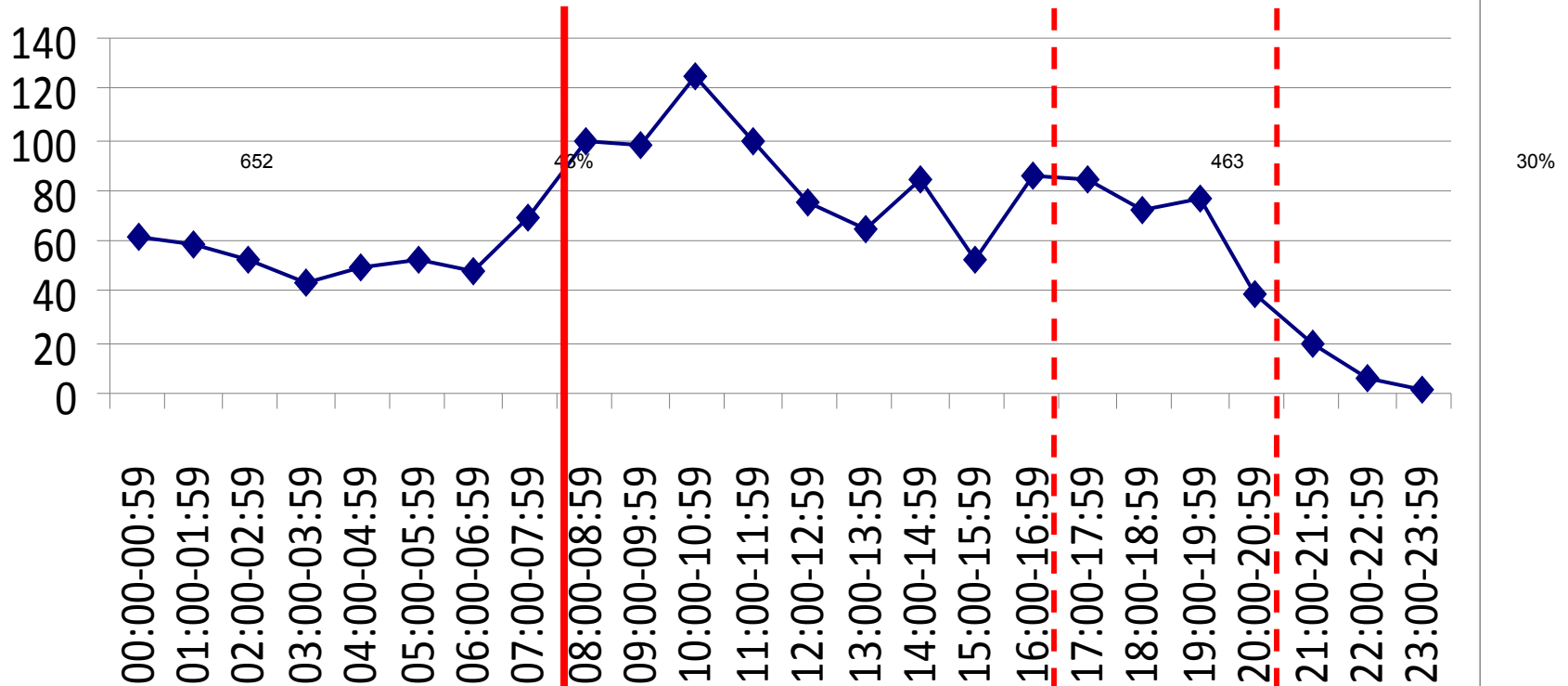
# Hospital Admissions: Oxon 2009/10

- Approx 900 patients admitted per annum with AECOPD
- 31% patients current smokers
- 32% lived in a house/flat alone
- 49% previously admitted/ seen on Early discharge scheme
- 24% discharged patients readmitted within 90 days
- LoS median 6 days, mean 8 days
- In-patient mortality 11%

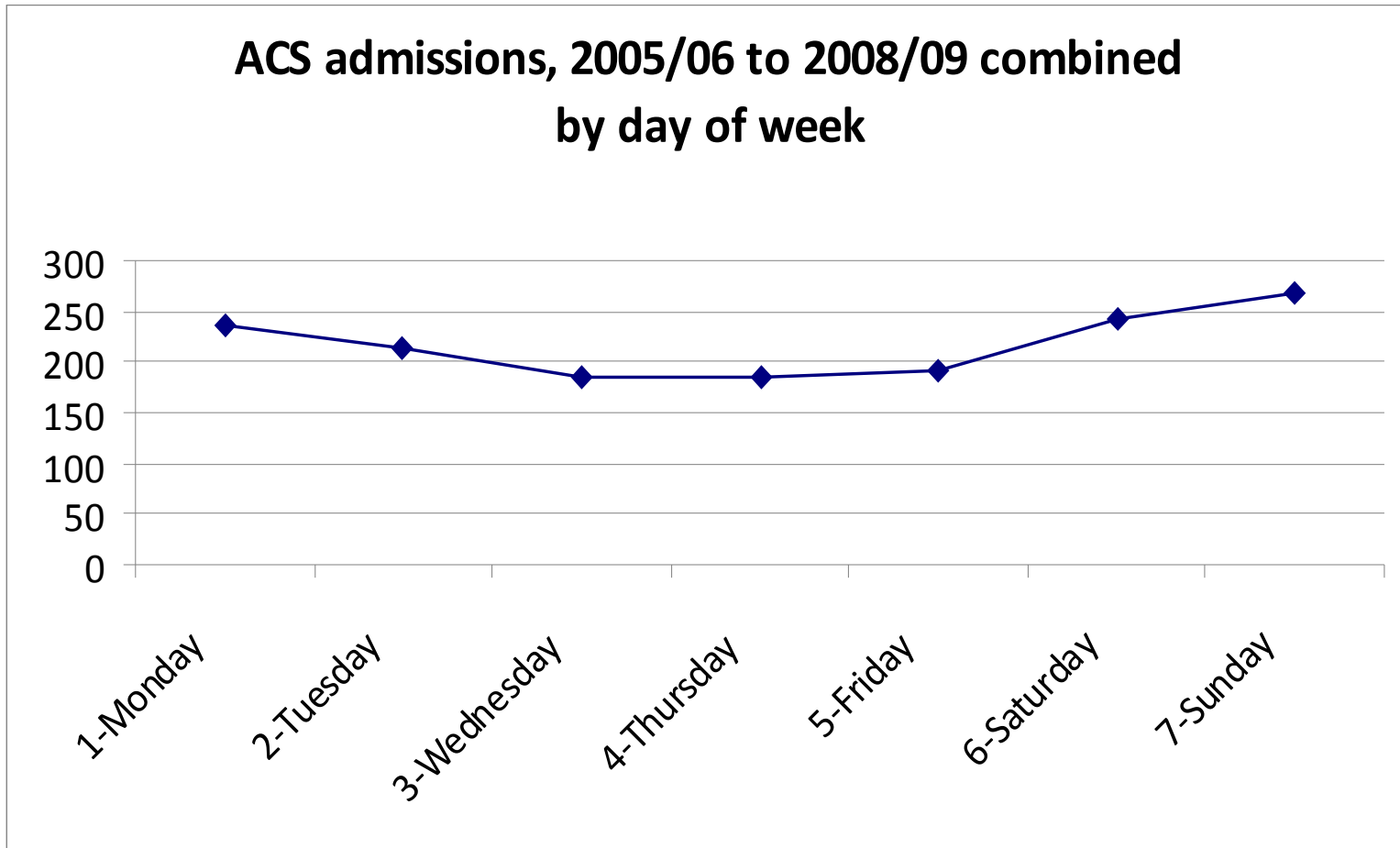
652 (43%) admissions between 5pm to 8am

463 (30%) admissions between 9pm to 8am

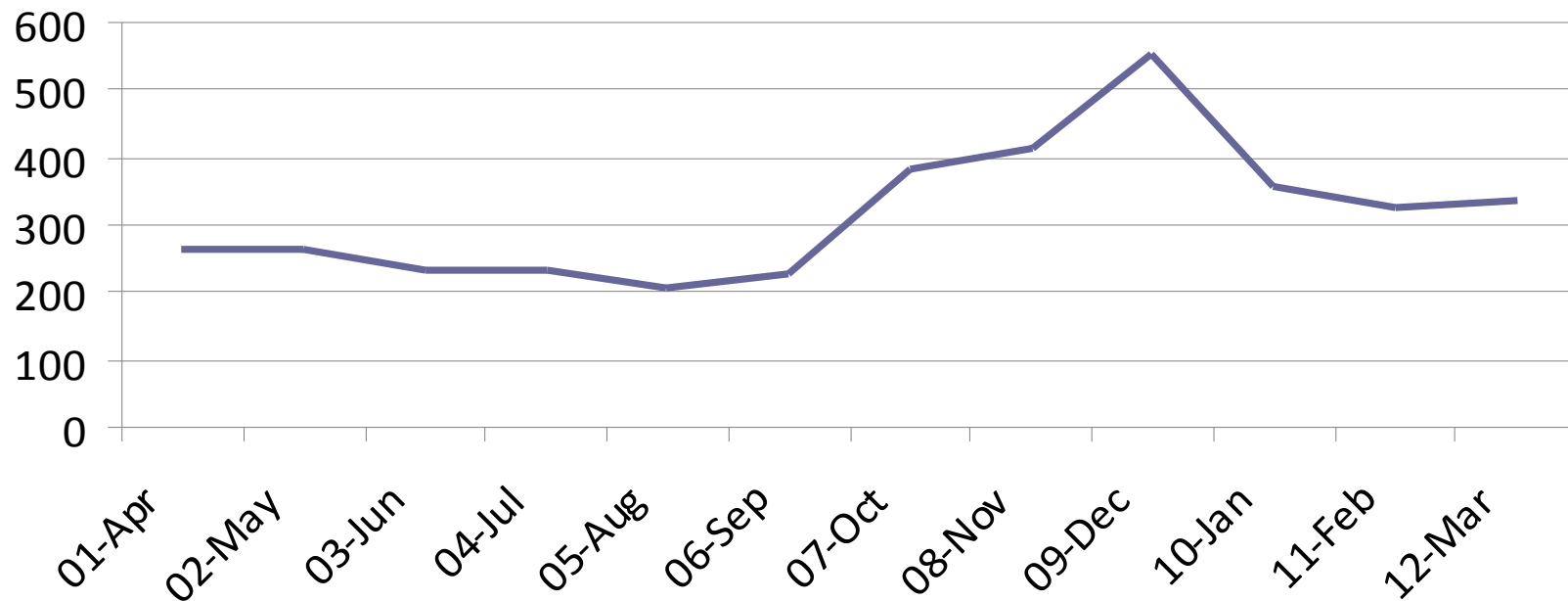
### COPD admissions, 2005/06 to 2008/09 combined by time of day



510 (34%) COPD admissions occurred on Sat/Sun



## A&E Attendances coded as Respiratory-related 2009/10



# Readmissions and frequent admitters, 2009 \*

## Readmissions

No of patients	531
Readmitted < 30 days	37 (7%)
Readmitted < 90 days	86 (16%)

## Frequent Admitters

No of re- admissions	No of patients
1	407 (77%)
2	67 (13%)
3	23 (4%)
4	21 (4%)
5+	13 (2%)

**23% had 2 or more re-admissions**

\* Based on emergency readmission to ORH hospitals for same HRG code, all COPD codes

# Reasons for Hospital admissions

- Acute exacerbations of COPD
- Symptoms on acute SOB, cough in previously undiagnosed COPD
- Failure to manage variation of symptoms in COPD as a LTC
- Lack of social/ supportive care

# What is an exacerbation?

- No sputum or plasma biomarkers with good sensitivity and specificity, that can identify presence or severity of an exacerbation.
- *Anthonisen* definition most widely accepted:
  - increased dyspnoea, sputum purulence, and sputum volume.
- Defined by
  - Patient reported symptoms
  - Healthcare Utilisation

# Who gets exacerbations?

- exacerbations frequent even in mild COPD<sup>1</sup>
- have chronic cough / sputum ie bronchitic phenotype<sup>2</sup>
- presence of lower airway bacterial colonisation in the stable state is related to exacerbation frequency<sup>3</sup>

1. Anzueto et al, Eclipse study, *ATS* 2009
2. Powrie D J, *et al* *ATS* 2005
3. Patel IS, *Thorax*. 2002 Sep;57(9):759-64.

# When do exacerbations occur?

- 50% more likely to occur in winter
- exacerbations are associated with colder outdoor temperature ( $p < 0.005$ )<sup>1</sup>.

Donaldson G C, Seemungal T, Jeffries D J. *et al*

Effect of temperature on lung function and symptoms in chronic obstructive pulmonary disease.

*Eur Respir J* 1999. 13:844–849.

# Causes of exacerbations

## Infections

- Rhinoviruses (common cold)
- Influenza
- Parainfluenza
- Coronavirus
- Adenovirus
- Respiratory Syncytial Virus
- C pneumoniae
- H influenzae
- S pneumoniae
- M catarrhalis
- Staph aureus
- P aeruginosa

## Common pollutants

- Nitrogen dioxide
- Particulates
- Sulphur dioxide
- Ozone

The cause of the exacerbation may be unidentifiable in up to 30% of exacerbations

# Treatment of AECOPD:NICE

- In absence of significant contraindications **oral corticosteroids**
  - should be considered in patients in the community who have an exacerbation with a significant increase in breathlessness which interferes with daily activities.
  - should be used, in conjunction with other therapies, in all patients admitted to hospital with an exacerbation of COPD.
- Prednisolone 30 mg orally should be prescribed for 7 to 14 days
- Steroid treatment should not be longer than 14 days as there is no advantage in prolonged therapy.
- Antibiotics should be used to treat exacerbations of COPD associated with a history of more purulent sputum.

# Prevention of hospital admissions

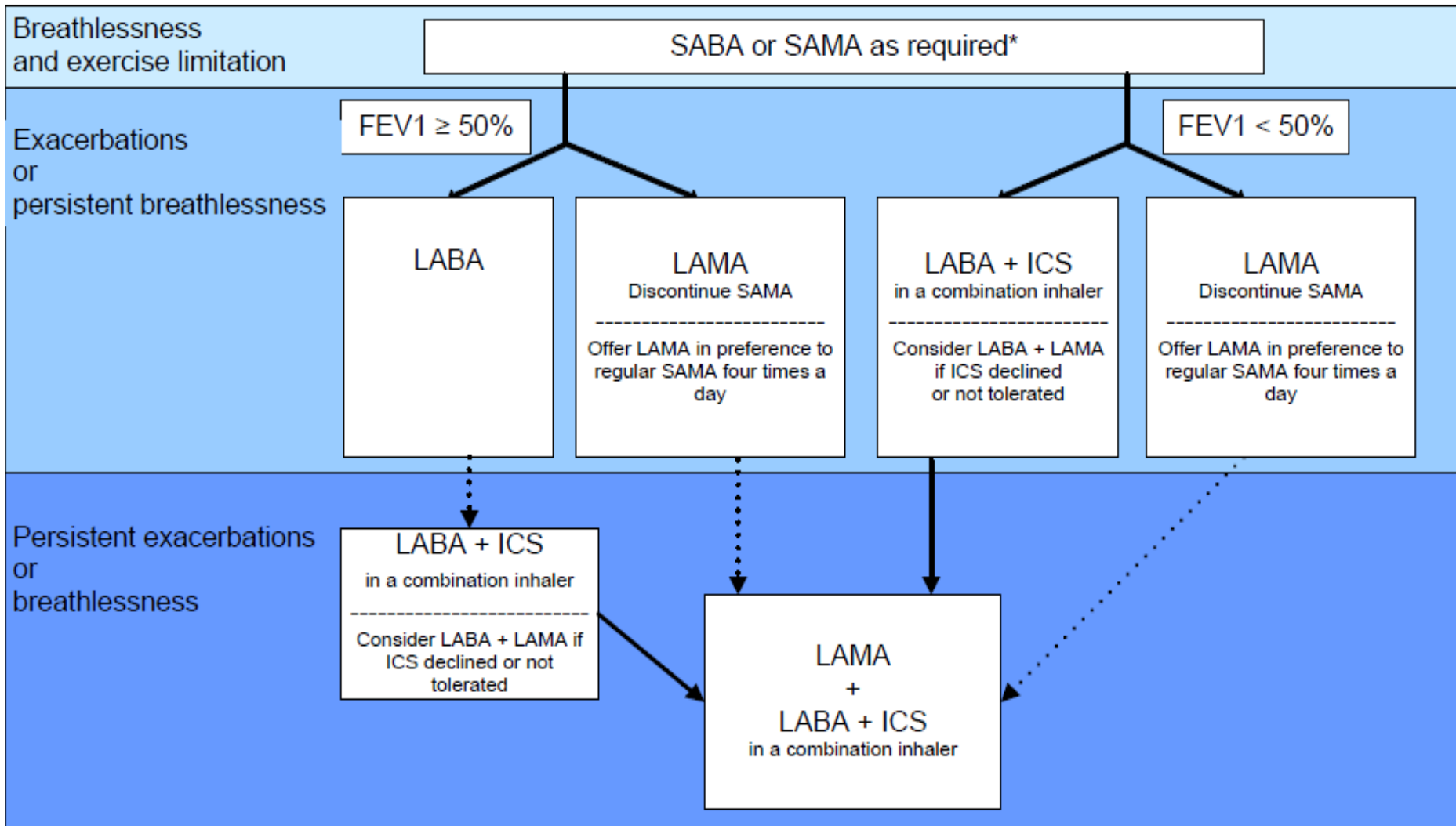
- Structured medicines management approach
- Pulmonary rehabilitation
- Personalised care planning - self-management
- Identification of severe end stage COPD for supportive palliative care

## NEW 2010 UPDATE RECOMMENDATION 5 (U5)

In people with stable COPD who remain breathless or have exacerbations despite use of short-acting bronchodilators as required, offer the following as maintenance therapy:

- if  $FEV_1 \geq 50\%$  predicted: either long-acting beta<sub>2</sub> agonist (LABA) or long-acting muscarinic antagonist (LAMA)

Offer LAMA in addition to LABA+ICS to people with COPD who remain breathless or have exacerbations despite taking LABA+ICS, irrespective of their  $FEV_1$ .



# Tiotropium studies (Casaburi + Vincken)

- NNT to prevent one patient having at least one exacerbation/year = 13 (95% CI 8-41)
- NNT to prevent one patient having at least one admission/year = 25 (95% CI 14-97)
- Length of stay: for each patient given tiotropium, at least 0.6 of a hospital day/ year was saved

# UPLIFT (Understanding potential long term impacts on function with tiotropium)

Tashkin DP et al. A 4-year trial of tiotropium in Chronic Obstructive Pulmonary Disease. N Engl J Med 2008;359:1543–54

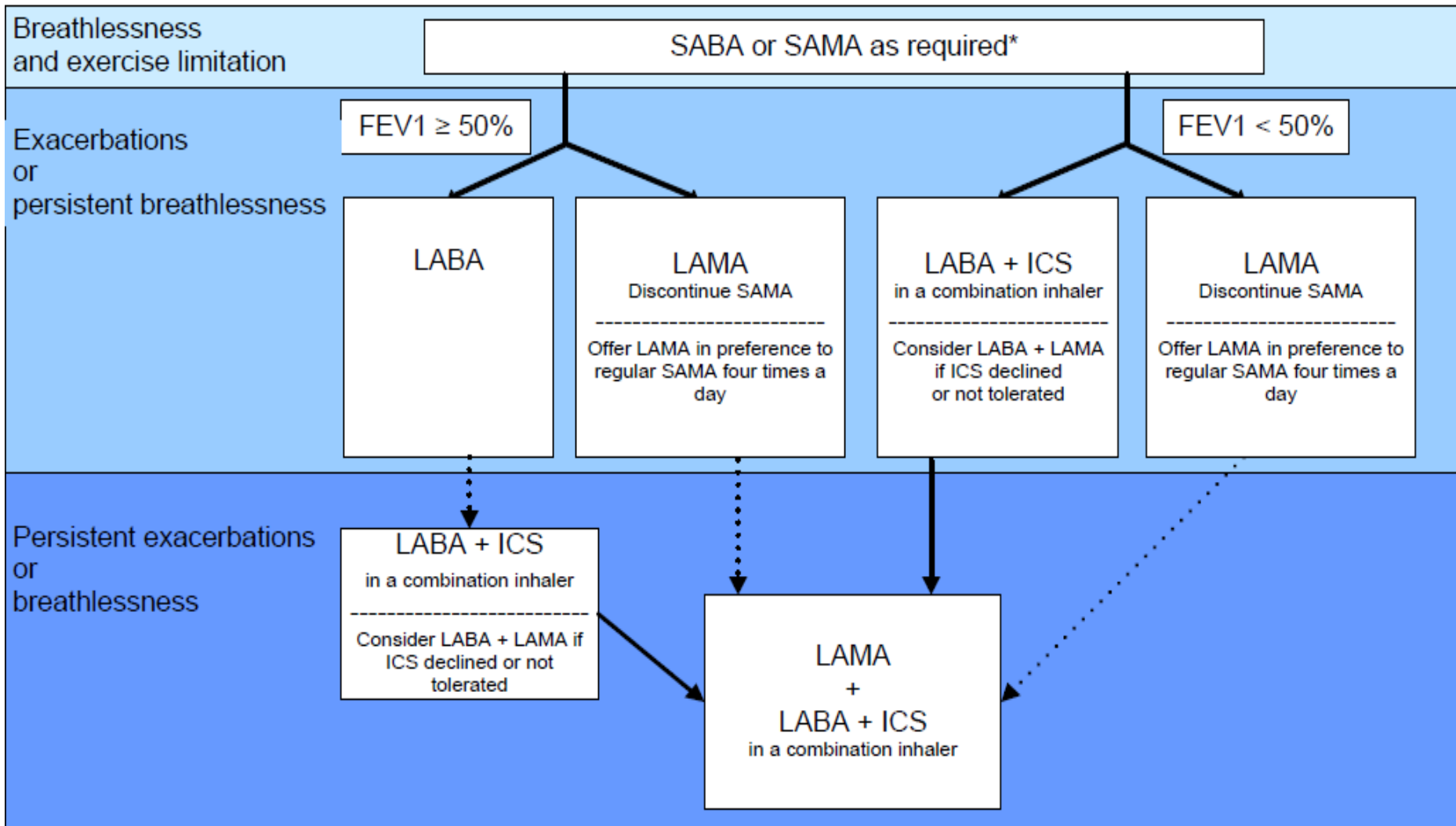
## Secondary endpoints

- Delayed time to first exacerbation (4.2 months)
- 14% reduced risk of exacerbations and exacerbations leading to hospitalisation

# Tiotropium versus Salmeterol for the Prevention of Exacerbations of COPD

Vogelmeier et al for THE POET-COPD INVESTIGATORS  
N ENGL J MED 2011; 364:1093-1103

- 7376 patients randomised to treatment with tiotropium (3707 patients) or salmeterol (3669 patients).
- Tiotropium, as compared with salmeterol,
  - increased the time to the first exacerbation (187 days vs. 145 days), with a 17% reduction in risk (hazard ratio, 0.83; 95% confidence interval [CI], 0.77 to 0.90;  $P < 0.001$ ).
  - increased the time to the first severe exacerbation (hazard ratio, 0.72; 95% CI, 0.61 to 0.85;  $P < 0.001$ ),
  - reduced the annual number of moderate or severe exacerbations (0.64 vs. 0.72; rate ratio, 0.89; 95% CI, 0.83 to 0.96;  $P = 0.002$ ),
  - reduced the annual number of severe exacerbations (0.09 vs. 0.13; rate ratio, 0.73; 95% CI, 0.66 to 0.82;  $P < 0.001$ ).



# Inhaled steroids and exacerbations

## ISOLDE Burge et al BMJ 200

- 25 % reduction in frequency of exacerbations in symptomatic patients with *moderate to severe* COPD (FEV1<50%) and *frequent exacerbations (>1/year)*, but not mild COPD .

TORCH: Towards a revolution in COPD Health  
survival study

*Calverly et al NEJM Feb 2007*

Patients treated with seretide vs placebo

Secondary endpoints - COPD exacerbations

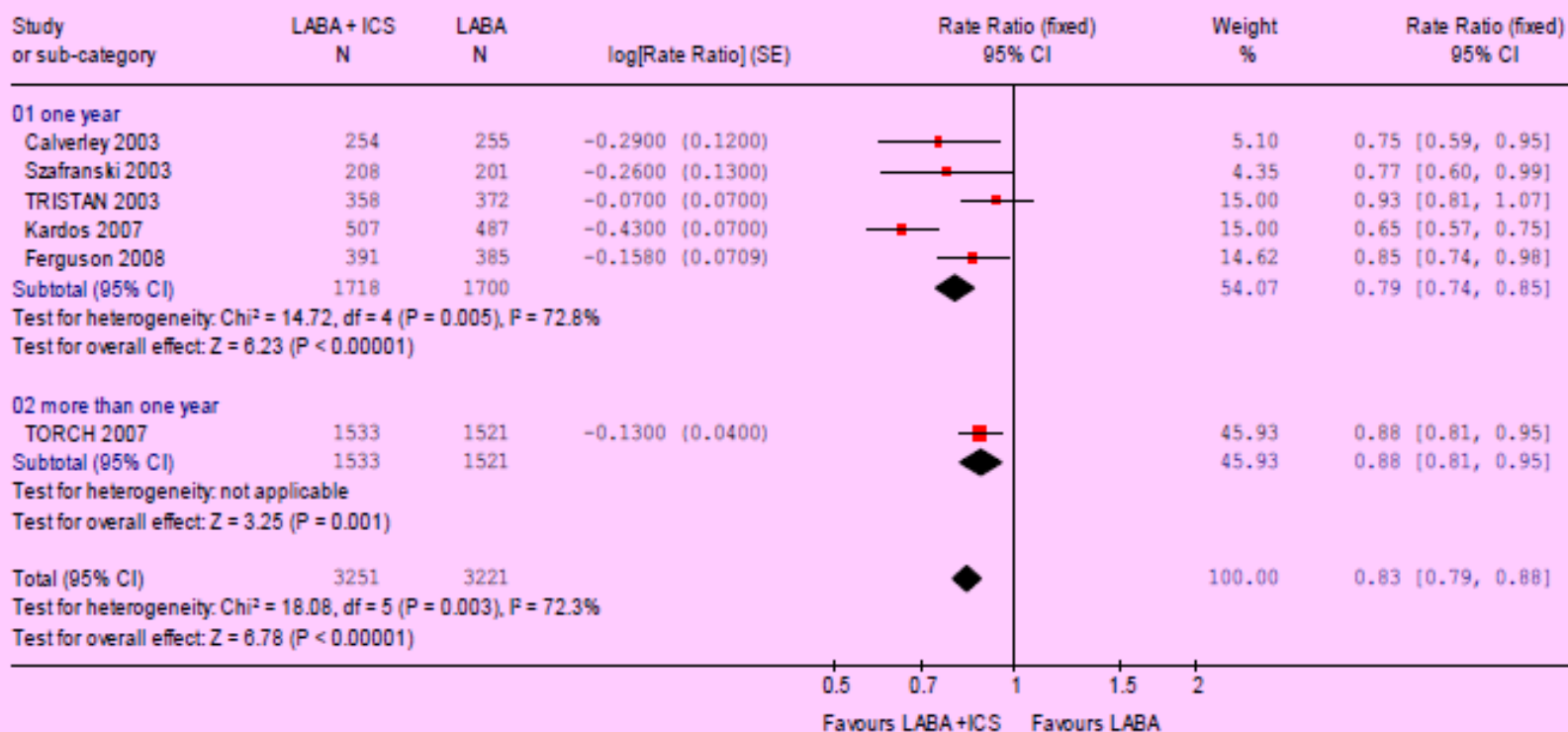
- Decreased from 1.13 to 0.85 per annum (25%) compared with placebo  $p < 0.001$

## Exacerbations (expressed as a rate ratio)

Review: Drug 3a: LABA + ICS vs. LABA (Cochrane) (latest 300309)

Comparison: 01 LABA + ICS vs. LABA

Outcome: 03 Exacerbations (rate ratio) - duration of study split



# NICE 2010

Be aware of the potential risk of developing side effects (including non-fatal pneumonia) in people with COPD treated with inhaled corticosteroids and be prepared to discuss this with patients.

# NICE 2010: Mucolytic therapy

- Consider in people with a chronic productive cough and continue use if symptoms improve.
- Do not routinely use to prevent exacerbations.
- Do not use to treat exacerbations.

## **Azithromycin for Prevention of Exacerbations of COPD**

Albert RK et al, M.D., for the COPD Clinical Research Network

N Engl J Med 2011; 365:689-698 August 25, 2011

RCT of 1142 COPD pts to either azithromycin 250mg od or placebo for 1 year in addition to usual care.

Azithromycin group had

- Reduced median time to the first exacerbation: 266 days (95% CI 227 to 313) vs 174 days (95% CI 143 to 215) in placebo group ( $p < 0.001$ ).
- Reduced frequency of exacerbations: 1.48 exacerbations/patient-year compared with 1.83 /patient-year in placebo group ( $p = 0.01$ ),
- Improved St. George's Respiratory Questionnaire: change of  $2.8 \pm 12.8$  vs  $0.6 \pm 11.4$  in placebo group ( $p = 0.004$ )
- Increased rate of hearing decrements than in placebo group (25% vs. 20%,  $P = 0.04$ ).

Effects on microbial resistance rates unknown

# Roflumilast

- Selective PG4 inhibitor
- NICE HTA appraisal underway

# NICE 2010: Pulmonary rehabilitation

- Offer to all appropriate people with COPD, including *those who have had a recent hospitalisation for an exacerbation* and those who consider themselves functionally disabled by COPD (usually MRC grade 3 and above)

# **Outpatient pulmonary rehabilitation following acute exacerbations of COPD. Seymour et al Thorax 2010**

60 patients admitted to hospital for an exacerbation of COPD underwent concealed randomisation at the time of their hospital discharge to receive either usual follow-up care (UC) or PEPR after discharge.

Patient characteristics mean (SD)

UC: n=30, age 65 (10) years, FEV1 52 (22)% predicted; PEPR: n=30, 67(10) years, 52 (20)% predicted

# Outpatient pulmonary rehabilitation following acute exacerbations of COPD. Seymour et al Thorax 2010

**Table 2**

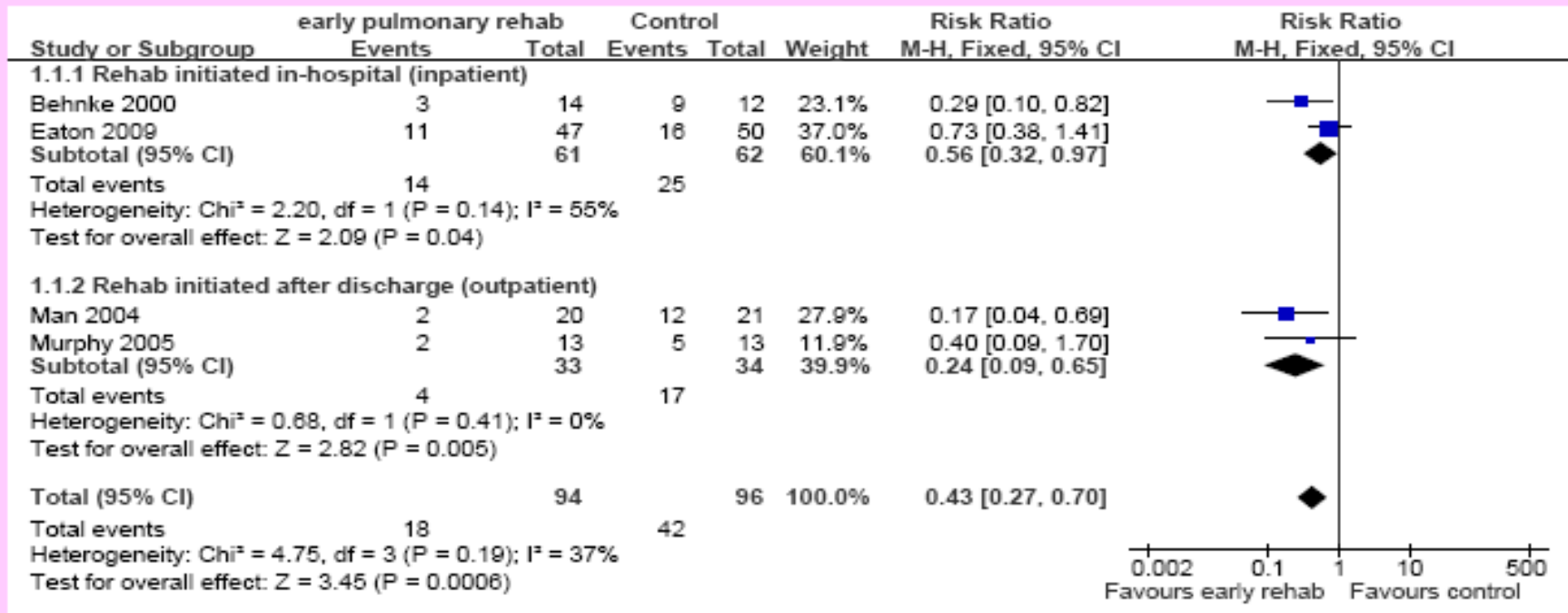
Healthcare utilisation in the UC and PEPR arms over 3 months

	Number (% subjects within group)		OR (95% CI) PEPR vs UC <sup>†</sup>	p Value
	UC (N=30)	PEPR (N=30)		
Hospital admission for exacerbation	10 (33%)	2 (7%)	0.15 (0.03 to 0.72)	0.02
ED attendance for exacerbation	7 (23%)	6 (20%)	0.66 (0.18 to 2.36)	0.52
Hospital or ED attendance for exacerbation	17 (57%)	8 (27%)	0.28 (0.10 to 0.82)	0.02

<sup>†</sup> Binary logistic regression: expB (95% CI for ExpB).

## Forest Plots

### Readmission



- Compared with usual care, people with an exacerbation of COPD who received early pulmonary rehabilitation had
1. a significantly decreased risk of readmission to hospital [low quality evidence]
  2. no significant difference in exacerbations [very low quality evidence]

# End of Life Care/ Supportive palliative care

Identify patients for inclusion on EoL registers

- Severe AFO  $FEV_1 < 30\%$  predicted
- Respiratory failure
- BMI < 19
- Housebound/ MRC grade 5
- 2 or more admissions in previous year
- Required NIV for AECOPD
- “Surprise question”
- Provide information and support for carers

# What is PCT doing about COPD? Respiratory Task force

- Educational and development programme for primary care: initially spirometry training (performing and interpreting)
- Improving access to respiratory expertise
- MUR inhaler technique project
- COPD Telehealth project
- Pulmonary rehab expansion (200 to 530 places per annum 2011/2)
- Future projects:
  - Evaluating and expanding the scope/remit of the respiratory nursing service: review underway
  - Supporting smoking cessation opportunities

# South Bucks GP collaborative

- 34 practices commissioned COPD project from respiratory team (2 doctors and 2 nurses) from Highfield practice
- Aims
  - Support provision of high quality COPD care
  - Increase prevalence
  - Improve patient outcomes
  - Increase self-management
  - Reduce hospital admissions
- Cost £30,000 first year, £20,000 second year – hospital admissions reduced by 20% first year
- Resources developed
  - [www.smokingpackyears.com](http://www.smokingpackyears.com)
  - [www.clinicalindications.com](http://www.clinicalindications.com)

# COPD services in Oxfordshire

Oxford Health County wide respiratory nursing team whose remit is

- Admissions avoidance for COPD patients
- Early discharge scheme for COPD patients
- Patient education and self-management
- Home oxygen assessment service (with ORH)

ORH COPD out-patient and in-patient services

- Multi-disciplinary clinic (lung function, radiology, respiratory nursing, physiotherapy)
- Weekly COPD meeting with Community and HOS team
- Access to NIV both sites
- Most patients seen by respiratory specialist (nursing or medical)

# How should we reduce hospital admissions, prevent re-admissions and improve quality of admissions?

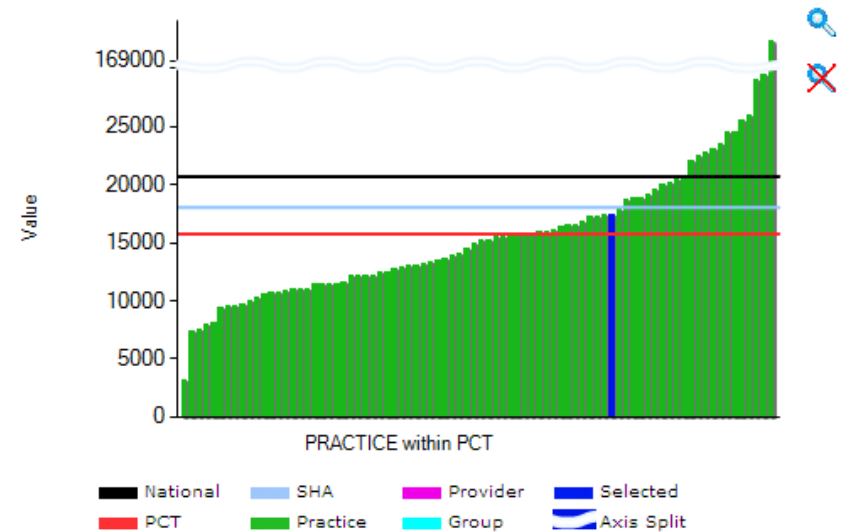
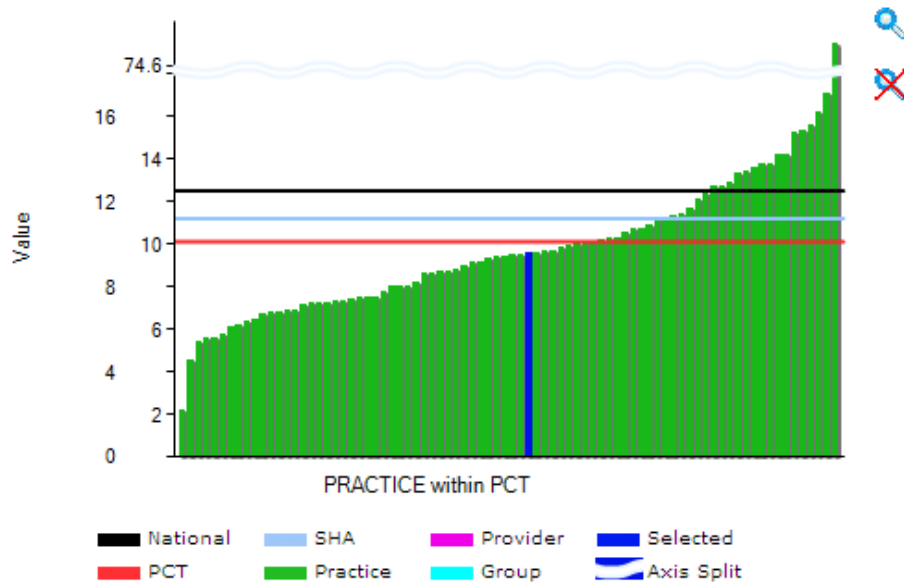
- Improving integrated care
  - Improved integrated working between acute and community sectors
  - Improved supported self-management
- Improve quality of admission
  - Increase numbers of patients looked after by Respiratory teams
  - COPD discharge bundles and CQUINs
  - Increasing provision and quality of early discharge scheme
- Prevention of readmissions
  - Increased patient support for self management – EPP
  - Early pulmonary rehab
  - Increased social support

# Summary

- Variety of pharmacological strategies for 'frequent exacerbators'
- Early pulmonary rehabilitation
- Organisation and integration of care
- Phenotype specific management
- New treatments - NICE to evaluate Roflumilast

# NHS Comparators – GP Practice Level Comparison of Expenditure on Problems of Respiratory Emergency Admissions

**Oxfordshire had a large variation in 2008/09 of activity and spend on Respiratory emergency admissions per 1000 population at practice level**



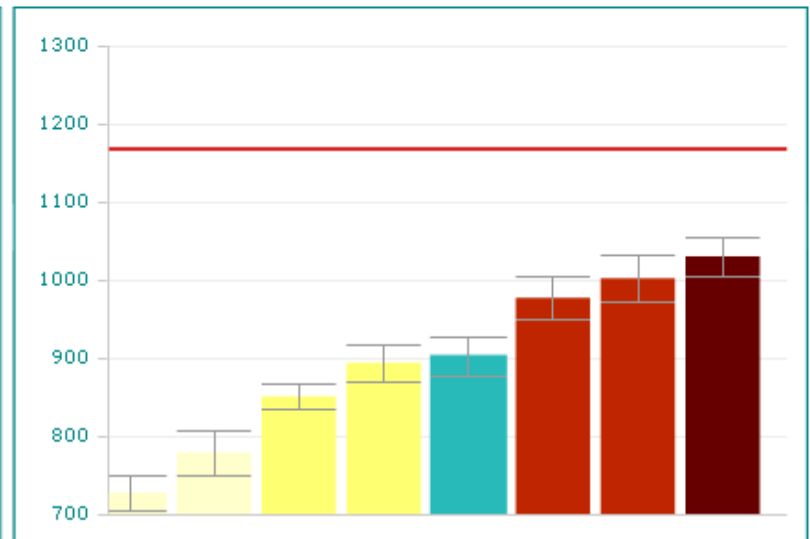
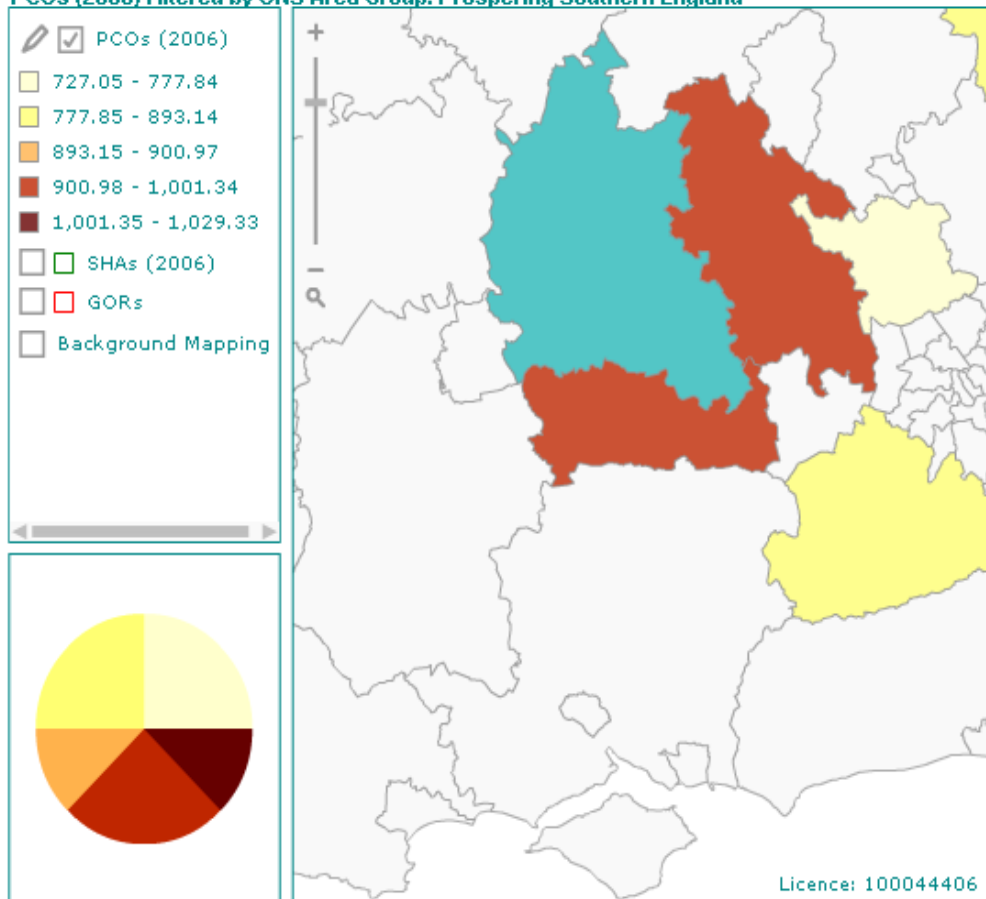
Type	Org	Standardised Rate	Total Count	Expected Count	Count Difference	% Difference
Practice	K84049	9.6	46	60	-14	-23.6
PCT	5QE	10.1	6,496	8,090	-1,594	-19.7
SHA	Q38	11.2	47,241	52,830	-5,589	-10.6
National		12.5	681,384	681,384	0	0.0

Type	Org	Standardised Rate	Total Cost £	Expected Cost £	Cost Difference £	% Difference
Practice	K84049	17,449.0	77,211	91,644	-14,433	-15.8
PCT	5QE	15,769.3	10,079,701	13,238,198	-3,158,498	-23.9
SHA	Q38	18,023.8	75,582,286	86,849,299	-11,267,014	-13.0
National		20,710.6	1,127,903,502	1,127,903,502	0	0.0

# Hospitalisation: Respiratory system problems. All Non-elective admissions, indirectly age-standardised rate per 100,000 population, all ages FY 2007/2008

**Oxfordshire has an average number of non elective admissions for Respiratory problems when compared to similar PCTs**

Indicator: Hospitalisation: Respiratory system: Non-elective admissions, indirectly age-standardised rate per 100,000 population, all ages, FY 2007/8  
 PCOs (2006) Filtered by ONS Area Group: Prospering Southern England



	Name ▲	Count	Indicator	95% CI LL	95% CI UL ▲
●	ENGLAND	596,8...	1,168.25	1,165.29	1,171.22 ▲
●	East Midlands SHA	No Data	No Data	No Data	No Data
●	East of England SHA	No Data	No Data	No Data	No Data
●	London SHA	No Data	No Data	No Data	No Data
●	North East SHA	No Data	No Data	No Data	No Data
●	North West SHA	No Data	No Data	No Data	No Data
●	South Central SHA	No Data	No Data	No Data	No Data
●	South East Coast SHA	No Data	No Data	No Data	No Data ▼