

# ABSTRACTS OF SOCIETIES

## Scottish Thoracic Society Meeting

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### **Audit of Ambulatory Oxygen Assessment and Prescription in Edinburgh.**

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In 2004 the Scottish Executive approved the provision of Ambulatory Oxygen Therapy (AOT) for ambulatory patients on Long Term Oxygen Therapy LTOT and others who fulfil certain criteria. In Edinburgh, patients considered for AOT undergo a blinded incremental walk test breathing either air or oxygen. The decision to prescribe rests with the referring physician. We conducted an audit of all patients assessed for AOT with the aims of determining the outcome of the assessment and the use of AOT by patients. Data was obtained from all patients referred for assessment between April 2004 and April 2007 from the Western General Hospital and Royal Infirmary of Edinburgh. Information on prescription of oxygen was obtained from primary care and patients were invited to participate in a telephone interview. Eighty-one patients (46 male, 35 female) were referred for AOT assessment over this period. The most common diagnosis was COPD (n=59). Forty-seven patients were eligible for AOT, but only 26 received a prescription (five of whom did not meet criteria). Of the 47 patients not prescribed AOT, 26 showed improved exercise capacity and/or BS > 10%. The median number of portable cylinders prescribed per month for all patients was 3.5 (range 0 – 27.1). Of 20 patients interviewed, 17 used AOT on a regular basis but mostly within the home as short-burst (n=13) or for self-care and housework (n=7). Cylinders were found to be heavy (n=15), awkward (n=12) and embarrassing (n=9).

Therefore, a substantial number of patients who fulfil Scottish criteria for AOT do not receive a prescription. The majority of patients who receive AOT fail to use it appropriately. These issues need to be explored and addressed before encouraging greater prescription of AOT.

### **Impact Assessment of the Document *Tuberculosis: Clinical Diagnosis and Management of Tuberculosis, and Measures for its Prevention and Control* on NHS Staff Tuberculosis Screening by Occupational Health Services and Referral to Medical Respiratory Services.**

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**Introduction:** The 2006 RCP document recommended that BCG vaccination should be offered to healthcare workers, irrespective of age, who: are previously unvaccinated (that is without adequate documentation or a characteristic scar), and will have contact with patients or clinical materials, and are Mantoux (or interferon-gamma) negative (Recommendation 80). Recommendations 119 and 120 advise that if the Mantoux test is positive (6mm or greater), the person should be referred for clinical assessment for diagnosis and possible treatment of latent infection or active disease. This would be a change compared to the previous BTS guidelines as it applies to a new

employee from the UK or a low-incidence setting as well as new employees from countries of high TB incidence. The likely impact on respiratory out-patient services of the increase in referrals has raised concern from respiratory physicians. This paper assesses this impact using data collected over the past 6 years from one NHS Occupational Health Service. **Methods:** Data on TB screening of NHS staff over a six year period was collated and used to identify the average annual rate of Mantoux testing/1000 employees screened and the average annual rate of BCG vaccination/1000 employees screened. This provides an average annual rate of employees that would be referred to respiratory clinics/1000 employees screened. This data can be used to measure the impact on respiratory services in Scotland if the RCP guideline is implemented. **Results:** The numbers attending for TB screening varied from 916 to 1284 over the six year period with an annual average of 1112 per annum. 86.8% of staff had evidence of previous BCG immunisation. The annual average rate of TB skin testing was 131.4/1000 employees. The average annual rate of BCG vaccination was 38.4/1000 employees. The rate of Mantoux positive or strongly positive cases that would be referred to respiratory clinics is 93 for every 1000 NHS staff who are processed by an Occupational Health Service. **Discussion:** Latest NHS workforce statistics indicate a workforce of 157,986 in 2006 with 20% involved in administrative and other areas without TB exposure. The turnover was 7.7% for 2006-7 across all staff groups. The total number of new employees was 9731. This excludes medical, nursing and other health professional students. The estimated number of out-patient appointments in Scotland if the RCP guidelines are implemented is 905 cases/annum across Scotland (95% CI: 847-965 cases).

### **Use of Plan-Do-Study-Act (PDSA) Cycles to Improve the Management of Community Acquired Pneumonia (CAP).**

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**Introduction:** Community Acquired Pneumonia (CAP) is a common cause of morbidity, mortality and consumption of hospital resources in the UK. There are evidence-based markers of severity at presentation and of stabilisation in response to treatment that can be used to support clinical decisions about processes of care (SIGN 59). Nonetheless, in Scotland a large prospective audit of 205 patients, admitted with CAP to 2 hospitals in Tayside, showed significant gaps in the quality of care. Measurement of a core set of evidence-based, well defined and readily measurable performance indicators offer a means of targeting key interventions and evaluating their impact. **Methods:** A prospective improvement study was performed as part of a Scotland National Audit Project funded by the Health Foundation and co-ordinated by the Royal Colleges of Physicians in Scotland (<http://www.snaproject.org.uk/>). Overall, the CAP project aims to implement changes that simplify and reinforce the use of clinical actions that are proven to improve outcomes for patients diagnosed with CAP in secondary care. It seeks to guide clinical decision making which maximises the treatment of severe CAP, while reducing the over-treatment of mild and moderate CAP. Locally, over a period of 8 months (Dec 2006 to Aug 2007), we used PDSA cycles to encourage adherence to CAP guidelines. **Objective:** To improve risk stratification of patients by use of the CURB65 criteria and ensure prompt antimicrobial therapy. **Results:** There was an improvement in recording of CURB65

criteria from 45% through to 82% through six PDSA cycles. Administration of antibiotics within four hours of hospital admission started off well on the first assessment but subsequently fell on the second. However, thereafter there was an improvement to 76%. Very few patients with CURB65 criteria of zero or one were actually discharged within 24 hours but there were various factors for this, mainly hypoxia. At the end of each cycle a different intervention was performed. Success of these interventions was variable with teaching medical staff and updating their progress with emailed illustration posters being most useful and introduction of CAP stickers and nurse induction being least successful and probably explaining the dip in the small sample collected in April-May. **Discussion:** The medical and nursing staff on the acute medical receiving unit in our DGH have become more aware of the management of CAP. The use of PDSA cycles has encouraged evaluation early on in the process and therefore problems can be identified and changes made. We have evaluated different interventions to assess which have improved the management of CAP sufferers (emails to SHO/SpR (January), email and poster to FY1/FY2 (February), CAP Sticker, nurse induction (March-May) and email redistribution (August)). This is part of an ongoing study, and ultimately we hope to see improved mortality rates, reduced complication rates and reduced hospital admissions, as more patients with mild CAP are cared for in the community.

### Is There a Relationship between Smoking Cessation and Socioeconomic Status in Patients with Chronic Obstructive Pulmonary Disease?

C Lomas, MZ Al-khairalla, JH Winter

The **objective** of this study was to determine whether Chronic Obstructive Pulmonary Disease (COPD) patients from a lower socioeconomic status had a lower proportion of ex-smokers. This population-based observational study analysed over 4500 subjects selected from the Tayside Respiratory Disease Information System (TARDIS) database, who had a smoking history and a deprivation category (DEPCAT) score recorded. The study also examined other smoking cessation factors in this group through a postal questionnaire randomly sent out to 300 randomly selected patients with COPD.

The **results** of this study clearly demonstrated a statistically significant social gradient in determining smoking status with COPD patients from affluent socioeconomic DEPCAT scores having a higher proportion of ex-smokers than those from those at the other end of the deprivation scale ( $n=4650$  P-value  $<0.01$  using the chi-square for independence non parametric test). Other factors associated with being an ex-smoker were age, male gender, smoking less than 40-pack years and hospitalisation. Factors associated with being a current smoker were female gender, lower social class and increased anxiety and depression scores. 78% of ex-smokers used willpower alone and knowledge of having COPD did not have a statistically significant effect on smoking status.

**Conclusion:** The study confirms social inequalities that probably contribute to the health inequalities seen in this respiratory disease. Deprived groups have a higher prevalence of COPD and lower smoking cessation success rate when compared to more affluent ones. Health providers should note this multi-factorial independent risk factor when running or setting up smoking cessation services in the aim of modifying this single most important modifier in COPD.

### Management of Acute Severe Asthma in west Glasgow

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**Background:** The UK has 69,000 hospital admissions and over 1,400 deaths from asthma annually, the highest in Europe. The British Thoracic Society (BTS) guidelines represent the standard by which acute asthma exacerbations should be managed. We assessed the degree of conformity with these guidelines in an acute medical unit. **Methods:** Data from consecutive admissions were collected prospectively using a standardised proforma based on BTS guidelines. Two cycles of data collection were performed, from October to December 2005, and October 2006 to January 2007. Between cycles an educational programme directed toward junior medical staff was instigated. **Results:** Data was collected from 58 patients, 29 in each cycle. Median age was 35 years (IQR:23-51) across both groups. Assessment of severity was documented in 55% and 66% in cycle one and two respectively. Of these, the assessment was incorrect in 33% in cycle one and 21% in cycle two. All misclassifications of severity were underestimates. Life-threatening attacks occurred in 26% and 55% of patients in cycles one and two respectively, none of which were correctly identified. There was no significant improvement in severity assessment between cycles. Overall 60% of patients were under-treated according to the BTS guidelines. None were over-treated. Under-treatment was more frequent in cycle two compared with cycle one (62.1% vs. 17.2%,  $p<0.0001$ ), predominantly due to inadequate treatment of life-threatening asthma. **Conclusion:** The management of acute asthma patients in a large, urban teaching hospital is suboptimal. Educational intervention alone failed to improve care; more comprehensive strategies are required.

### The Effect of Mechanical Ventilation on Asthma control - a Randomised Controlled Trial.

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**Background:** Allergy to the house dust mite allergen *Dermatophagoides pteronyssinus* 1 (Der p1) is commonly associated with asthma in the UK. The warm, humid environment of modern homes favours the dust mite population, but the effect of improved domestic ventilation on the control of asthma is uncertain. **Methods:** We conducted a randomised double-blind placebo-controlled trial of the installation of mechanical heat recovery ventilation in the homes of 120 adults with asthma who were sensitive to Der p1. Activation of the unit was concealed from the subjects. All subjects had conventional allergen avoidance at baseline. The primary outcome measure was morning peak expiratory flow at 12 months. **Results:** At 12 months, the change in mean morning peak expiratory flow, as compared with baseline, did not differ between the mechanical ventilation group and the control group (mean

difference 13.59 litres per minute, 95% CL -2.66 to 29.85,  $p=0.100$ ). However, evening mean peak expiratory flow was significantly improved in the mechanical ventilation group (mean difference 24.56 litres per minute, 95% CI 8.97 to 40.15,  $P=0.002$ ) and there were fewer hospitalisations for asthma. (0 vs. 4,  $p=0.029$ ). **Conclusion:** The installation of mechanical ventilation in the homes of adults with chronic asthma and sensitivity to house dust mite results in an improvement in some indices of asthma control.

### IL-33 is Sufficient to Induce Eosinophilic Airway Inflammation, and Exacerbates Established Inflammation, Through Increased Local Th2 Cytokine and Chemokine Production.

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**Introduction:** The key pathological features of asthma are eosinophilic airway inflammation, mucus hypersecretion and airway remodelling, mediated by Th2 cytokines IL-4, IL-5 and IL-13. IL-4 and/or IL-13 administered directly to the airways, in the absence of antigen, induce these pathological features. IL-33 is a novel cytokine which binds to the ST2 receptor and induces Th2 cytokine expression. I hypothesised that IL-33 alone would be sufficient to induce eosinophilic airway inflammation, and would also exacerbate antigen-specific allergic airway inflammation. **Methods:** To assess the antigen-independent effect of IL-33 in the airways, PBS  $\pm$  recombinant (r)IL-33 was administered intranasally (i.n.) to mice for seven consecutive days. Mice were culled on day eight, bronchoalveolar lavage (BAL) performed and lungs obtained for histology. Differential cell counts were performed on cytopreps, and the concentration of BAL cytokines and chemokines determined by ELISA.

Allergic airway inflammation was induced in mice by intraperitoneal (i.p.) sensitisation with ovalbumin (OVA) and alum on day one, followed by i.n. challenge on days nine and 11 with OVA  $\pm$  rIL-33. Mice were culled on day 12 and analysed as above. **Results:** rIL-33 given alone induced marked eosinophilic inflammation and BAL eosinophilia. BAL IL-5 and IL-13, but not IL-4, were markedly increased, as were BAL chemokines eotaxin-1, eotaxin-2 and TARC (table 1). Airway challenge with OVA following sensitisation induced prominent eosinophilic airway inflammation and BAL eosinophilia, which was exacerbated by co-administration of rIL-33. IL-5 and IL-13, and eotaxin-1, eotaxin-2 and TARC (table 1). IL-33 had no effect in ST2KO mice in either model. **Conclusions:** Thus IL-33 alone induces airway pathology similar to that of asthma, through the induction of Th2 associated cytokines and chemokines, with the particular exception of IL-4. In addition, IL-33 exacerbates OVA-specific airway inflammation through a similar mechanism. Thus IL-33 / ST2 may represent an important mediator of IL-4 independent airway inflammation, and may represent a novel target for therapeutic intervention.

Mediator	IL-33 ALONE			IL-33 and OVA AIRWAY INFLAMMATION		
	PBS	IL-33	p value	OVA	OVA + IL-33	p value
Eosinophils (cells/ml $\pm$ SEM)	0 $\pm$ 0	16.6 $\pm$ 4	<0.05	0.7 $\pm$ 0.2	2.89 $\pm$ 0.43	<0.001
IL-4 (pg/ml $\pm$ SEM)	4 $\pm$ 0.8	8 $\pm$ 0.6	NS	62 $\pm$ 17	95 $\pm$ 30	NS
IL-5 (pg/ml $\pm$ SEM)	11 $\pm$ 4	2022 $\pm$ 426	<0.05	172 $\pm$ 58	1268 $\pm$ 231	<0.001
IL-13 (pg/ml $\pm$ SEM)	1 $\pm$ 0.6	447 $\pm$ 131	<0.05	5 $\pm$ 4	362 $\pm$ 71	<0.001
Eotaxin-1 (pg/ml $\pm$ SEM)	48 $\pm$ 9	335 $\pm$ 26	<0.001	60 $\pm$ 10	134 $\pm$ 19	<0.001
Eotaxin-2 (pg/ml $\pm$ SEM)	0.3 $\pm$ 0.3	1213 $\pm$ 90	<0.001	82 $\pm$ 20	725 $\pm$ 143	<0.001
TARC (pg/ml $\pm$ SEM)	0.7 $\pm$ 0.7	826 $\pm$ 76	<0.001	72 $\pm$ 14	478 $\pm$ 134	<0.01

**Table 1** BAL eosinophil counts and cytokine/chemokine concentrations