

Abstract S157 Table 1 Summary of results using a priori risk estimates

Exposure definition	No of cases in high-risk job	No of controls in high-risk job	Odds Ratio adjusted	95% Confidence Interval	p value
JEM					
All	81	172	0.76	0.55–1.04	0.08
Adult onset	59	145	0.82	0.57–1.18	0.29
Childhood worsening	22	27	0.62	0.31–1.22	0.17
ECRHS					
All	109	215	0.90	0.68–1.19	0.46
Adult onset	80	181	0.98	0.71–1.35	0.90
Childhood worsening	29	34	0.70	0.38–1.29	0.25
SWORD					
All	9	31	0.49	0.23–1.04	0.06
Adult onset	6	28	0.44	0.18–1.08	0.07
Childhood worsening	3	3	0.85	0.16–4.41	0.84

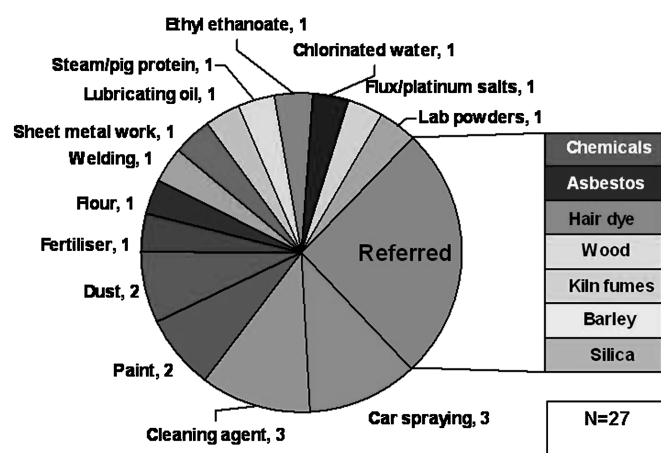
### S158 OCCUPATIONAL ASTHMA; REFERRAL PATTERNS FROM PRIMARY CARE IN THE UK

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**Introduction and Objectives** Occupational asthma is the commonest reported occupational lung disease in the UK<sup>1</sup>. The British Occupational Health Research Foundation (BOHRF)<sup>2</sup> guidelines 2010 recommend that 'all family practices be able to screen for occupational asthma, and have a plan for further management'. The standards of care for occupational asthma<sup>3</sup> recommend 'early referrals to a specialist with an interest in occupational asthma if such a diagnosis is suspected'. This referral should take place 'after occupational asthma is screened for before important life decisions are made'. (SIGN guidelines<sup>4</sup>). Very little is known about the proportion of cases that are referred on to clinical specialists once identified.

**Methods** The Health & Occupation Reporting network in General Practice (THOR-GP) at the University of Manchester, collects work-related ill-health data between 250 and 300 GPs trained to diploma level in occupational medicine. Cases with a diagnosis of occupational asthma reported in 2006–2009 were divided into subgroups by their causative agent. Cases referred to a hospital specialist were compared to those not referred.



Abstract S158 Figure 1 Agents attributed to asthma cases referred to hospital specialists THOR-GP 2006–2009.

**Results** In 2006–2009, GPs reported 4902 cases of work-related ill-health, of which 115 (2%) were reports of respiratory disease. 33 were diagnosed with asthma, 6 were referred to a hospital specialist (Abstract S158 Figure 1). The cases not referred included workers exposed to a variety of known asthmagens.

**Conclusion** Despite national recommendations, these data show that the majority of cases suspected as having occupational asthma are not referred to hospital specialists from primary care. It is not known if the lack of referral affects outcome with regards to disease prognosis, disability or employment status.

### S159 DO OCCUPATIONAL ASTHMATICS WITH SMALL CHANGES IN PEF AT WORK HAVE LESS FEV1 DECLINE THAN THOSE WITH LARGER CHANGES?

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**Background** The significance of consistent small changes in PEF related to work, or records with diurnal variation within the normal range, are disputed. We related PEF changes at diagnosis to longitudinal changes in FEV1 in workers remaining exposed to their causative agent.

**Methods** 163 consecutive workers attending a tertiary referral clinic were identified. All had a clinical history suggestive of occupational asthma and a diagnostic serial PEF record (Oasys score >2.50). Average annual rate of FEV1 decline was calculated using simple linear regression for each worker with at least 12 months of FEV1 measurements. PEF responses to work exposure were made from the initial diagnostic PEF record. Subjects were split into tertiles according to their PEF responses. Mean work-rest PEF was >35 l/min in the highest tertile and <20 l/min in the lowest. Corresponding values for diurnal variation (DV) % predicted were ≥16% (high) and <10% (low).

**Results** Ninety workers had FEV1 measurements for at least 12 months during exposure to the original causative agent (median 2.9 years, IQR 1.8–4.8 years). The mean annual loss of FEV1 was increased at 101 (SEM 17.7) ml/year, unrelated to agent; high MW (10), isocyanates (16), metals (13), colophony (9), biocides (10), metal working fluid (7) and others (23). There were no significant differences related to continued smoking or treatment. There were large between individual differences with annual declines <50 ml in 35/90 workers. There were no statistically significant differences between those with high rest-work PEF changes (–126 SEM 44 ml/year), and low changes (95 SEM 22.1 ml/year), or between those with high DV (98 SEM 36.5 ml/year) and low DV (142 SEM 30.3 ml/year).

**Conclusion** Some workers with occupational asthma have normal FEV1 decline during continued exposure, but the average is around 3× predicted. Workers with small work-related PEF changes or low DV do as badly as those with larger values. The classification of FEV1 decline in an individual worker requires longer measurements than we have available; the group mean changes should be more reliable. Those who are able to remain exposed are likely to be those with least severe disease.

### S160 THE EFFECT OF SHIFT WORK ON SERIAL PEAK EXPIRATORY FLOW MEASUREMENTS USED TO DIAGNOSE OCCUPATIONAL ASTHMA

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We investigated the effects of shift work on Peak Expiratory Flow (PEF) measurements used for diagnosing occupational asthma (OA).

In a clinic database of workers investigated for OA, 123 workers with OA and 69 workers without OA had PEF records containing >1 shift pattern with  $\geq 4$  days on each shift. The OA definition was based on Oasys-2 score  $>2.51$  and the non-OA on an alternative clinical diagnosis and Oasys-2 score  $<2.51$ . Records not fulfilling the minimum data quantity for the Area Between Curves (ABC) PEF score, or containing respiratory infections, changes in asthma treatment or different exposures on each shift were excluded. The mean ABC score, mean PEF diurnal variation (DV) on workdays and cross-shift PEF changes were calculated for each shift. The ABC score of the OA workers was lower on nights ( $p=0.028$ ) and afternoons ( $p=0.020$ ) compared to day shifts, without significant differences in diurnal variation. There was statistically significant difference between day and night shift cross-shift changes ( $p<0.001$ ), larger changes being observed in nights. The sensitivity and specificity of the ABC score was 79% and 99% for day shifts, 83% and 98% for nights and 72% and 96% for afternoon shifts. The sensitivity of increased DV on work days compared to rest days was 76% for day shifts, 78% for nights and 70% for afternoons, specificities being 26%, 48% and 42%, respectively. PEF changes between work and rest show small differences with shift types. The ABC score has high sensitivity and specificity for all three shifts; differences in DV have high sensitivity, but low specificity when using a cut-off point of  $>0\%$  for the difference between work and rest day DV.

## S161 REDUCING EXPOSURE TO ALLERGENS IN BAKERIES

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**Introduction and Objectives** Bakers have one of the highest incidence rates of occupational asthma. This is related to the levels of dust generated in bakeries from both flour itself and 'improvers', which are added to flour to improve the quality of the bread. Bakery improvers can contain known allergens such as fungal alpha amylase, hemicellulase and soya trypsin inhibitor from soya flour, as well as vegetable oil, calcium sulphate and emulsifiers; usually consisting of organic esters and calcium silicate. This study investigated changes to the 'dustiness' of flour by altering the proportions of improvers in the mix, and measured any concomitant reduction in allergen exposure resulting from these changes.

**Methods** The concentration of calcium sulphate, calcium silicate and vegetable oil were manipulated in a standard improver mix. Both standard 'dustiness' tests and simulation of bakery activities were undertaken. Atmospheric levels of total soluble protein, wheat flour antigen, soya trypsin inhibitor and calcium were measured.

**Results** The most effective method of decreasing dustiness of improvers and exposure to allergens was to increase the vegetable oil content of the improver. Raising the oil from 2% to 4% of the improver mix was associated with a 77% decrease in airborne wheat flour antigen and soya trypsin inhibitor in the simulation. Reducing the calcium sulphate content reduced the dustiness of the improver, measured by gravimetric analysis. However, the effect on the atmospheric levels of allergens was less clear. Reducing the calcium silicate content within the emulsifier mix was the least effective of the three methods tested.

**Conclusions** Changing the formulation of the improver represents a simple, practical and inexpensive method of reducing the dustiness and potential exposure to allergens in bakery workers. This study has shown that a small increase in the oil content would be an

effective method for reducing bakers' exposure to allergens and dust. However it could affect how easily the improver is blended and so could be subject to limitations. ©Crown copyright (2010).

## S162 JOB CATEGORIES AND RISK OF ADULT ONSET ASTHMA IN THE 1958 BIRTH COHORT FROM AGE 16 TO AGE 42 YEARS

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**Introduction** Exposures in the workplace may cause adult onset asthma. In this analysis, we present the prevalence of ever working in job categories and the associated risks of adult onset asthma by age 42 in participants in the 1958 birth cohort.

**Methods** All persons born in the first week of March in Britain in 1958 were recruited into the cohort. By age 42 9890 cohort members had provided a full occupational history and health information. Job titles and descriptions were initially coded into Standard Occupational Classification 1990 (SOC-90) using a text based computer program. Blind to asthma status we have recoded these jobs into the International Standard Classification of Occupations 1988 (ISCO-88) codes. The prevalence of ever working in jobs defined by these codes was determined. Adult onset asthma was defined as reporting 'ever asthma' at ages 33 or 42 and excluding all those who reporting 'ever asthma' at ages 11 or 16 (childhood asthma). The risk of adult onset asthma associated with these job categories was determined in logistic regression analysis adjusted for sex, smoking, region and father's social class at birth. The Simes procedure was used to correct for multiple testing.

**Results** After excluding childhood asthma the sample consisted of 8358 cohort members with a 9% prevalence of adult onset asthma. The most common jobs with the greatest risks of adult onset asthma are tabulated.

**Conclusion** Several job categories were associated with adult onset asthma by age 42 in this cohort of adults born in 1958. This analysis confirms in a British population existing knowledge about occupations associated with the development of asthma in working life, and in particular shows consistent evidence of asthma development in those who have ever worked as a cleaner.

Abstract S162 Table 1

ISCO-88 Code	Occupation	Prevalence % (n)		
		Total n = 8358	OR (crude)	OR (adjusted)
9130	Cleaners—unspecified	2.1 (176)	1.90	1.76 (1.12–2.76)
9131	Cleaners—domestic	1.5 (124)	1.74	1.54 (0.90–2.64)
9132	Cleaners—hotels	7.0 (585)	1.76	1.65 (1.24–2.18)
5122	Cooks	4.9 (406)	1.61	1.55 (1.12–2.16)
5123	Waiters/bartenders	9.1 (760)	1.47	1.38 (1.12–2.16)
5133	Home-based personal care workers	5.4 (450)	1.85	1.67 (1.23–2.27)
5141	Hairdressers	2.9 (244)	1.89	1.60 (1.09–2.36)
5169	Protective services workers not elsewhere classified	1.8 (147)	1.63	2.05 (1.23–3.43)
8263	Sewing-machine operators	1.8 (154)	1.93	1.72 (1.07–2.77)
9320	Labourers	2.6 (216)	1.84	2.02 (1.34–3.07)
9322	Hand packers and other manufacturing labourers	2.3 (188)	1.60	1.48 (0.93–2.34)

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