Introduction Occupational exposure to dust, gases and fumes has been associated with chronic airway disease or poor lung function in several workforce based studies. However, workforce studies may underestimate such associations because of healthy worker effect confounding bias. We conducted a community-based study that used a more generalised populations of individuals and less susceptible to healthy worker effect. We investigated the associations between the self-reported occupational exposure and chronic bronchitis, as well as pulmonary function testing.

Methods The study population is the Third-Generation cohort from Framingham Heart Study with a total of 3,894 participants. We used participants' examination of FEV1, FEV1/FVC, chronic bronchitis (based on self reported symptoms) as outcomes. Occupational exposure was assessed by self-reported exposure to vapours, gas, dust, or fumes at work. Gender, age, height, pack-years, and smoking status were used as covariates in our analysis. We used linear mixed effect models for continuous outcomes and generalised estimating equations for dichotomous outcomes due to the family structure.

Results There are 1,745 participants reporting occupational exposure at work and 2,149 participants reporting no occupational exposure. The association of occupational exposure on the FEV_1 and FEV_1/FVC was not significant in this cohort. However, self-reported occupational exposure was associated with a risk of chronic bronchitis after controlling for covariates (OR 1.55, 95% CI 1.19 to 2.01). Current smoking was associated with a greater risk of chronic bronchitis after controlling for covariates (OR 3.20, 95% CI 2.37 to 4.32). Those with combined occupational and smoking exposure had a 5 fold increased risk of chronic bronchitis compared those with neither occupational nor smoking exposure.

Conclusions Occupational exposure is significantly associated with chronic bronchitis. In addition to preventing smoking exposure, preventive strategies should be taken by clinicians and health policy-makers to reduce occupational exposures in workplace.

S133 COPD, OCCUPATION AND QUALITY OF LIFE AMONG RESIDENTS OF A HISTORICALLY INDUSTRIALISED AREA

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LGB Lewis, A Darby, J Waterhouse, D Fishwick. *Sheffield Teaching Hospitals, Sheffield, United Kingdom*

Introduction COPD is known to significantly affect health and quality of life, and is increasingly recognised to have a significant contribution from occupational exposures, particularly vapours, gases, dusts and fumes (VGDF). However, there is a paucity of evidence exploring the relationship between exposure to VGDF at work and health-related quality of life.

Methods A random selection of adults aged over 55 years in the Sheffield area of the UK were mailed a self-completed questionnaire (including questions on respiratory symptoms and physician-diagnosed disease, smoking and occupational history); responders were invited to perform lung function (FEV_1 and FVC), and to complete the EQ-5D-3L quality of life instrument. A measure of socioeconomic deprivation (SED), using the proportion of individuals within a participants postal code receiving income support, was also collected.

Results Out of 4000 questionnaires, 2001 were returned. From these, 623 provided further data as detailed above. 57% were male, 62% had been, or were, smokers, 24% had a physician diagnosis of COPD and 62% reported having been exposed to VGDF in the past. In univariate analysis those with COPD were more likely to be older, have smoked, been exposed to VGDF and have a lower quality of life (all $p<0.001$). A history of exposure to VGDF was associated with a lower quality of life ($p<0.001$). Both VGDF exposure and COPD were associated with greater levels of SED ($p<0.001$). A linear regression analysis was performed using the EQ_5D summary index as the dependant variable and age, gender, SED, smoking status, physician diagnosed COPD and percentage predicted FEV_1 and VGDF exposure as independent variables. Female gender, greater SED, VGDF exposure and physician diagnosed COPD were identified as predictors of reduced quality of life (as measured by EQ-5D VAS and summary index scores).

Discussion These results support the link between COPD and reduced quality of life, and additionally provide evidence to link occupational exposures to VGDF to a reduction in quality of life. These findings are of significance to health care professionals and policy makers, given future expectations for longer working lives.

S134 COMPARISON OF SPECIFIC INHALATION CHALLENGE (SIC) WITH OASYS ANALYSIS OF SERIAL PEF ANALYSIS IN THE DIAGNOSIS OF OCCUPATIONAL ASTHMA

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VC Moore, PS Burge. *Birmingham Heartlands Hospital, Birmingham, England*

Aims to compare Specific inhalation challeng (SIC) with serial measurements of PEF in the diagnosis of occupational asthma Methods; All workers having SIC with occupational agents over a 3 year period were included. Their serial PEF records made during exposure to the suspected agents where analysed using Oasys software. Positive records were those with any of the following; Oasys score >2.5; ABC score ≥15litres/min/hr or timepoint ≥1 non-waking reading Results; 211 challenges were done in 51 workers. 45/51 kept serial PEF records suitable for Oasys analysis. SIC and Oasys analysis were concordant in 17/45 (38%), particularly those exposed to isocyanates or metal-working fluids. SIC was positive in 5 workers with equivocal Oasys analysis in line with its known sensitivity of c70–80%. 12 workers had negative or non-asthmatic SIC responses with positive Oasys analysis. Further investigation showed that occupational asthma was the most likely diagnosis. Negative SIC responses were due failure to identify the correct causative agent or problems with reproducing the work exposures. This was a particular problem with cleaning agents where a protein source may be needed to convert chlorine-releasing agents to chloramines (as shown in swimming pool asthma). Nine workers had equivocal challenges and clearly positive Oasys analysis, helping to clarify the diagnosis in this group, again non-standard agents were common in this group.

Conclusion SIC and serial PEF analysis are complementary methods for validating a diagnosis of occupational asthma. SIC has particular problems when methods of exposure for newer agents have not been fully developed, Oasys analysis lacks sensitivity when current specificity is fixed at >90%.

Abstract S134 Table 1

	Oasys		
SIC	**Positive**	**Equivocal**	**Negative**
Positive	16	5	0
Equivocal	9	1	1
Rhinitis etc	5	0	0
Negative	7	1	1

S135 ASTHMA, OCCUPATION AND QUALITY OF LIFE IN A HISTORICALLY INDUSTRIALISED AREA OF THE UNITED KINGDOM

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LGB Lewis, A Darby, J Waterhouse, D Fishwick. *Sheffield Teaching Hospitals, Sheffield, United Kingdom*

Introduction Whilst harmful inhaled workplace exposures are known to be associated with either the development or aggravation

of asthma, little is known about the specific relationship between asthma, occupational exposures and health-related quality of life.
Methods Adults aged over 55 years in the Sheffield area of the UK were randomly mailed a self-completed questionnaire (including questions on respiratory symptoms and physician-diagnosed disease, smoking and occupational history); responders were invited to perform lung function (FEV_1 and FVC), and to complete the EQ-5D-3L instrument. A measure of socioeconomic deprivation (SED) derived from postal code data was also included.
Results 623 individuals provided data as detailed above. 57% were male, 62% were "ever smokers", 13% had an exclusive diagnosis of asthma (without any other respiratory disease) and 62% reported occupational exposure to vapours, gases, dusts or fumes (VGDF). A linear regression analysis was performed using the EQ-5D summary index score as the dependent variable and reported doctor diagnosed asthma, age, gender, percentage predicted FEV_1 (PPFEV),smoking history and prior history of VGDF exposure as independent variables. SED ($p<0.001$), Age ($p<0.001$), gender ($p<0.001$) and VGDF exposure ($p<0.001$) were all independently associated with a lower quality of life. Asthma ($p=0.394$) and smoking ($p=0.541$) were not.
Discussion These data do not support a link between self reported doctor diagnosed asthma and a reduction in quality of life in this population, after correcting for the effects of other relevant factors, although do support a link between occupational exposure to VGDF and a reduced health-related quality of life.

S136 PRE- AND POST-SPECIFIC INHALATIONAL CHALLENGE MEASUREMENTS OF FRACTIONAL EXHALED NITRIC OXIDE (FENO) IN THE DIAGNOSIS OF OCCUPATIONAL ASTHMA

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GI Walters, VC Moore, PS Burge. *Birmingham Heartlands Occupational Lung Disease Unit, Birmingham, UK*

Introduction The interpretation of Specific Inhalation Challenge (SIC) can be equivocal, particularly for late asthmatic reactions. It has been suggested that increases in FE_{NO} 24-hours post-challenge might help separate positive from negative challenges.
Methods We reviewed all positive and equivocal SIC tests with occupational agents between March 2008 and June 2012 from our tertiary referral centre. FE_{NO} was measured pre- and 24-hours post control and active challenges using a Niox Mino handheld machine at 50 ml/sec, compliant with ERS/ATS recommendations. Post-challenge changes >20% for FE_{NO} >50 ppb, or >10 ppb for <50 ppb, were counted as per ATS guidelines for a clinically significant change (1).
Results 24 patients had complete data related to control and active challenges, which were positive in 15 and equivocal in 9 cases. 13/24 patients had raised pre-control challenge FE_{NO} (mean=31.3) after adjusting for smoking and inhaled corticosteroid use. Increases in $FE_{NO,}$ more than the minimum clinically relevant difference, were seen after 13/24 control challenges: including 6/7 exposures to cleaning agents or hand gels and 2/6 unused metalworking fluids. 5/24 patients had a clinically significant increase in FE_{NO} after positive or equivocal challenges: including 1/4 challenges with isocyanates, 1/6 cleaning agents or hand gels, and 2/3 with used metalworking fluids. There was no statistically significant difference in mean percentage change in FE_{NO} between control and active challenges.
Conclusions The previously defined minimum clinically relevant difference for FE_{NO} was seen as commonly following control as active challenges. Measuring changes in FE_{NO} pre- and 24-hours post challenge to the diverse range of low molecular weight agents tested did not provide useful additional information for interpreting SIC responses.
Reference

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Treating asthma

P1 OMALIZUMAB IN PAEDIATRIC ASTHMA: IMPORTANCE OF MULTI-DISCIPLINARY ASSESSMENT TO IDENTIFY ELIGIBLE PATIENTS

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S Rao, L Barrett, S Frost. *Birmingham Children's Hospital NHS Trust, Birmingham, UK*

Omalizumab is effective treatment for patients with severe asthma. It is reserved for patients with truly severe disease as it is expensive and associated with significant treatment burden. Identifying this small number of patients in problematic severe asthma (PSA) group is challenging. We evaluated the impact of multi-disciplinary severe asthma (SA) protocol on identifying those with severe disease and on potential use of omalizumab.

After initial clinic visit, 19 patients aged between 6–15yrs with PSA underwent specialist nurse led SA protocol which included: assessment of clinical status, lung function, atopy, inhaler technique, asthma control test (ACT), quality of life (QoL); home visit for further assessment of environment, adherence and psychosocial comorbidities; school contact to address impact on education.

Before SA protocol, 17/19 patients met criteria for use of omalizumab. After SA protocol, only 6(35%)were eligible as modifiable factors were identified in 11(65%). They included poor adherence, ongoing allergen exposure and psychological issues. 5/6 patients received omalizumab and 4(80%) improved. Of other 11 patients, clinical status improved in 6 (55%), unchanged but stable in 4(36%), worsened in 1(9%) after assessment.

SA protocol identified modifiable factors in significant proportion of PSA children limiting omalizumab use to those with truly severe disease. Home visit assessment is essential to identify these factors which would otherwise be unrecognised. We hypothesise that proper recognition and management of these factors might not only ensure appropriate use of omalizumab but also improve its effectiveness.

P2 EVALUATION OF SWITCHING THERAPY FROM FIXED-DOSE COMBINATION INHALED CORTICOSTEROID/LONG-ACTING BETA2AGONIST TO BECLOMETASONE DIPROPIONATE/ FORMOTEROL (FOSTAIR 100/6®)

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[1]T Harris, [2]I Small, [3]D Price, [4]J Haughney, [5]D Ryan, [6]K Gruffydd-Jones, [7]M Ali, [7]S Musgrave, [7]J Brockman, [8]F Lavorini, [9]A Papi. *[1]Chiesi UK, United Kingdom; [2]NHS Grampain, United Kingdom; [3]University of Aberdeen, Aberdeen, United Kingdom; [4]International Primary Care Respiratory Group, United Kingdom; [5]Medical School Teviot Place, Edinburgh, United Kingdom; [6]Royal College of General Practitioners, United Kingdom; [7]Research in Real Life, Cambridge, United Kingdom; [8]University of Florence, Florence, Italy; [9]University of Ferrara, Ferrera, Italy*

Introduction and Objectives Asthma therapy reviews aim to minimise side-effects and achieve cost-effective asthma control. We set out to examine the impact of switching from a fixed dose combination therapy inhaled corticosteroid/long-acting β2 agonist (FDC ICS/LABA) therapy via dry power inhaler (DPI) or metered-dose inhaler (MDI) to beclometasone dipropionate/formoterol (BDP/FOR) via MDI at the same or reduced dose of ICS in stable patients.
Methods We utilised the UK's Optimum Patient Care Research Database to identify suitable primary care patients (aged 18–80 years) with asthma (diagnostic code and/or ≥2 asthma prescriptions in the last year) who were changed from FDC ICS/LABA to a prescription of BDP/FOR MDI at the same or lower BDP-equivalent ICS daily dose following a review of their existing ICS/LABA therapy. The number of exacerbations was measured as an outcome,